



**BOOSTING THE GREEN FUTURE
VIA UNIVERSITY MICRO-CREDENTIALS**
Reference Number: 2022-1-BG01-KA220-HED-000085821

DELIVERABLE № 4.3
B-Green-ED Experimentation (Piloting)
International Report



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Erasmus+ Programme: KA 220 - Higher Education

Reference Number: 2022-1-BG01-KA220-HED-000085821

Document description:	
Elaborated by	UPV, all Partners as contributors
Work Package No. and title	WP4 - Exploitation
Deliverable N° and title	Dev. 4.3 B-Green-ED Experimentation (Piloting) Report
Dissemination level	PU
Deliverable target group	All interested parties
Activity related	Piloting the B-Green-ED micro-credential courses with the participation of lecturers and students
Language	EN







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INTRODUCTION

The European Commission has recognized the key role standards play on the internal market and internationally, for boosting the competitiveness of the economy and applying innovations, however, the impact of standards is highly dependent on the level of knowledge among the workforce.

Therefore, the project consortium chose to address as a main priority environment and fight against climate change as the project envisages elaboration of training materials for higher education courses related to standards in the areas of management systems and environmental standards and support for the university lecturers for producing innovative micro-credentials.

The project contributes also to two additional priorities in the area of HE – Stimulating innovative learning and teaching practices and supporting digital and green capabilities of the higher education sector. The project encourages an innovative method of teaching at universities by using digital technologies. The training materials and the training will be performed online, some of the digital materials will become open educational resources, which could be further used by other universities or interested educational institutions.

The main objective of the project is to boost the European green economy and climate neutrality through the development of innovative HE practices related to the implementation of micro-credentials designed in cooperation with European standards bodies that meet the market needs and facilitate the provision of flexible, accessible, and inclusive education in relevant industry/sector standards that support the transition to a green and digital economy.

In the framework of this aim the achievement of the following objectives has been foreseen:

- encouragement of innovation in the provision of flexible training opportunities that enhance the existing HE degree programs via the design and development of curricula for micro-credential courses aiming to overcome skills mismatches related to management, environmental and green standards, and standardization;
- supporting the inclusive and resilient remote high-quality learning and teaching through the establishment of a digital learning platform that provides a tailored virtual learning environment that facilitates access to HE, including for those from disadvantaged backgrounds;
- fostering the usage of digital technologies and e-learning standards for the development of high-quality interoperable and re-usable learning content and educational tools;
- strengthening the relation academia-industry to provide more inclusive curricula and more flexible learning pathways that meet market needs with responsiveness and agility.

Part 1 – General Information

1.1.- Quality Assurance Measurement and the Experimentation (Piloting) Report

Quality assurance (QA) is any systematic process determining whether a product or service meets specified requirements. The ISO (International Organization for Standardization) is a driving force behind QA practices and mapping the methods used to implement QA. QA is often paired with the ISO 9000 international standard. The ISO 9000 family consists of the world's best-known standard for quality management systems (QMS), ISO 9001, and a set of supporting standards on quality management, all published by ISO/TC 176 and its subcommittees.

DoW/DoA mentions that after the training feedback will be collected. Thus, this national piloting report summarizes the data collected at the national level from the BG, LT, ES, and RO teams. QET will analyze the achieved and expected results based on the quantitative and qualitative indicators:

- quantitative – e.g.: number of lecturers and students involved;
- qualitative – e.g.: elaborated materials' comprehensiveness; materials' coherence with the learning objectives and target groups' expectations; level of participation and feedback provided by participants in the training; participants' satisfaction; didactic model effectiveness; level of transferability in other domains.

Therefore, the measurement of Quality Assurance in the B-Green-ED projects helps us to guarantee the designing of micro-credentials that are clear of defects and meet the needs and expectations of target groups.

This report shows the quality of the results by collecting target groups' feedback and the set of recommendations thoroughly driven by collecting it.

During the B-GREEN-ED project, 12 micro-credentials have been implemented (Table 1):

Table 1.- List of micro-credentials implemented in the B-GREEN-ED project

Country	Partner	MC Course Name
Bulgaria	BFU	1 st Course (BFU) - Circular Economy, Business Models and Green Standards
		2 nd Course (BFU) - Electronics and Communication of Renewable Energy Sources
		3 rd Course (BFU) - Engineering and Exploitation of Energy Systems
Lithuania	MRU	1 st Course (MRU) -Andragogical technologies and safe environment
		2 nd Course (MRU) - Social responsibility and career management
		3 rd Course (MRU) - Social responsibility in family work
Romania	USVT	1 st Course (USVT) - Risk Management in Bioeconomy course
		2 nd Course (USVT) - Carbon footprint assessment
		3 rd Course (USVT)- Biomass and Good Practices in the Management of Degraded Lands and Desertification
Spain	UPV	1 st Course (UPV) - Quality Management Systems standards
		2 nd Course (UPV) - Environmental Management Systems standards
		3 rd Course (UPV) - Waste Management and Industrial Pollution Control Standards

1.2.- Qualitative and Quantitative Data

This section is about the results of the implemented micro-credentials strategy. In this process, the officially registered micro-credential courses were approved through pilot training where took part educators and students from all partner universities took. The piloting activities are realized in strong collaboration between universities BFU, MRU, LSU, UPV, and standardization bodies BDS and ASRO. The detailed results of the satisfaction surveys are provided inside each specific National Report, which has been issued by every university partner of the project.

1.2.1.- List of qualitative indicators

The following **qualitative indicators** are used to measure the level of the achievement of the objectives:

- relevance of the micro-credential courses regarding the industry/sector skills sets demands and standards as well as the strategic goals and market needs at local /national/international level;
- quality and efficacy of the approaches and tools for information and data collecting;
- level of participation and appreciation of the piloting sessions;
- the quality of the feedback, data, and specific comments and suggestions collected during the piloting;
- level of satisfaction of the stakeholders involved in the piloting;
- transferability of the outcomes (courses and strategies);
- stackability and portability of the micro-credential courses developed.

1.2.2.- List of quantitative indicators

For evaluating the quality level of the outputs, and the achievement of the objectives the following **quantitative indicators** are considered:

- the number of target group representatives involved in the piloting;
- the number of questionnaires and data-collecting tools developed;
- the number of micro-credential e-courses' instances piloted and approbated;
- the number of higher education micro-credential courses in standardization and management, environmental, and green standards registered in the online B-Green-ED Catalogue.

1.3.- Comparative analysis of the B-Green-Ed piloting

This part includes overall results and comparisons from each partner analysis. These results are described in detail in each National Report, which has been issued by each specific partner, following the results of the specific satisfaction questionnaires performed to every course. The B-GREEN-ED micro-credential courses were piloted by all 4 Universities (BFU, MRU, USVT, UPV) and this document section presents the results of the comparative analysis of the feedback from trainees as well as the instructors involved in the piloting of the MC courses.

The micro-credential courses have been piloted via an online platform, and the satisfaction of the participants (students) has been measured using two types of satisfaction surveys:

- For all the 4 universities, the survey specifically designed by the B-GREEN-ED project, that has been used by all the university partners in order to be able to compare in a uniform way the results obtained by all the courses. This survey included topics about the design, structure, feasibility, relevance, viability, overall satisfaction, suitability, efficacy, and quality, and identified aspects for improvements.
- Some universities require the realization of a specific satisfaction survey as a part of their own QA process. The content of this survey is included in their corresponding National Report.

Table 2 and Figure 2 provide the information about the exact number of participants in every micro-credential course, as well as the number of the participants in the satisfaction surveys.

Table 3 and Figure 3 show these values aggregated by partner and for the whole group of the 12 B-Green-Ed courses.

Table 2.- Participants and satisfaction surveys for every micro-credential course

	BFU-1	BFU-2	BFU-3	MRU-1	MRU-2	MRU-3	USVT-1	USVT-2	USVT-3	UPV-1	UPV-2	UPV-3
Total number of participants in each course	23	23	31	54	18	11	114	59	55	29	36	41
Total number of participants that completed the satisfaction survey	16	17	26	43	18	11	65	28	25	18	22	27
Ratio of participation in the satisfaction survey	69.6%	73.9%	83.9%	79.6%	100.0%	100.0%	57.0%	47.5%	45.5%	62.1%	61.1%	65.9%

