Intellectual Output 1

A6: Validation exercises

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HEARTHANDS SOLUTIONS
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Empowering innovation in STE(A)M
through IP awareness
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REVISION HISTORY

Version	Date	Author	Description	Action	Pages
1.0	18/02/2022	INOVA+	Creation	C	TBS
1.1	05/07/2022	HESO	Insert	I	17

(*) Action: C = Creation, I = Insert, U = Update, R = Replace, D = Delete

REFERENCED DOCUMENTS

ID	Reference		Title
1	2020-1-UK01-KA201-078934		IPinSTEAM Proposal
2			

APPLICABLE DOCUMENTS

ID	Reference		Title
1			
2			

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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.

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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.

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2.2 Questionnaire for teachers

	3d Printing	Environmental Engineering	Mathematics	Physics	Robotics	Social Studies
Which subject did you test?	X					

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.	0	1	3	7	8
The topics and contents of the course addressed were relevant	1	1	4	5	8
The contents of the course were consistent with the proposed learning objectives	0	1	2	8	8
The activities and exercises proposed during the lesson plans were adequate to the acquisition of knowledge on Intellectual Property (IP)	2	2	3	5	7
The contents of the lesson plans were relevant/significant for the teaching of IP concepts on STEAM subjects	0	0	4	6	9
The course workload was adequate	2	1	3	6	7
The proposed activities were original	0	1	3	7	8
The proposed activities were adapted to the target-group	1	1	4	5	8
The students were engaged in the course.	1	1	2	7	8

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The technologies, materials and resources used were effective.	0	2	3	6	8
My general evaluation of the course is positive.	1	2	3	6	7

Modules assessment

About Module 1 Design: The objectives of the module and the lesson plan were clear	0	1	3	7	8
About Module 1 Design: The content was organized and well planned	1	1	4	5	8
About Module 1 Design: The contents of the lesson plan were easily applied in the classroom	0	1	2	8	8
About Module 1 Design: The suggested materials to be presented were clear and appropriate	2	2	3	5	7
About Module 1 Design: The duration of the activities was adequate according to the objectives	0	0	4	6	9
About Module 1 Design: The key questions for knowledge testing were adequate	2	1	3	6	7
About Module 2 Trademarks: The objectives of the module and the lesson plan were clear	0	1	3	7	8
About Module 2 Trademarks: the content was organized and well planned	1	1	4	6	7
About Module 2 Trademarks: The contents of the lesson plan were easily applied in the classroom	1	1	2	9	6
About Module 2 Trademarks: The suggested materials to be presented were clear and appropriate	0	2	3	8	6
About Module 2 Trademarks: The duration of the activities was adequate according to the objectives	1	2	3	7	6
About Module 2 Trademarks: The key questions for knowledge testing were adequate	1	3	3	7	5
About Module 3 Copyright: The objectives of the module and the lesson plan were clear	1	2	2	7	7

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About Module 3 Copyright: The content was organized and well planned	1	1	2	8	7
About Module 3 Copyright: The contents of the lesson plan were easily applied in the classroom	1	2	3	6	7
About Module 3 Copyright: The suggested materials to be presented were clear and appropriate	1	2	3	9	4
About Module 3 Copyright: The duration of the activities was adequate according to the objectives	1	2	3	6	7
About Module 3 Copyright: The key questions for knowledge testing were adequate	0	1	3	7	8
About Module 4 Patents: The objectives of the module and the lesson plan were clear	1	1	4	5	8
About Module 4 Patents: The content was organized and well planned	0	1	2	8	8
About Module 4 Patents: The contents of the lesson plan were easily applied in the classroom	2	2	3	5	7
About Module 4 Patents: The suggested materials to be presented were clear and appropriate	0	0	4	6	9
About Module 4 Patents: The duration of the activities is adequate according to the objectives	2	1	3	6	7
About Module 4 Patents: The key questions for knowledge testing were adequate	0	1	3	7	8

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2.3 Questionnaire for students

Which subject did you test?	3d Printing	Environmental Engineering	Mathematics	Physics	Robotics	Social Studies
	X					

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	0	0	1	1	4
The course helped me to understand better the importance of Intellectual Property in STEAM subjects	0	0	2	3	1
The course gave me important knowledge and resources to apply Intellectual Property in STEAM subjects	0	0	1	2	3
The topics and contents of the course were relevant	0	0	0	3	3
The duration of the course was adequate to its objectives	0	1	1	2	2
The proposed activities were original	0	0	0	5	1
I enjoyed to participate in the course	0	0	0	1	5
The teacher(s) was/were knowledgeable on the theme of Intellectual Property application in STEAM subjects	0	0	0	1	5
The teacher(s) was/were available for any clarification	0	0	0	0	6

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The technologies, materials and resources used were effective	0	0	1	2	4
I would recommend this course to others	0	0	1	2	3
My general evaluation of the course is positive	0	1	1	2	2

Modules assessment

About Module 1 Design: the objectives of the module and the lesson plan were clear	0	1	2	2	1
About Module 1 Design: the content was organized and well planned	0	0	2	1	3
About Module 1 Design: the materials and resources were appropriate	0	1	2	2	1
About Module 1 Design: the duration of the activities was adequate according to the objectives	1	1	1	2	1
About Module 1 Design: I was confident in completing the key questions for knowledge testing	0	1	2	2	1
About Module 1 Design: my evaluation of the module is positive	0	1	2	2	1
About Module 2 Trademarks: the objectives of the module and the lesson plan were clear	0	0	2	1	3
About Module 2 Trademarks: the content was organized and well planned	0	1	2	2	1
About Module 2 Trademarks: the materials and resources were appropriate	1	1	1	2	1
About Module 2 Trademarks: the duration of the activities was adequate according to the objectives	0	1	2	2	1

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|					
About Module 2 Trademarks: I was confident in completing the key questions for knowledge testing	0	1	2	2	1
About Module 2 Trademarks: my evaluation of the module is positive	0	0	2	1	3
About Module 3 Copyright: the objectives of the module and the lesson plan were clear	0	0	2	3	1
About Module 3 Copyright: the content was organized and well planned	0	1	1	2	2
About Module 3 Copyright: the materials and resources were appropriate	0	1	2	2	1
About Module 3 Copyright: the duration of the activities was adequate according to the objectives	0	1	2	2	1
About Module 3 Copyright: I was confident in completing the key questions for knowledge testing	0	0	2	1	3
About Module 3 Copyright: my evaluation of the module is positive	0	1	2	2	1
About Module 4 Patents: the objectives of the module and the lesson plan were clear	1	1	1	2	1
About Module 4 Patents: the content was organized and well planned	0	1	2	2	1
About Module 4 Patents: the materials and resources were appropriate	0	1	2	2	1
About Module 4 Patents: the duration of the activities was adequate according to the objectives	0	0	2	1	3
About Module 4 Patents: I was confident in completing the key questions for knowledge testing	0	1	2	2	1

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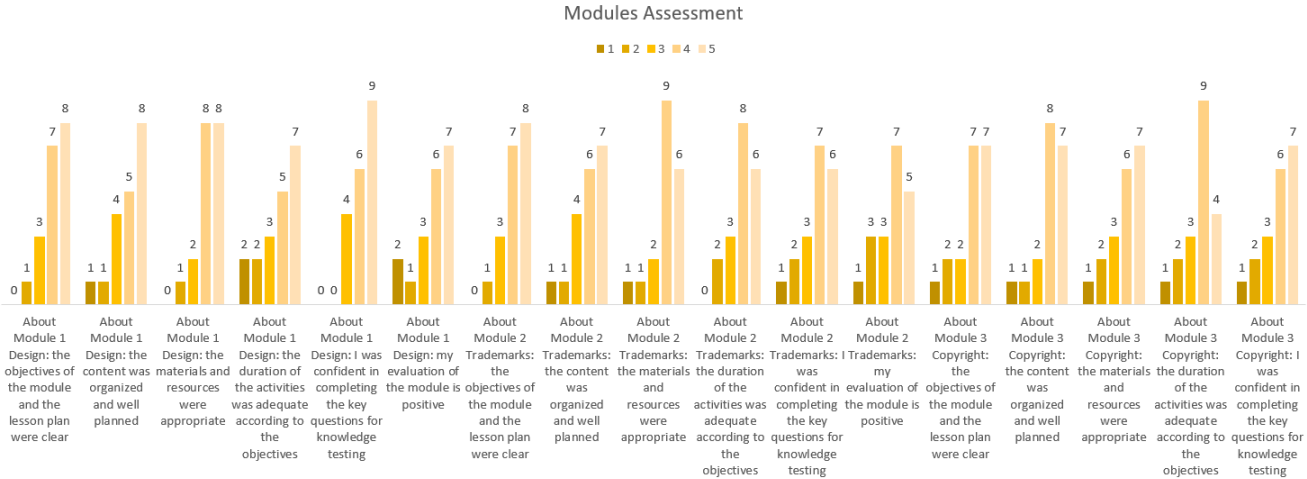| About Module 4 Patents: my evaluation of the module is positive	0	1	2	2	1