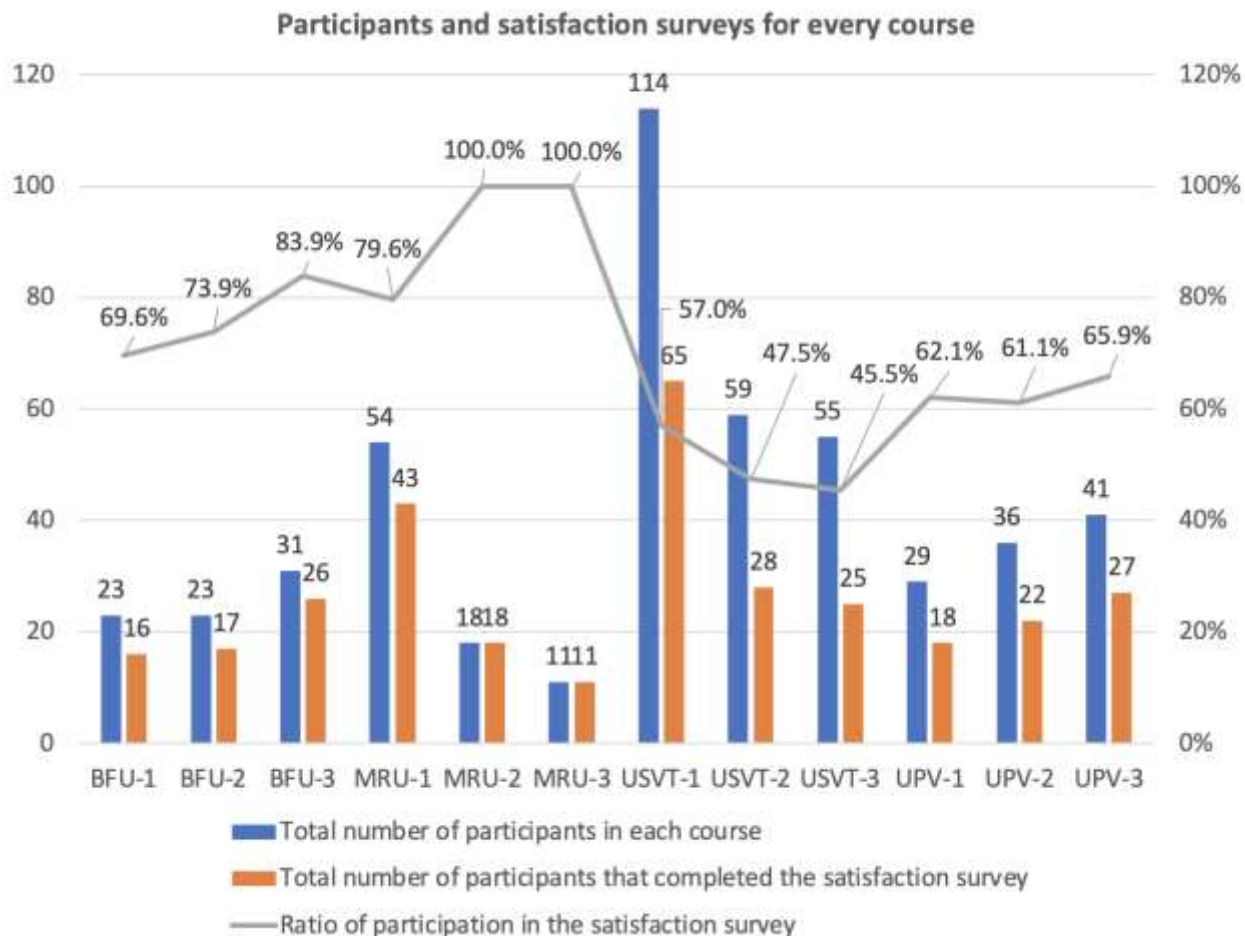


Figure 2.- Participants and satisfaction surveys for every micro-credential course

Table 3.- Participants and satisfaction surveys for every partner and for the whole project

	BFU	MRU	USVT	UPV	B-GREEN-ED
Total number of participants in the 3 courses	77	83	228	106	494
Total number of participants that completed the satisfaction survey	59	72	118	67	316
Ratio of participation in the satisfaction survey	76.6%	86.7%	51.8%	63.2%	64.0%

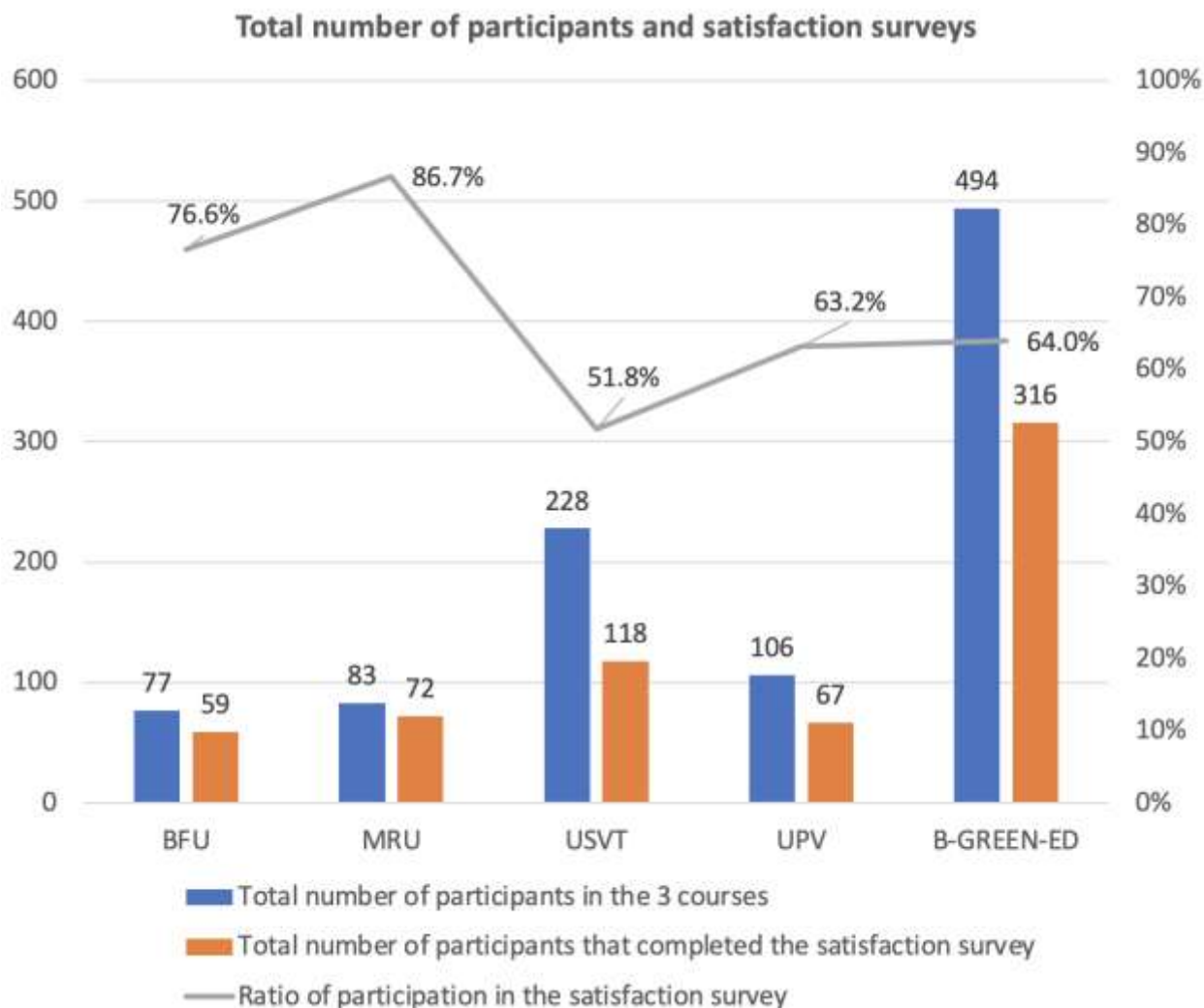


Figure 3.- Participants and satisfaction surveys for every partner and for the shole project

A total number of 494 students have participated in the micro-credential courses organized during the B-Green-Ed project, largely exceeding the expectations.

Besides, the overall ratio of participation in the satisfaction surveys is 64%, which is a very high value that provides robustness to the conclusions of the surveys that is analyzed in the following sections.

1.3.1.- Structure and content of the satisfaction surveys

The B-GREEN-ED satisfaction surveys include 11 different questions that are grouped inside 3 sections:

- **Section 1: Design, structure, and feasibility**

Question 1.- The course was well-designed and satisfied my need to learn more about European and international standards in ecology and management.

Question 2.- The topics covered were relevant to the course, and the information was presented at an appropriate level of complexity.

Question 3.- The micro-credential course has clear instructions and an easy-to-follow navigation structure.

- **Section 2: Relevance, viability, and overall satisfaction**

Question 4.- This micro-credential course was engaging and interesting, providing useful and relevant information for my needs.

Question 5.- Thanks to the course organized into micro-credits, I have a clear understanding of the subject.

Question 6.- My expectations were met in this course organized on microcredits

- **Section 3: Suitability, efficacy, and quality**

Question 7.- The course provided me with a significant amount of useful and practice-oriented information

Question 8.- My knowledge and understanding related to the ecological and management standards of the European and international sector/industry addressed in the course improved and expanded

Question 9.- The online tools and facilities for interacting with my instructor and other classmates are easy to use

Question 10.- The recommended additional materials and resources are relevant and contribute to a deeper understanding of the concepts

Question 11.- The educational content was presented in a clear and easily understandable language with an appropriate level of difficulty

The following sections summarize the results obtained by the satisfaction surveys, comparing between them the results obtained by the courses organized by every partner university. A detailed analysis of the individual courses by partner is included inside the corresponding National Reports.

1.3.2.- Section 1: Design, structure, and feasibility

Figure 4 summarizes the results obtained for the questions included in Section 1 by each one of the partners:

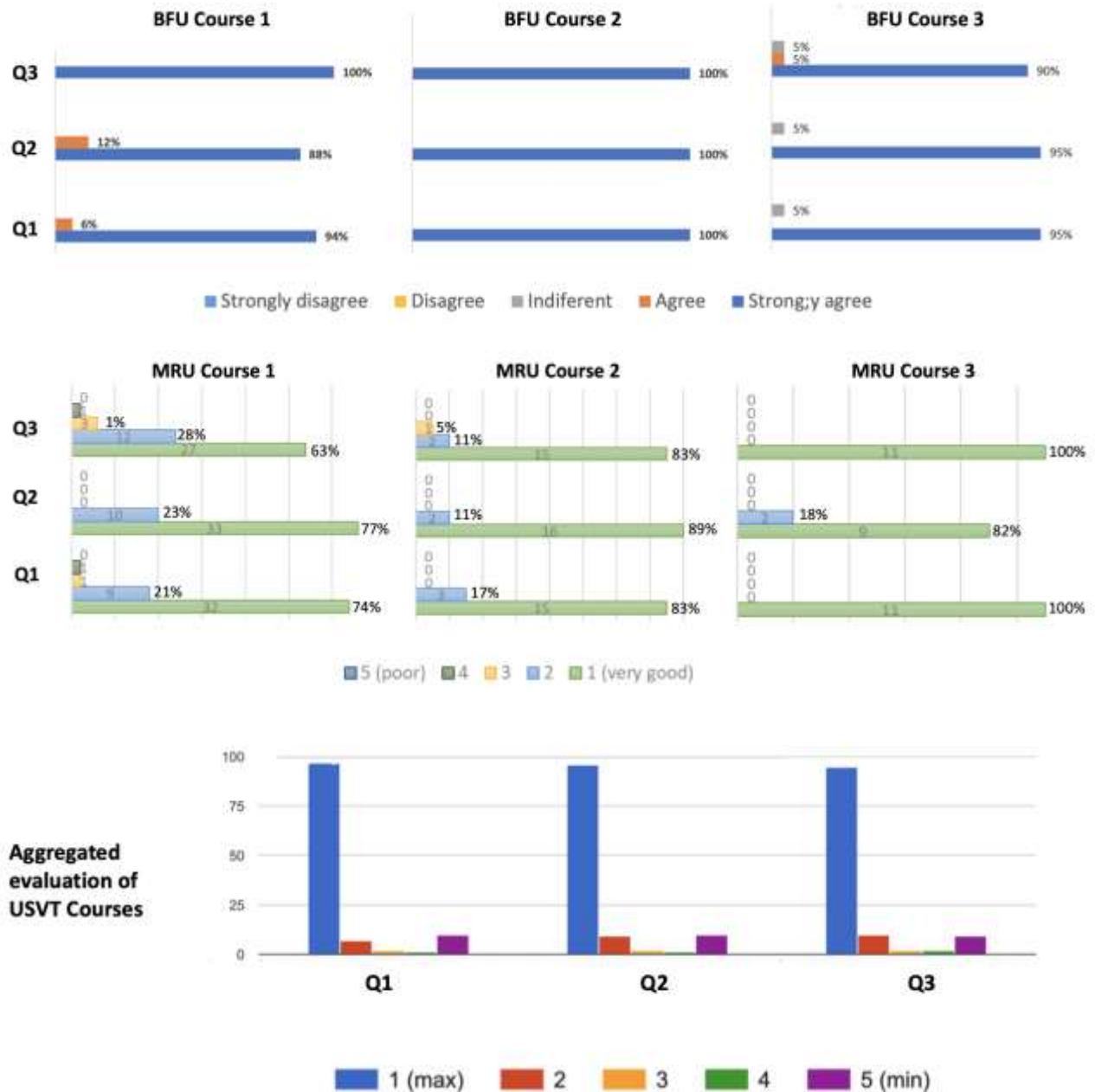


Figure 4.- Summary of the results obtained for Section 1 by each one of the partners

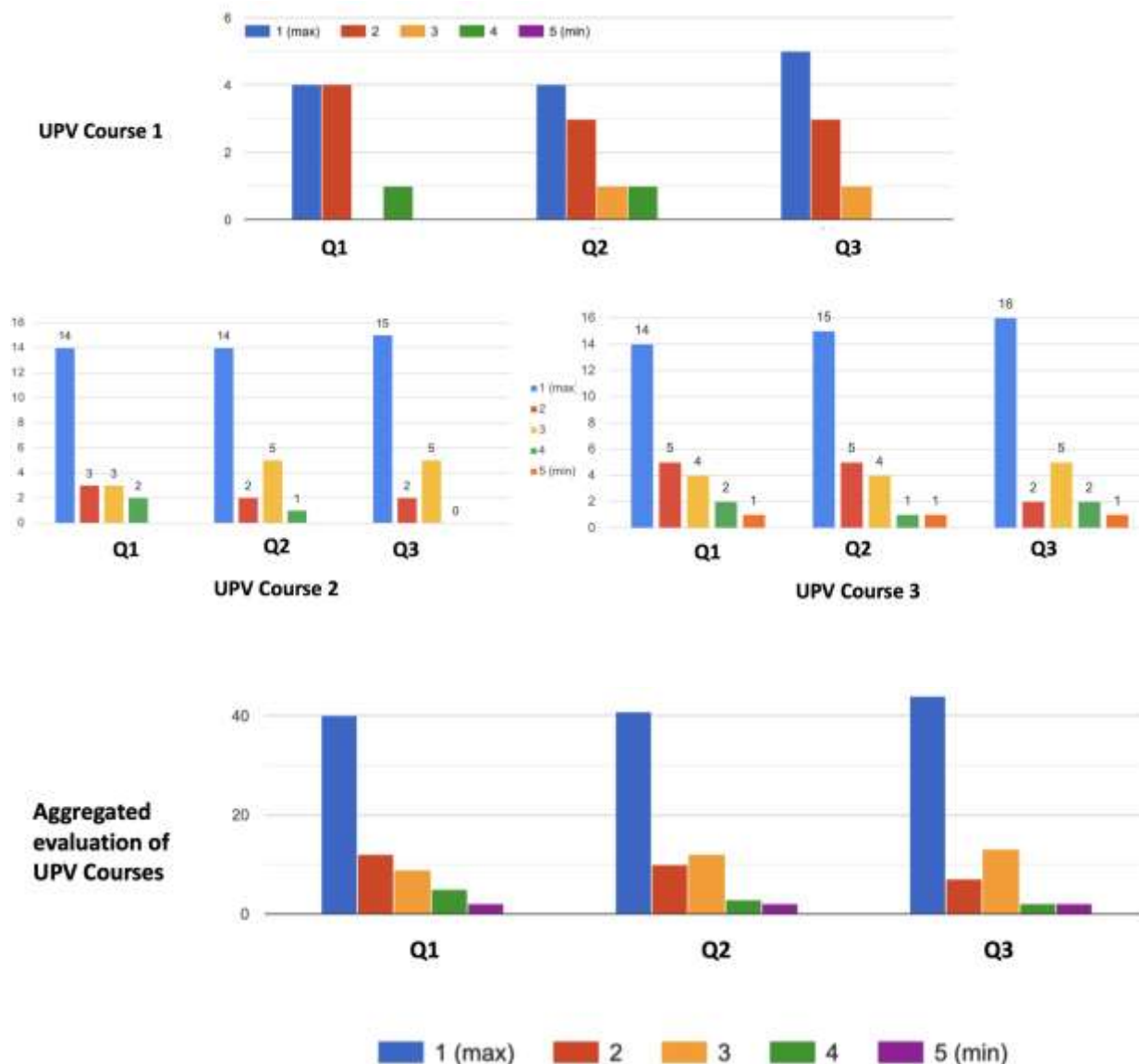


Figure 4.- Summary of the results obtained for Section 1 by each one of the partners (cont.)

Table 4 shows the aggregated results obtained for questions Q1, Q2 and Q3, for the set of 3 courses organized by every partner.

Table 5 shows the aggregated results obtained for questions Q1, Q2 and Q3, for the set of 12 courses organized inside the B-Green-Ed project.

Table 4.- Satisfaction survey results for Q1, Q2 and Q3, aggregated by partner

	Set of 3 BFU Courses					Set of 3 MRU Courses					Set of 3 USVT Courses					Set of 3 UPV Courses				
	Very High	High	Normal	Low	Very Low	Very High	High	Normal	Low	Very Low	Very High	High	Normal	Low	Very Low	Very High	High	Normal	Low	Very Low
Q1.- The courses were well-designed and satisfied my need to learn more about European and international standards in ecology and management	57	2	0	0	0	58	12	1	1	0	98	7	2	1	10	41	12	9	5	0
Q2.- The topics covered were relevant to the course, and the information was presented at an appropriate level of complexity	56	3	0	0	0	58	14	0	0	0	96	9	2	1	10	42	10	12	3	0
Q3.- The micro-credential courses have clear instructions and an easy-to-follow navigation structure	57	1	1	0	0	53	14	4	1	0	95	10	3	1	9	45	7	13	2	0

Table 5.- Satisfaction survey results for Q1, Q2 and Q3, aggregated for the overall set of 12 courses of the project

	Overall set of 12 BGREENED Courses					# responses
	Very High	High	Normal	Low	Very Low	
Q1.- The courses were well-designed and satisfied my need to learn more about European and international standards in ecology and management	254	33	12	7	10	316
Q2.- The topics covered were relevant to the course, and the information was presented at an appropriate level of complexity	252	36	14	4	10	316
Q3.- The micro-credential courses have clear instructions and an easy-to-follow navigation structure	250	32	21	4	9	316

Results shown in tables 4 and 5 allow to extract interesting conclusions about the specific questions Q1, Q2 and Q3, as explained below.

1.3.2.1- Question 1. “The course was well-designed and satisfied my need to learn more about European and international standards in ecology and management”

Figure 5 shows the distribution of marks given by the satisfaction surveys to Question 1 and for every course.