3. Conclusions

3.1 Conclusions for teachers

Regarding the conclusion of the questionnaire distributed among teachers, the average rate of the courses was **4.01/5**, with teachers being more enthusiastic about the lesson plans due to their high applicability in their regular work. A safe conclusion is that the course adds value to STE(A)M teaching introducing new concepts that can better engage students and teachers in the learning process.
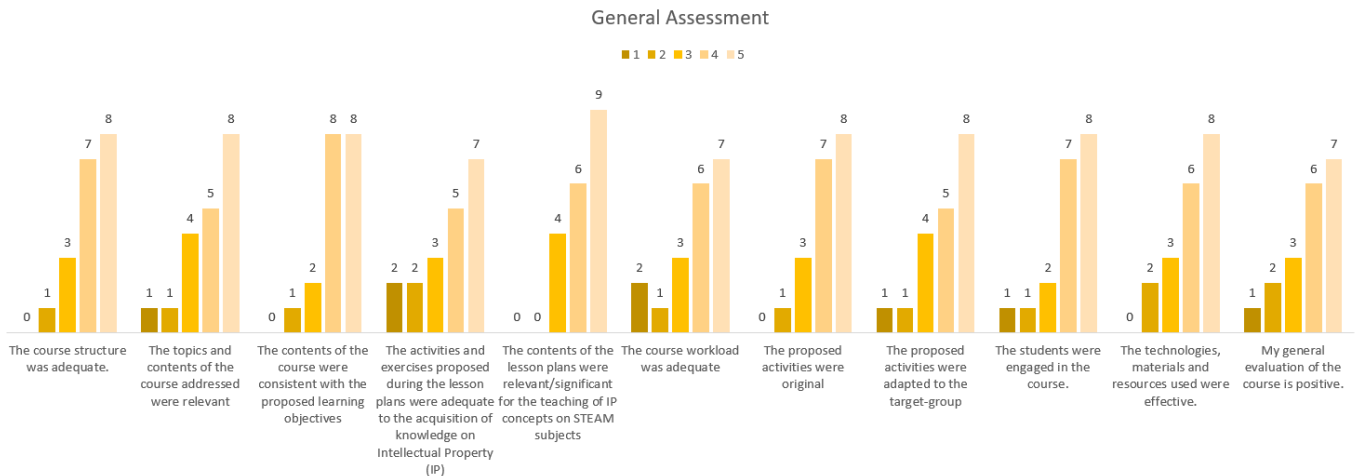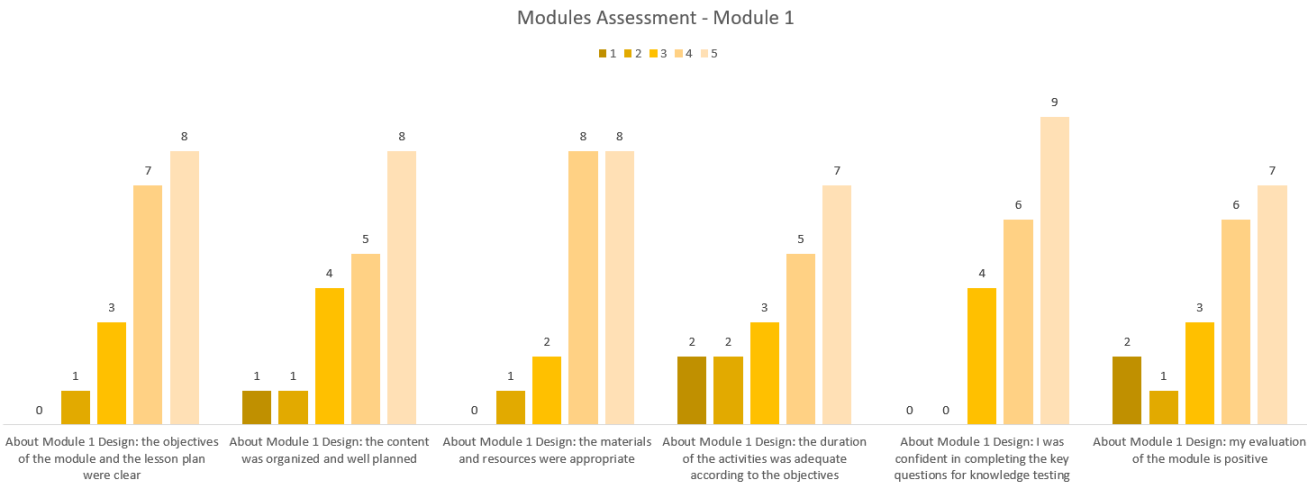