Figure 6 shows the distribution of marks given by the satisfaction surveys to Question 1 aggregating the results for the overall set of 12 courses organized inside the B-Green-Ed project.

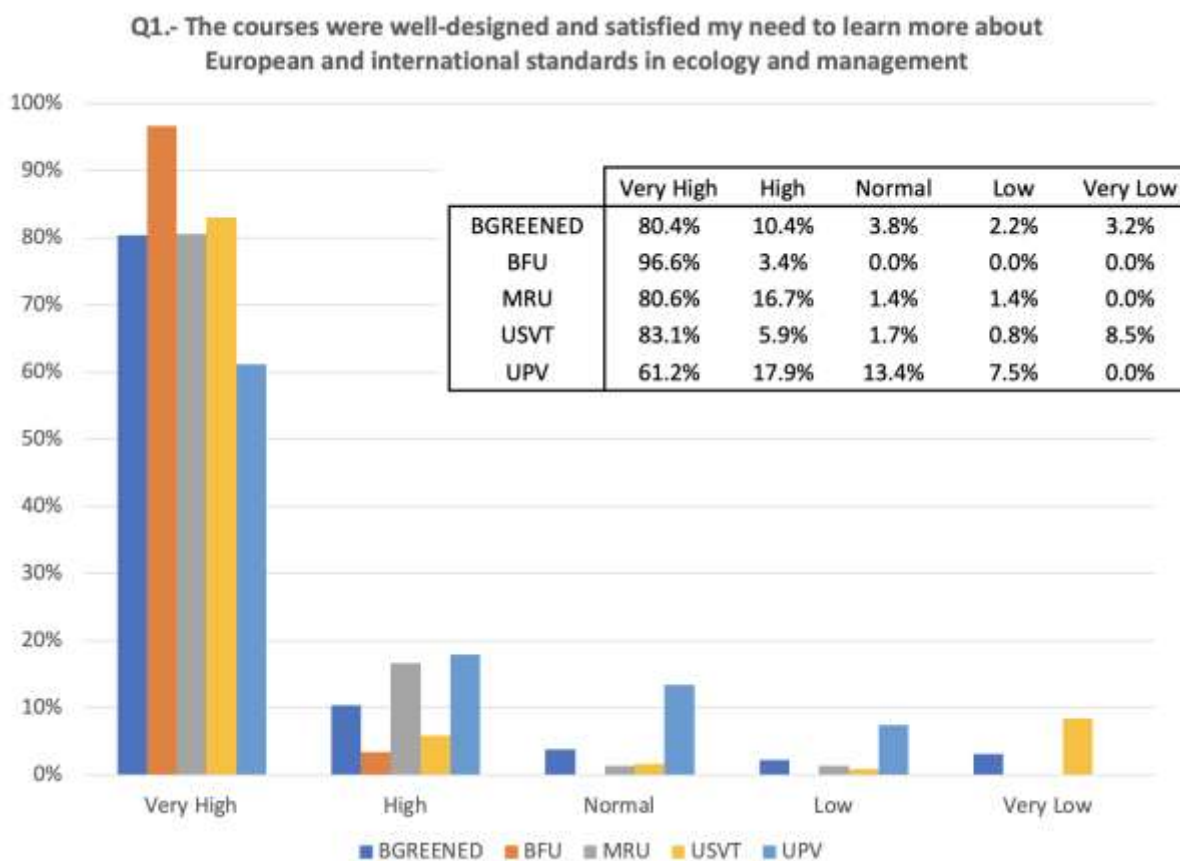


Figure 5.- Distribution of marks given by the satisfaction surveys to Question 1 and for every course.

Overall set of BGREENED micro-credential courses

Q1.- The courses were well-designed and satisfied my need to learn more about European and international standards in ecology and management

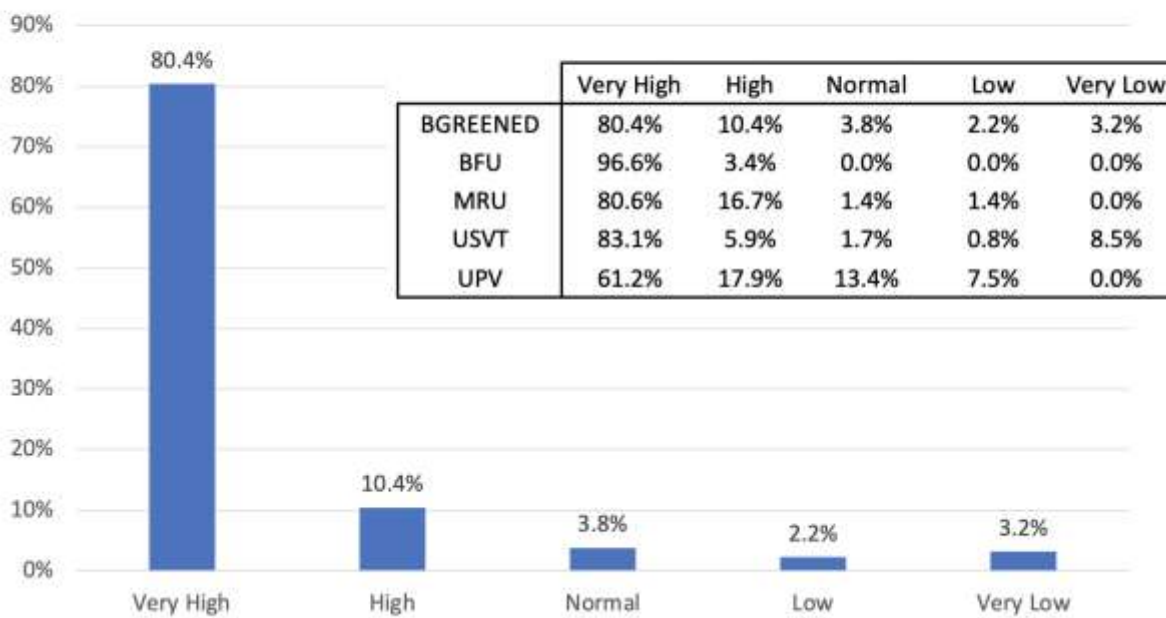


Figure 6.- Distribution of marks given by the satisfaction surveys to Question 1 aggregating the results for the overall set of 12 courses

Results of the satisfaction surveys about Question 1, shown in Figures 5 and 6, lead to the following conclusions:

- 316 students provided answers to Question 1 “The course was well-designed and satisfied my need to learn more about European and international standards in ecology and management”, as shown in Table 5.
- More than 80% of the students marked the answer to Q1 as “Very High”
- More than 90% of the students marked the answer to Q1 as “High” or “Very High”
- Only 2,2% of the students (7) marked the answer to Q1 as “Low”
- Only 3,2% of the students (10) marked the answer to Q1 as “Very Low”

1.3.2.2- Question 2. “The topics covered were relevant to the course, and the information was presented at an appropriate level of complexity”

Figure 7 shows the distribution of marks given by the satisfaction surveys to Question 2 and for every course.

Figure 8 shows the distribution of marks given by the satisfaction surveys to Question 2 aggregating the results for the overall set of 12 courses organized inside the B-Green-Ed project.

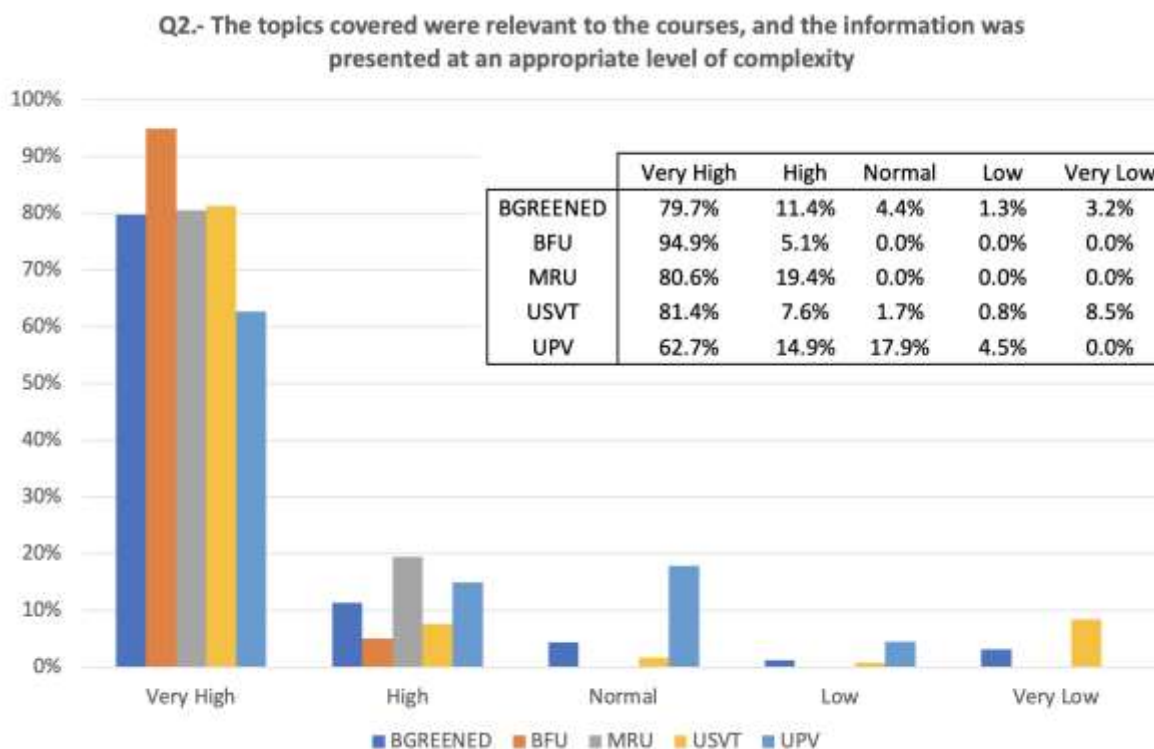


Figure 7.- Distribution of marks given by the satisfaction surveys to Question 2 and for every course.

Overall set of BGREENED micro-credential courses

Q2.- The topics covered were relevant to the courses, and the information was presented at an appropriate level of complexity

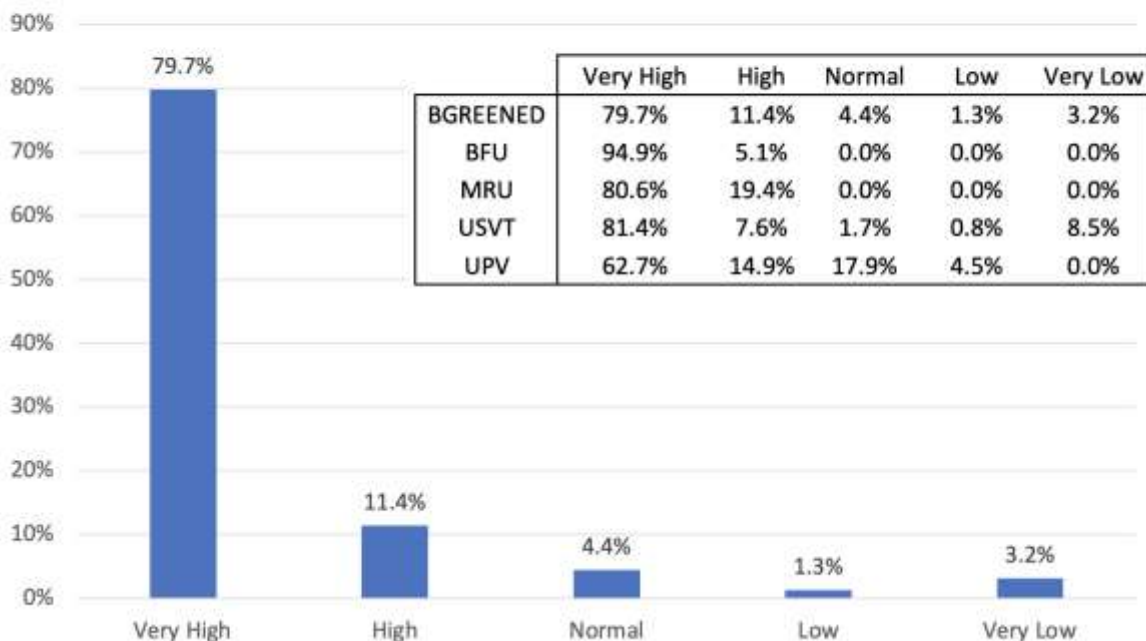


Figure 8.- Distribution of marks given by the satisfaction surveys to Question 2 aggregating the results for the overall set of 12 courses

Results of the satisfaction surveys about Question 2, shown in Figures 7 and 8, lead to the following conclusions:

- 316 students provided answers to Question 2 “The topics covered were relevant to the course, and the information was presented at an appropriate level of complexity”, as shown in Table 5.
- More than 79% of the students marked the answer to Q2 as “Very High”
- More than 90% of the students marked the answer to Q2 as “High” or “Very High”
- Only 1,3% of the students (4) marked the answer to Q2 as “Low”
- Only 3,2% of the students (10) marked the answer to Q2 as “Very Low”

1.3.2.3- Question 3. “The micro-credential course has clear instructions and an easy-to-follow navigation structure”

Figure 9 shows the distribution of marks given by the satisfaction surveys to Question 3 and for every course.

Figure 10 shows the distribution of marks given by the satisfaction surveys to Question 3 aggregating the results for the overall set of 12 courses organized inside the B-Green-Ed project.

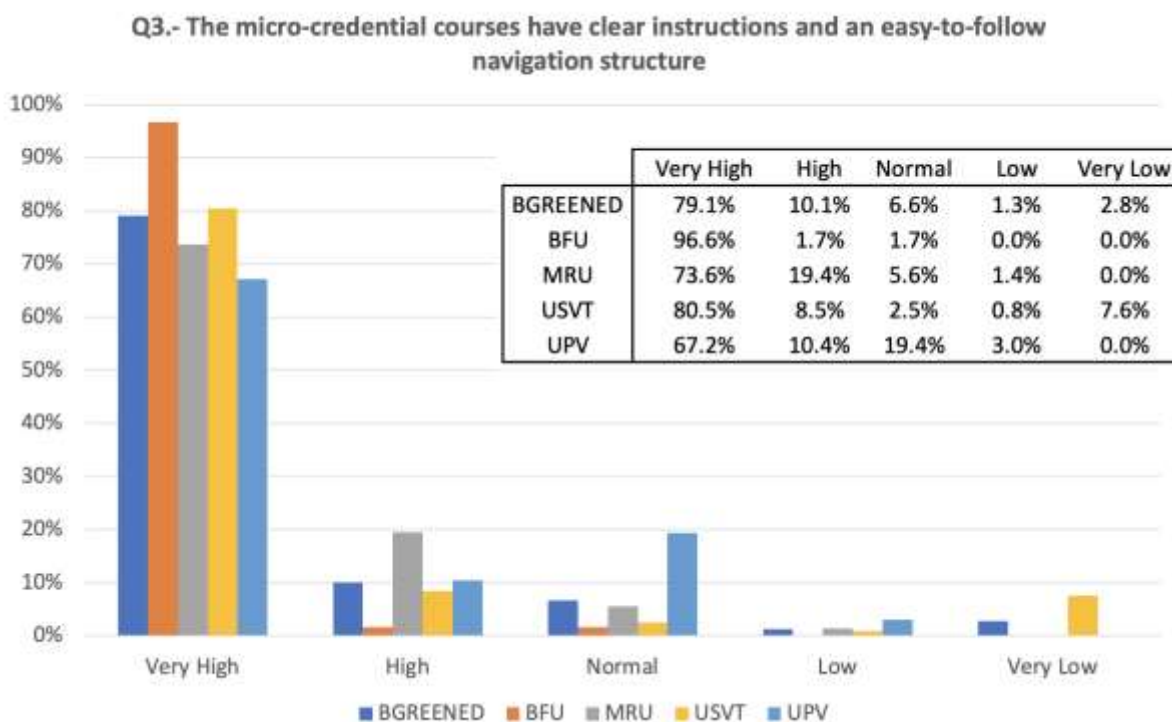


Figure 9.- Distribution of marks given by the satisfaction surveys to Question 3 and for every course.

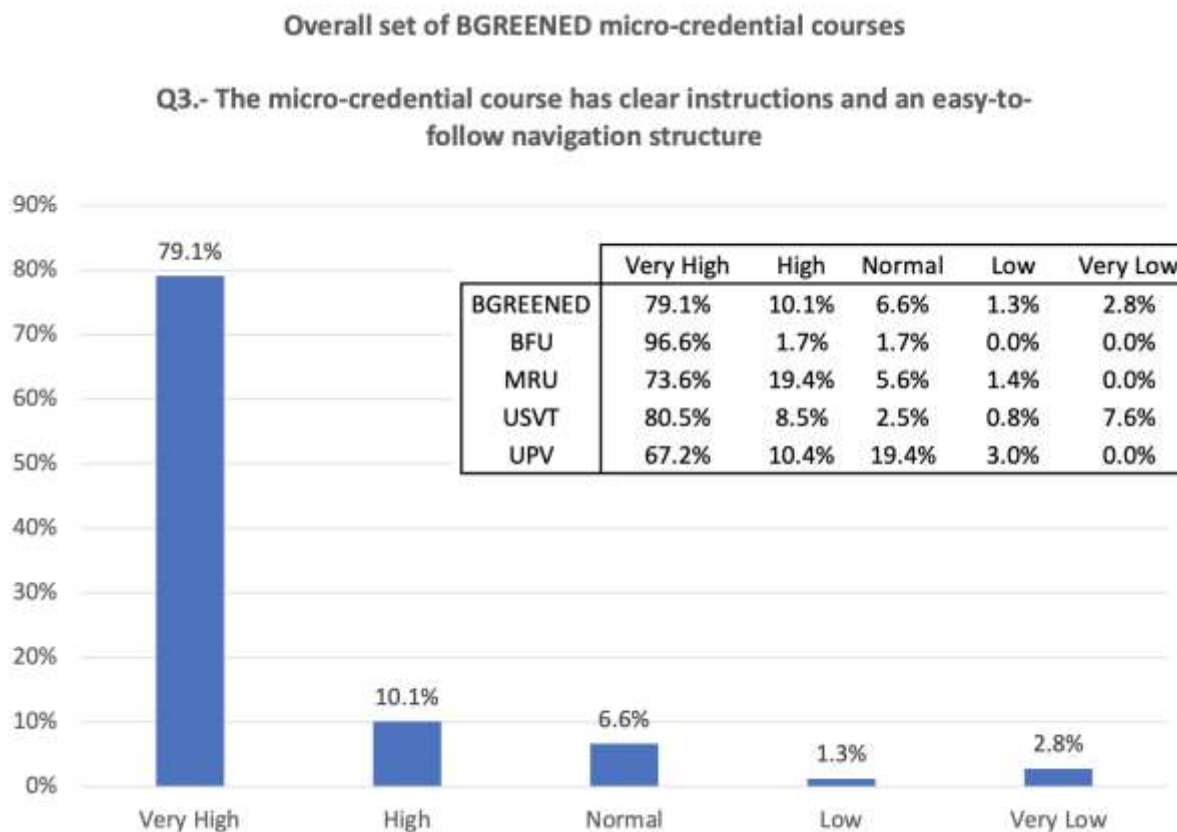


Figure 10.- Distribution of marks given by the satisfaction surveys to Question 3 aggregating the results for the overall set of 12 courses