Graph 1. General assessment by the teachers

With regards to the modules' assessment, the overall assessment has been relatively high with almost all participants rating the modules with 4 or 5. That being said, it seems that all four modules have a practical impact in teachers' work and can be easily applied to their lessons. In particular, the combination of theoretical knowledge with hands-on lesson plans was much appreciated by the participants.
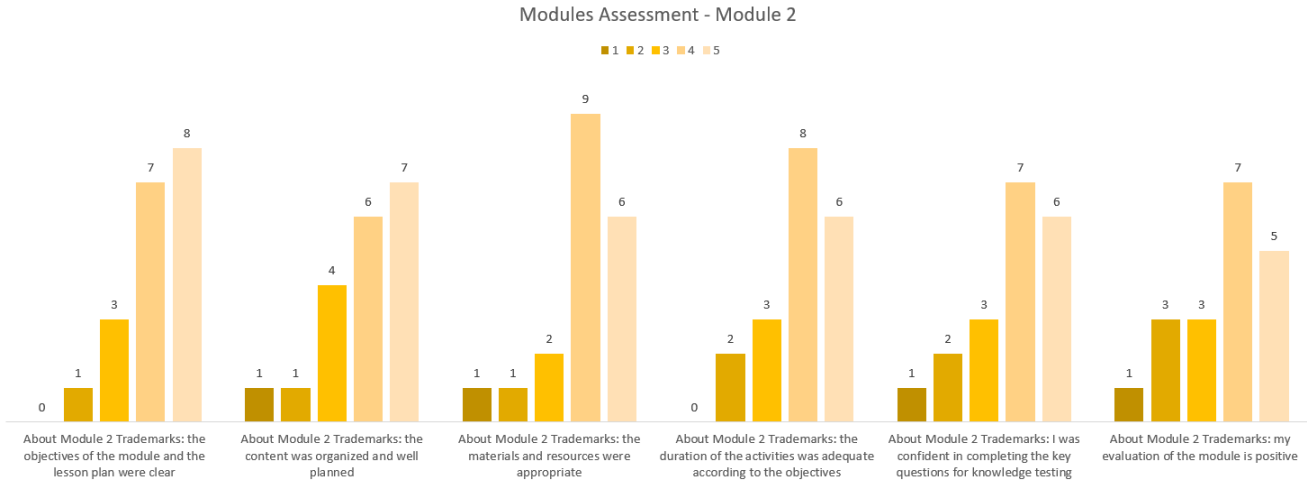
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Modules Assessment

Graph 2. Modules' assessment by the teachers

In particular, the average rate of Module 1 - Design was **4.01/5**, with teachers feeling more confident through the knowledge assessment tool of the module.
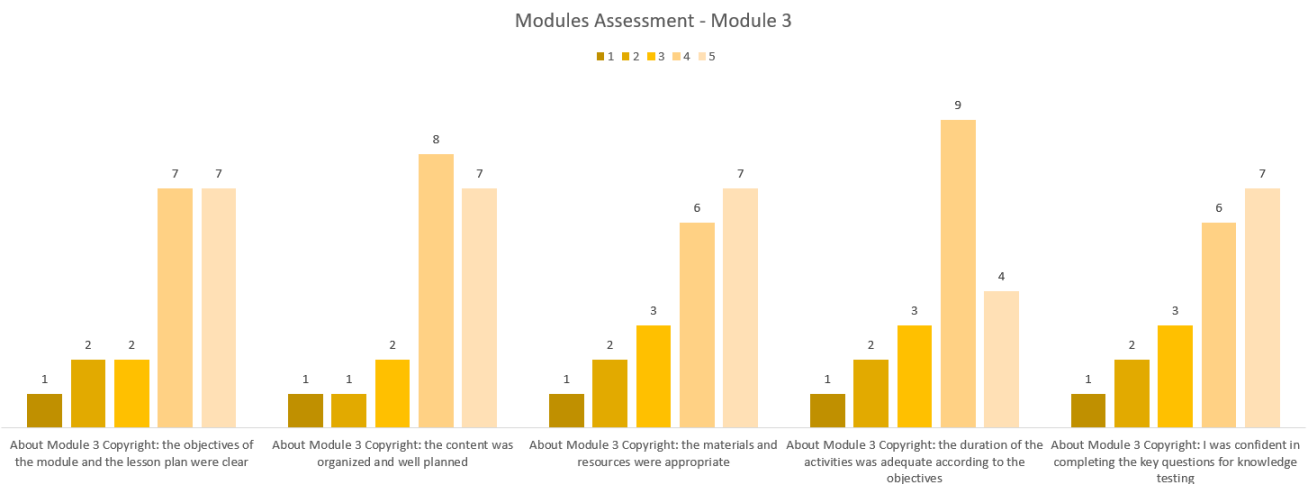
Modules Assessment - Module 1

Graph 3. Module 1 assessment by the teachers

The average rate of Module 2 – Trademarks was **3.89/5**, which is quite high given that the concepts was new to many of the respondents.

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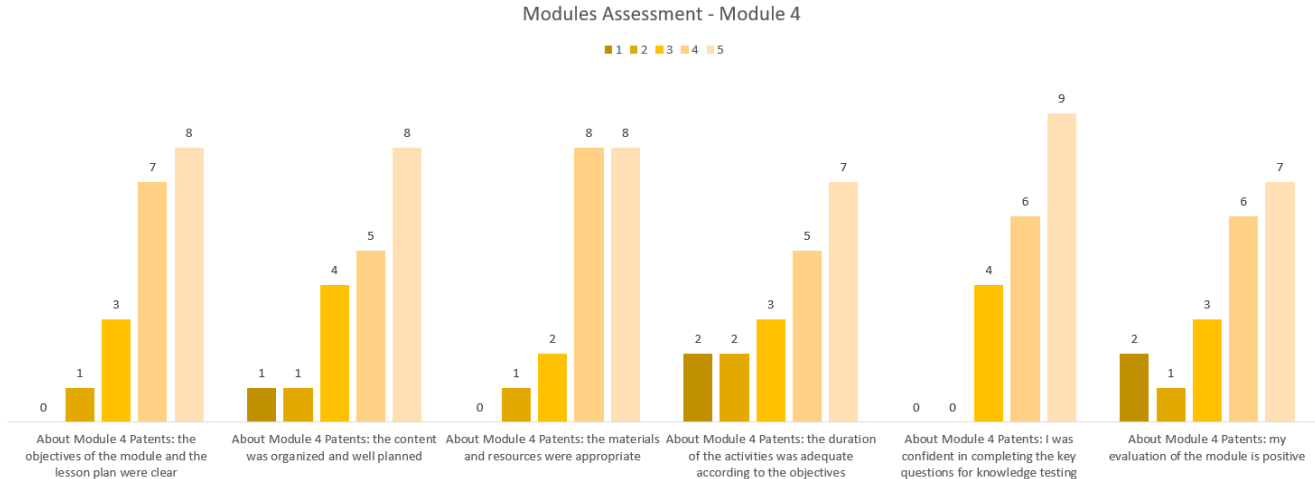**Modules Assessment - Module 2**

■1 ■2 ■3 ■4 ■5

Graph 4. Module 2 assessment by the teachers

Regarding the third module – Copyright, the average was **3.85/5**, with the most positive comments being related to the efficient organization and structure of the course.

Modules Assessment - Module 3

■1 ■2 ■3 ■4 ■5

*Graph 5. Module 3 assessment by the teachers*

Last, but not least, the average evaluation rate for Module 4 – Patents was again **4.01/5**, with teachers claiming that the materials and resources used were not only well-planned but also appropriate in comparison to their purposes and target group.

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Modules Assessment - Module 4