Results of the satisfaction surveys about Question 3, shown in Figures 9 and 10, lead to the following conclusions:

- 316 students provided answers to Question 3 “The micro-credential course has clear instructions and an easy-to-follow navigation structure”, as shown in Table 5.
- More than 79% of the students marked the answer to Q3 as “Very High”
- More than 89% of the students marked the answer to Q3 as “High” or “Very High”
- Only 1,3% of the students (4) marked the answer to Q3 as “Low”
- Only 2,8% of the students (9) marked the answer to Q3 as “Very Low”

1.3.3.- Section 2: Relevance, Viability, and Overall Satisfaction

Figure 11 summarizes the results obtained for the questions included in Section 2 by each one of the partners:

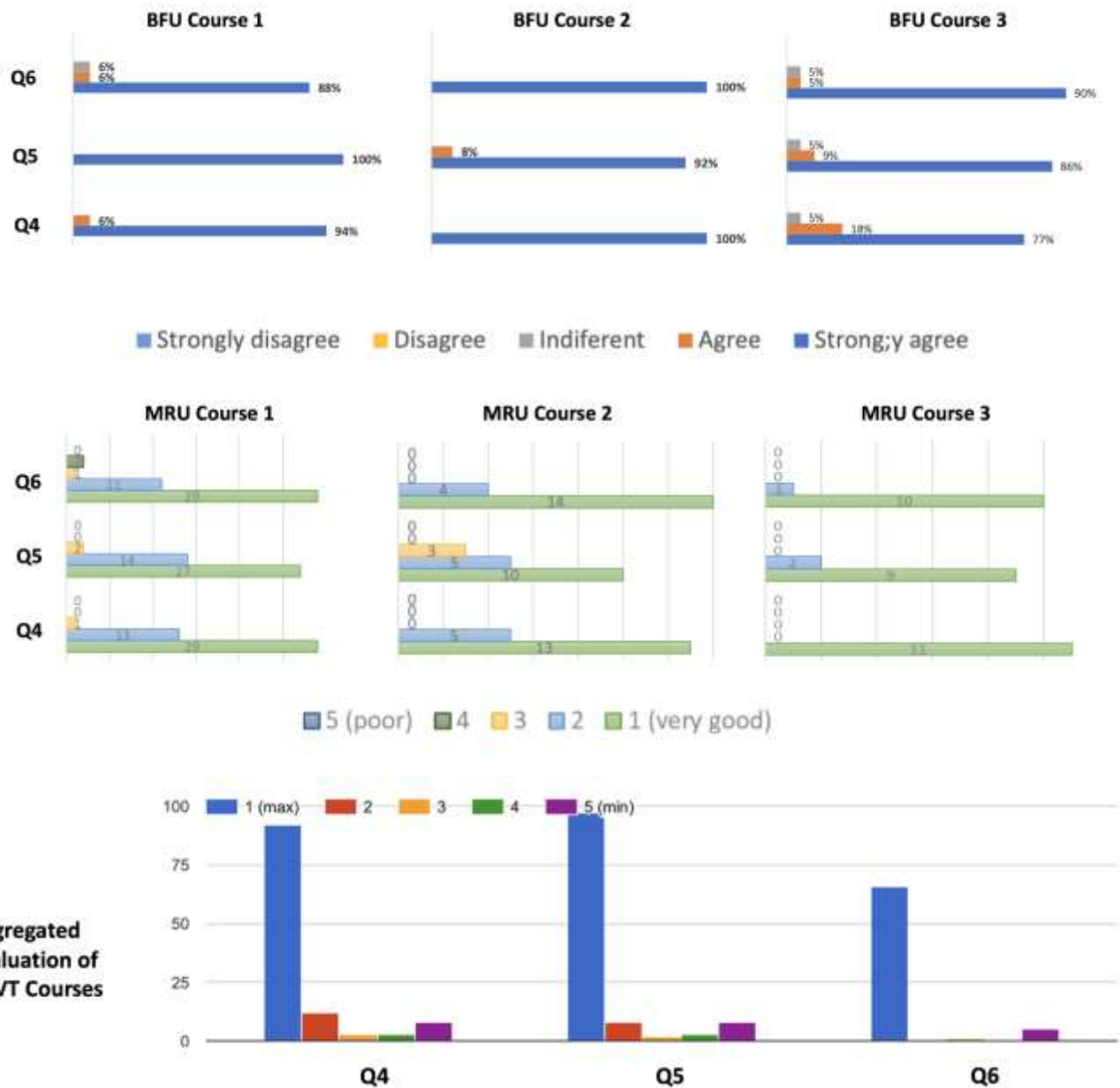


Figure 11.- Summary of the results obtained for Section 2 by each one of the partners

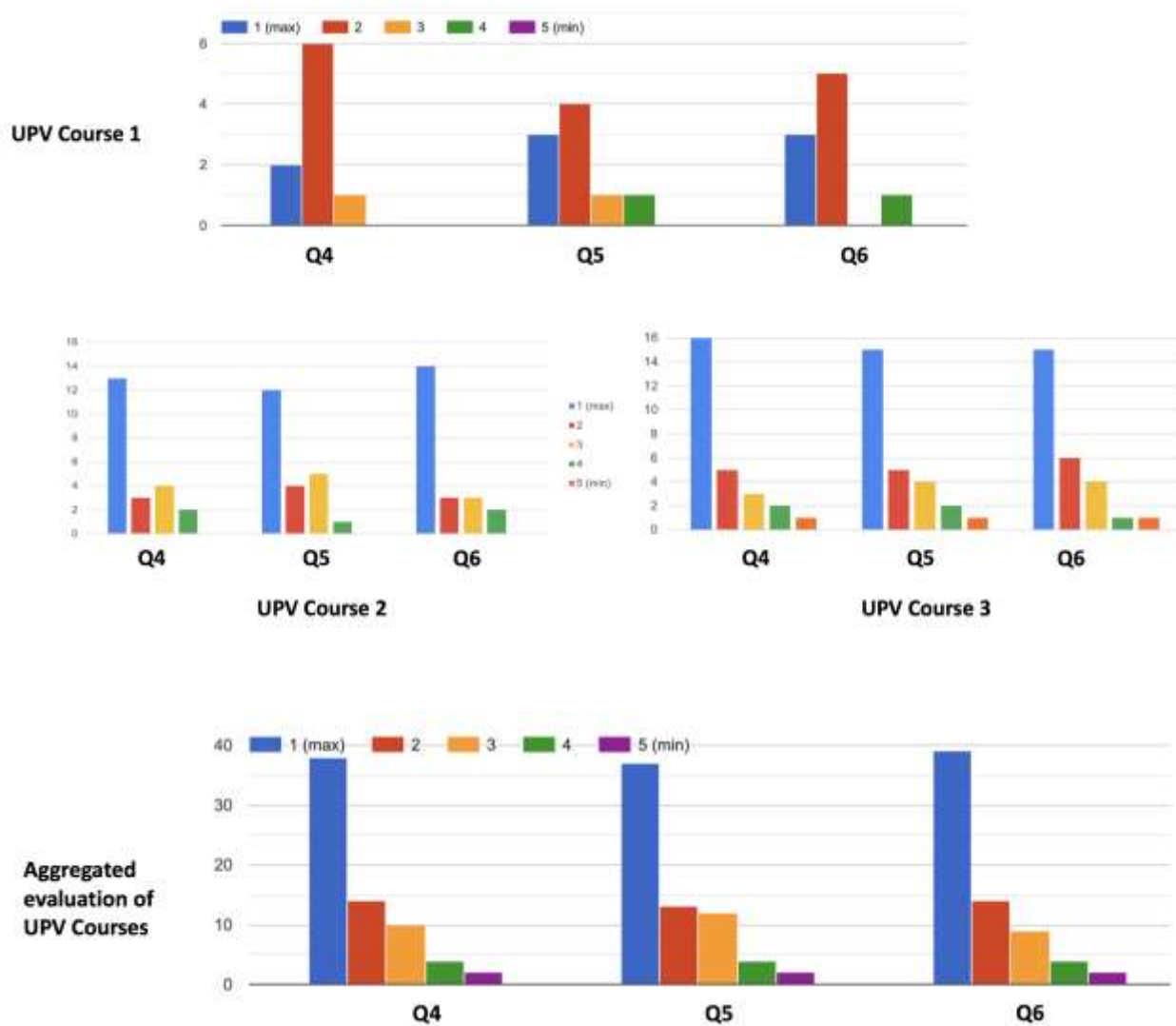


Figure 11.- Summary of the results obtained for Section 1 by each one of the partners (cont.)