■ 1 ■ 2 ■ 3 ■ 4 ■ 5

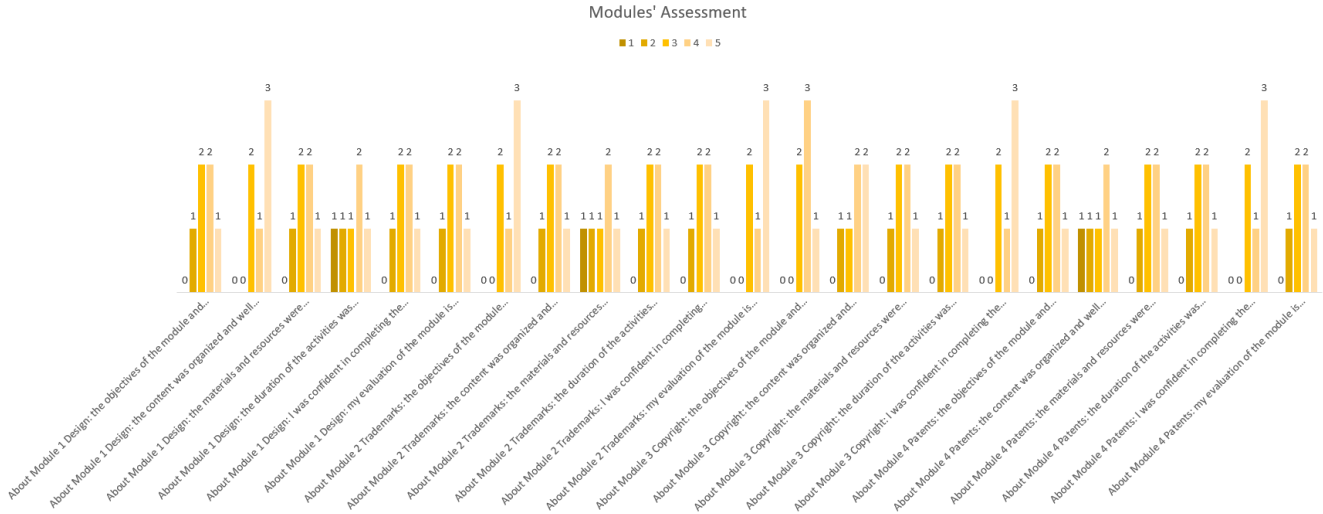*Graph 6. Module 4 assessment by the teachers*

3.2 Conclusions for students

When it comes to the evaluation of behalf of students, the average rate of the course was **4.37/5**, which leads to the conclusion that students actually enjoyed their participation in the course and established its added value.
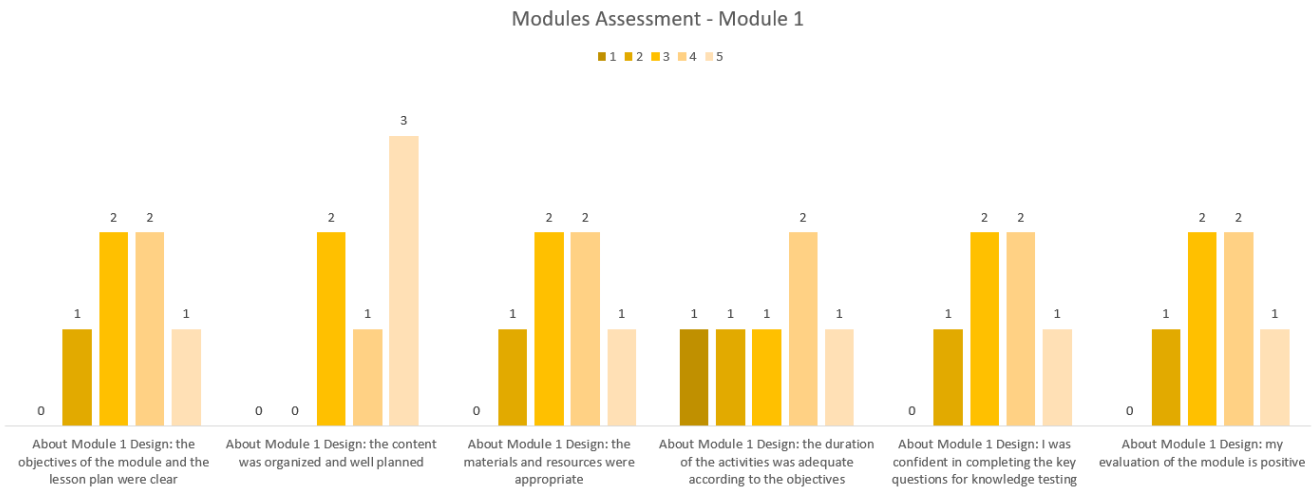
General Assessment