Table 6 shows the aggregated results obtained for questions Q4, Q5 and Q6, for the set of 3 courses organized by every partner.

Table 7 shows the aggregated results obtained for questions Q4, Q5 and Q6, for the set of 12 courses organized inside the B-Green-Ed project.

Table 6.- Satisfaction survey results for Q4, Q5 and Q6, aggregated by partner

	Set of 3 BFU Courses					Set of 3 MRU Courses					Set of 3 USVT Courses					Set of 3 UPV Courses				
	Very High	High	Normal	Low	Very Low	Very High	High	Normal	Low	Very Low	Very High	High	Normal	Low	Very Low	Very High	High	Normal	Low	Very Low
Q4.- This micro-credential course was engaging and interesting, providing useful and relevant information for my needs	52	6	1	0	0	53	18	1	0	0	92	12	3	3	8	39	14	10	4	0
Q5.- Thanks to the course organized into micro-credits, I have a clear understanding of the subject	55	3	1	0	0	46	21	5	0	0	97	5	5	3	8	38	13	12	4	0
Q6.- My expectations were met in this course organized on microcredits	55	3	1	0	0	53	16	1	2	0	66	0	1	0	5	40	14	9	4	0

Table 7.- Satisfaction survey results for Q4, Q5 and Q6, aggregated for the overall set of 12 courses of the project

	Overall set of 12 BGREEENED Courses					# responses
	Very High	High	Normal	Low	Very Low	
Q4.- This micro-credential course was engaging and interesting, providing useful and relevant information for my needs	236	50	15	7	8	316
Q5.- Thanks to the course organized into micro-credits, I have a clear understanding of the subject	236	42	23	7	8	316
Q6.- My expectations were met in this course organized on microcredits	214	33	12	6	5	270

Results shown in tables 6 and 7 allow to extract interesting conclusions about the specific questions Q4, Q5 and Q6, as explained below.

1.3.3.1- Question 4. “This micro-credential course was engaging and interesting, providing useful and relevant information for my needs”

Figure 12 shows the distribution of marks given by the satisfaction surveys to Question 4 and for every course.

Figure 13 shows the distribution of marks given by the satisfaction surveys to Question 4 aggregating the results for the overall set of 12 courses organized inside the B-Green-Ed project.

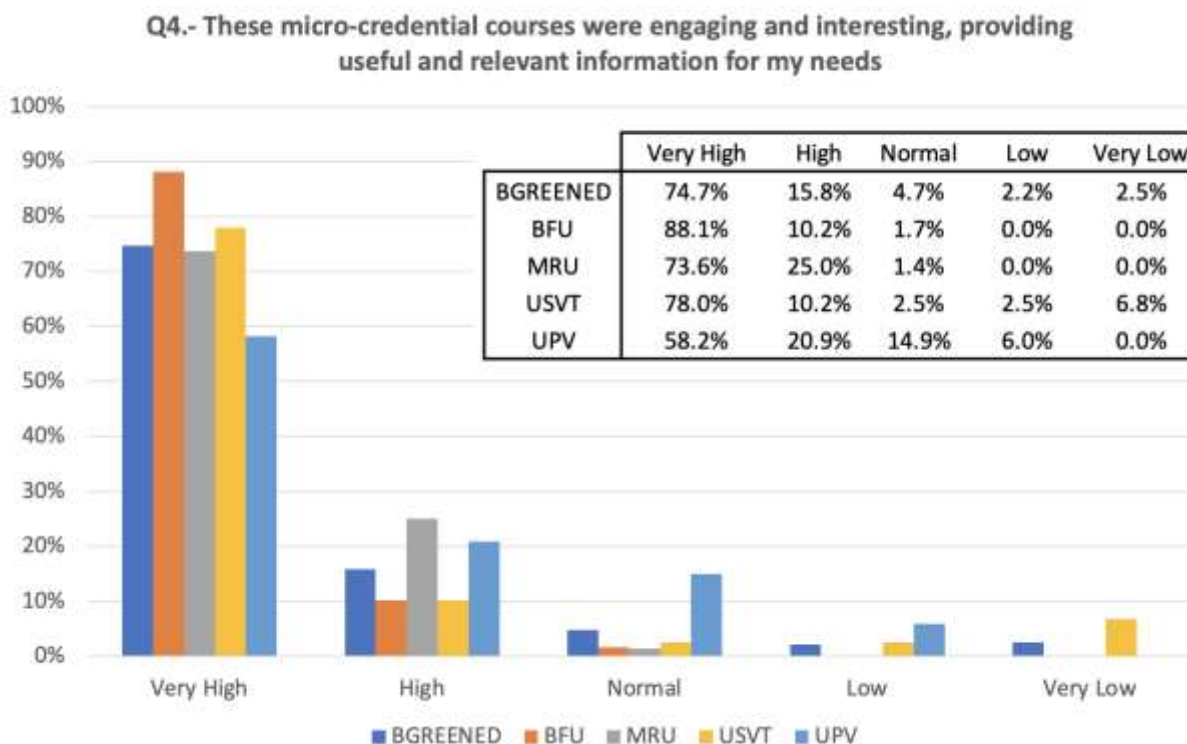


Figure 12.- Distribution of marks given by the satisfaction surveys to Question 1 and for every course.

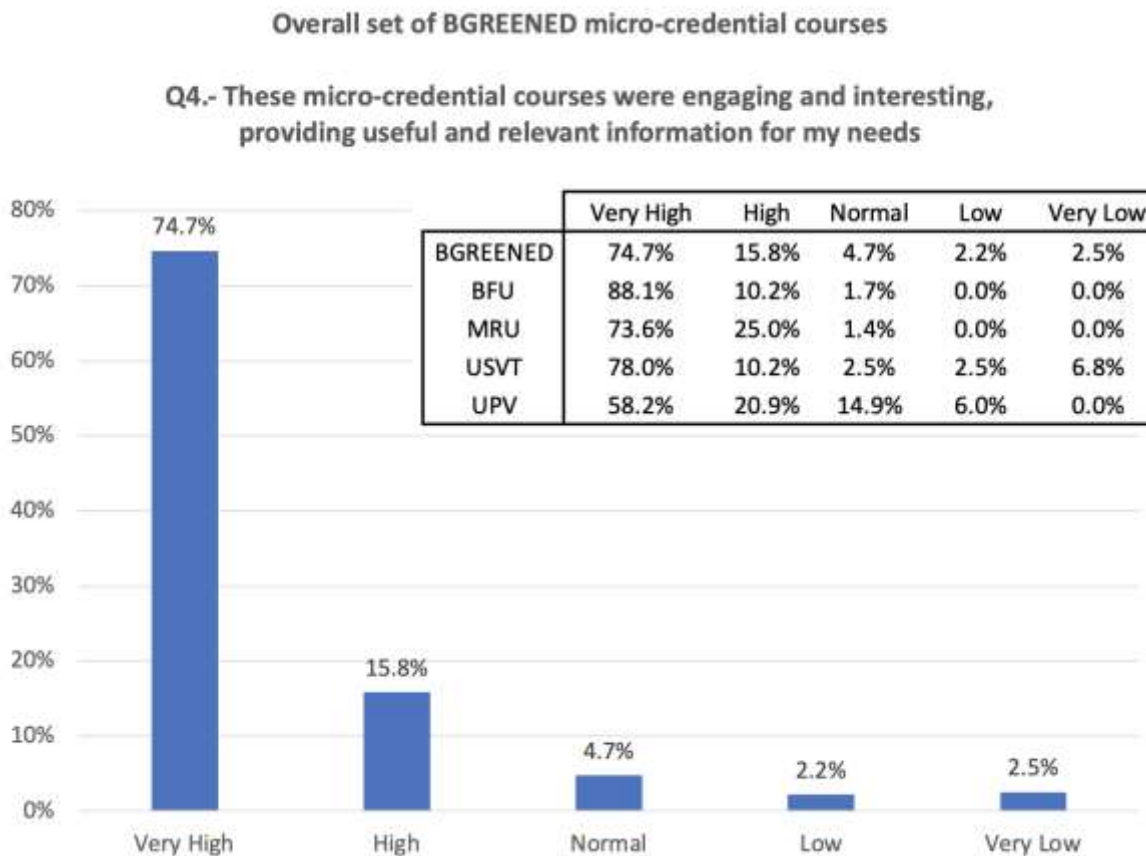


Figure 13.- Distribution of marks given by the satisfaction surveys to Question 1 aggregating the results for the overall set of 12 courses

Results of the satisfaction surveys about Question 4, shown in Figures 12 and 13, lead to the following conclusions:

- 316 students provided answers to Question 4 “This micro-credential course was engaging and interesting, providing useful and relevant information for my needs”, as shown in Table 7.
- More than 74% of the students marked the answer to Q4 as “Very High”
- More than 90% of the students marked the answer to Q4 as “High” or “Very High”
- Only 2,2% of the students (7) marked the answer to Q4 as “Low”
- Only 2,5% of the students (8) marked the answer to Q4 as “Very Low”

1.3.3.2- Question 5. “Thanks to the course organized into micro-credits, I have a clear understanding of the subject”

Figure 14 shows the distribution of marks given by the satisfaction surveys to Question 5 and for every course.

Figure 15 shows the distribution of marks given by the satisfaction surveys to Question 5 aggregating the results for the overall set of 12 courses organized inside the B-Green-Ed project.