■ 1 ■ 2 ■ 3 ■ 4 ■ 5
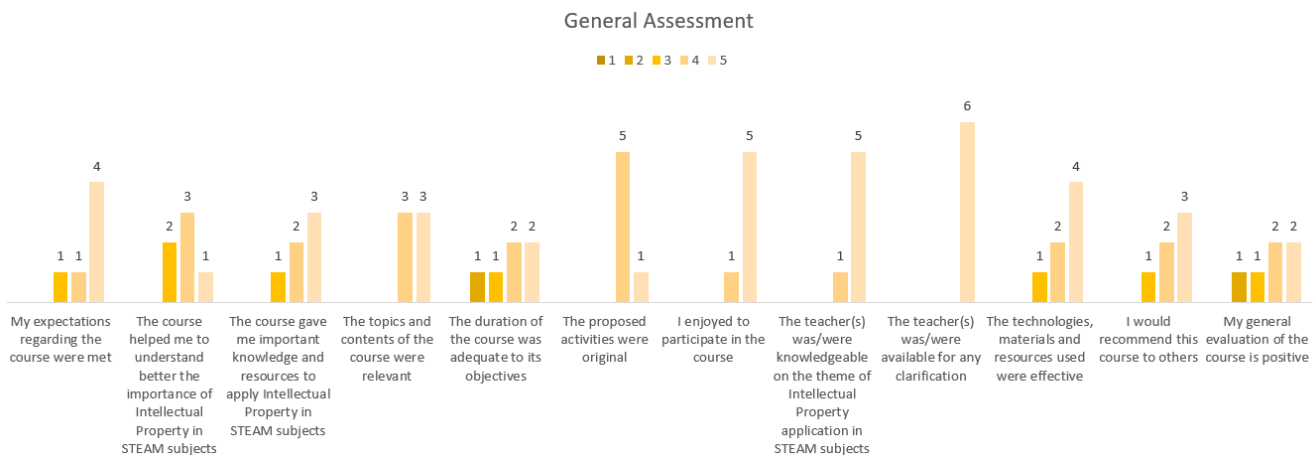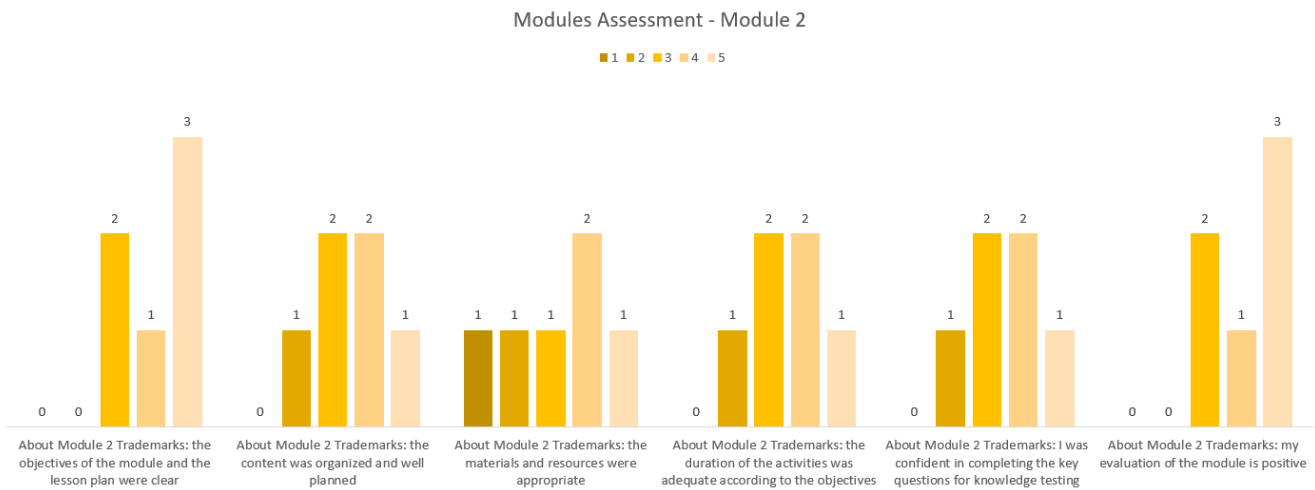

Graph 7. General assessment by the students

With reference to the modules' assessment, the overall rate was **3.63/5** which is relatively high provided the difficulty in conceptualizing and understanding the IP concepts.
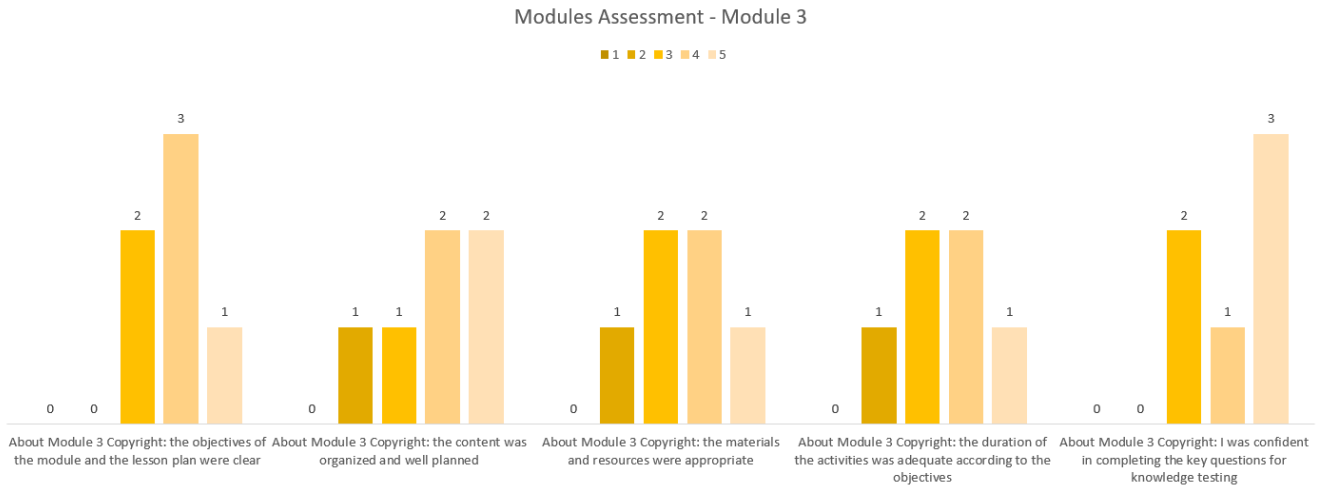
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Modules' Assessment

Graph 8. Modules' assessment by the students

Modules Assessment - Module 1

Graph 9. Module 1 assessment by the students

Modules Assessment - Module 2

Graph 10. Module 2 assessment by the students

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Modules Assessment - Module 3

■1 ■2 ■3 ■4 ■5

Graph 11. Module 3 assessment by the students

Modules Assessment - Module 4

■1 ■2 ■3 ■4 ■5
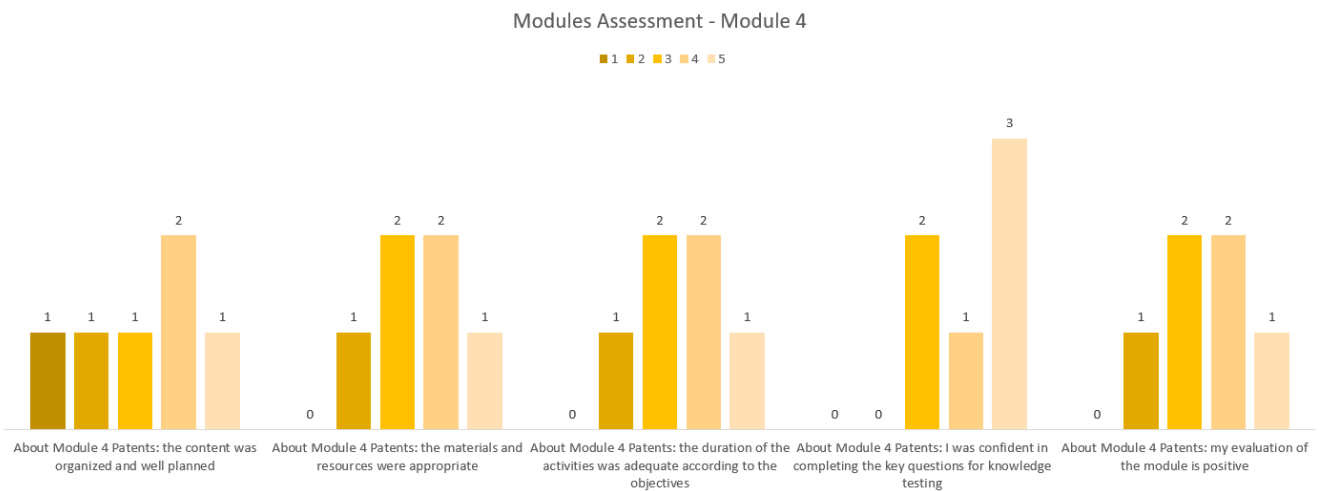
Graph 12. Module 4 assessment by the students

The results depicted that students were more familiar with the module of Copyright and better understood its use in STE(A)M subjects, while some definitions especially regarding trademarks were introduced for the first time.

It is worthwhile to mention that teachers were fully supportive towards their students with a view to help them embrace IP concepts in their future work and activities. This, together with the clear structure of the materials and the practical character of the lesson plans, increased the level of knowledge and understanding among students.