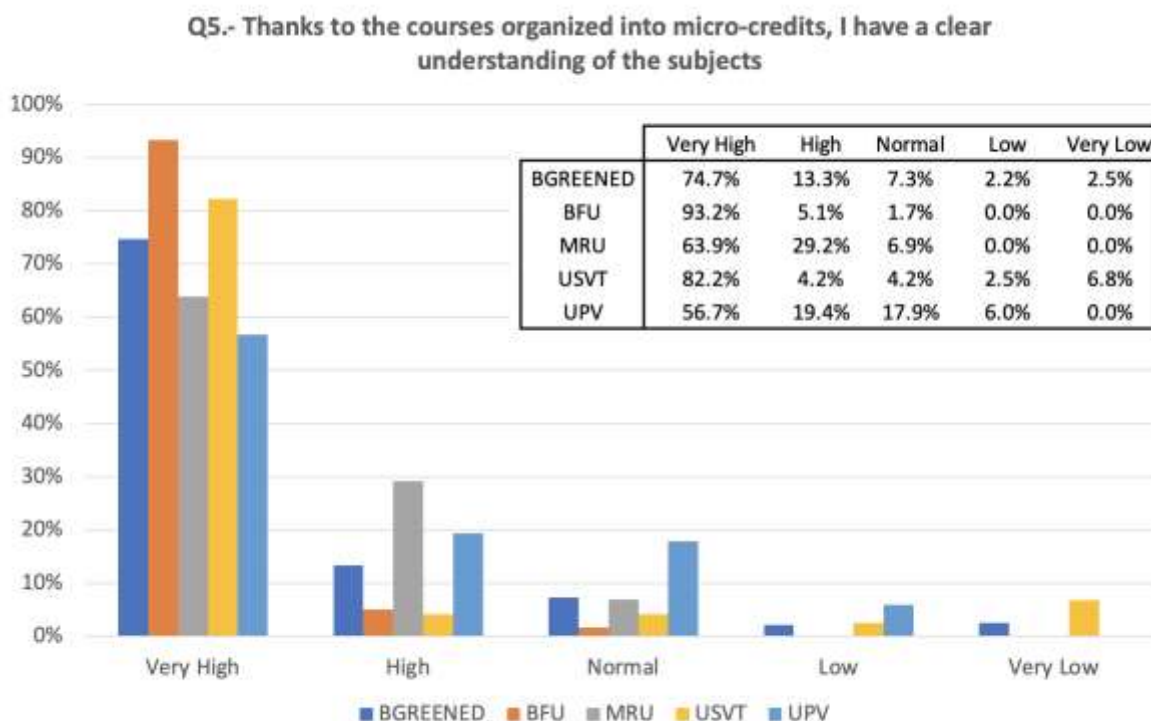


Figure 14.- Distribution of marks given by the satisfaction surveys to Question 5 and for every course.

Overall set of BGREENED micro-credential courses

Q5.- Thanks to the courses organized into micro-credits, I have a clear understanding of the subjects

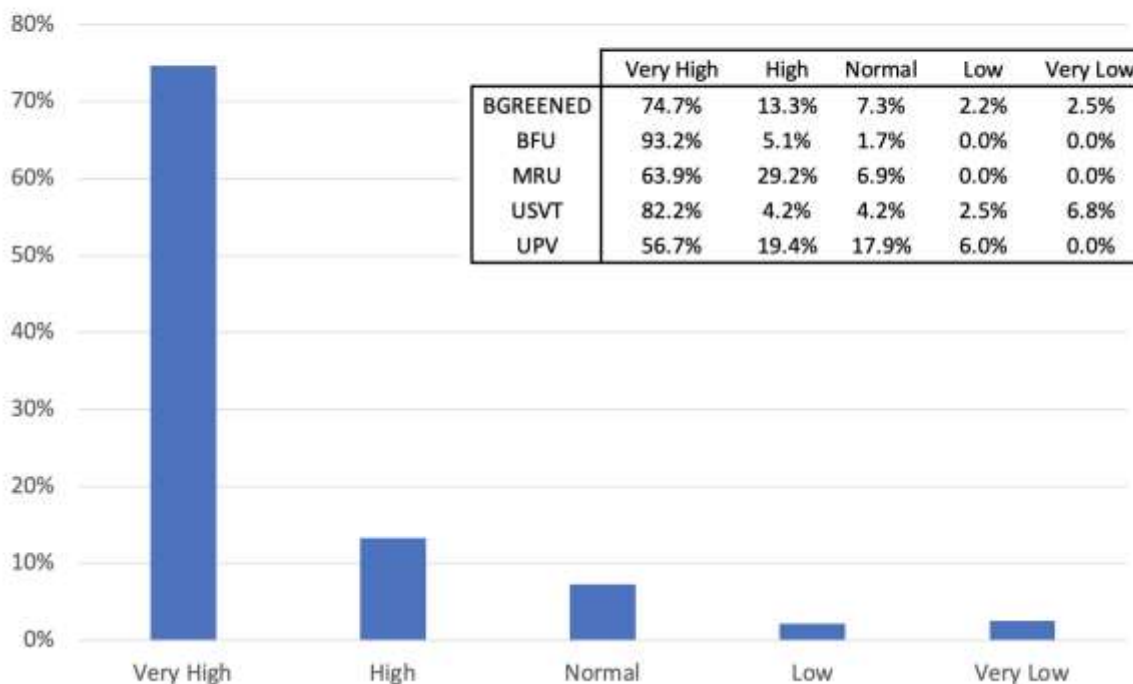


Figure 15.- Distribution of marks given by the satisfaction surveys to Question 5 aggregating the results for the overall set of 12 courses

Results of the satisfaction surveys about Question 5, shown in Figures 14 and 15, lead to the following conclusions:

- 316 students provided answers to Question 5 “Thanks to the course organized into micro-credits, I have a clear understanding of the subject”, as shown in Table 7.
- More than 74% of the students marked the answer to Q5 as “Very High”
- More than 88% of the students marked the answer to Q5 as “High” or “Very High”
- Only 2,2% of the students (7) marked the answer to Q5 as “Low”
- Only 2,5% of the students (8) marked the answer to Q5 as “Very Low”

1.3.3.3- Question 6. “My expectations were met in this course organized on microcredits”

Figure 16 shows the distribution of marks given by the satisfaction surveys to Question 6 and for every course.

Figure 17 shows the distribution of marks given by the satisfaction surveys to Question 6 aggregating the results for the overall set of 12 courses organized inside the B-Green-Ed project.

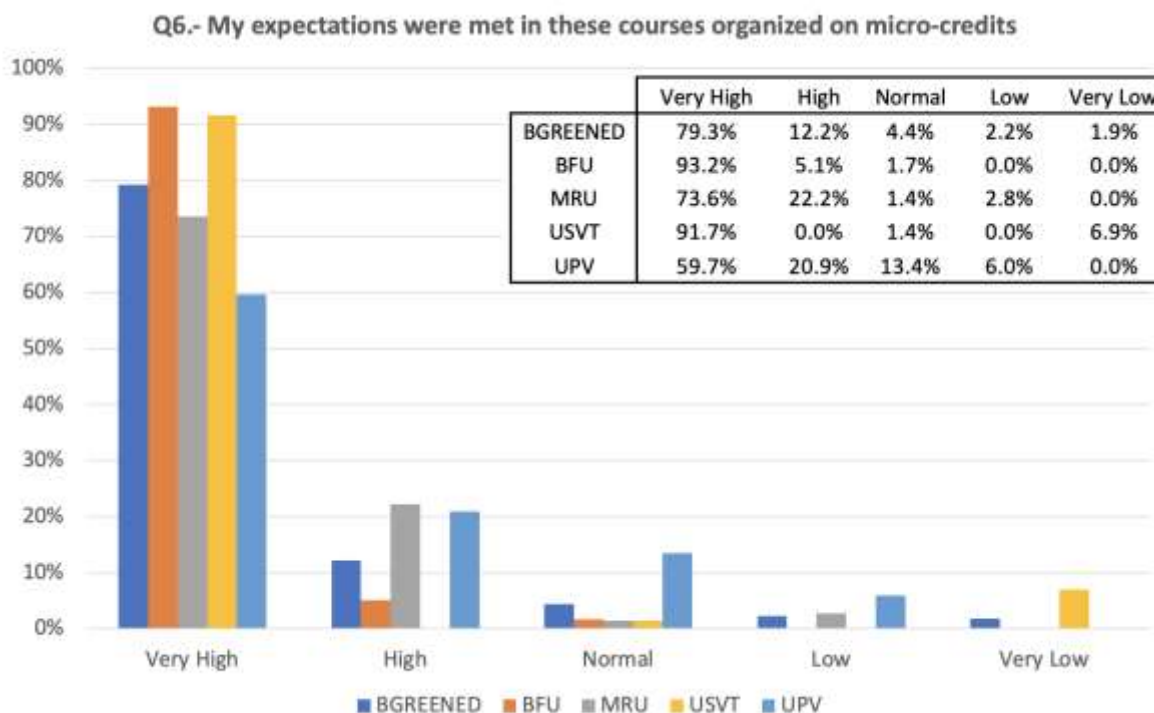


Figure 16.- Distribution of marks given by the satisfaction surveys to Question 6 and for every course.

Overall set of BGREENED micro-credential courses

Q6.- My expectations were met in these courses organized on microcredits

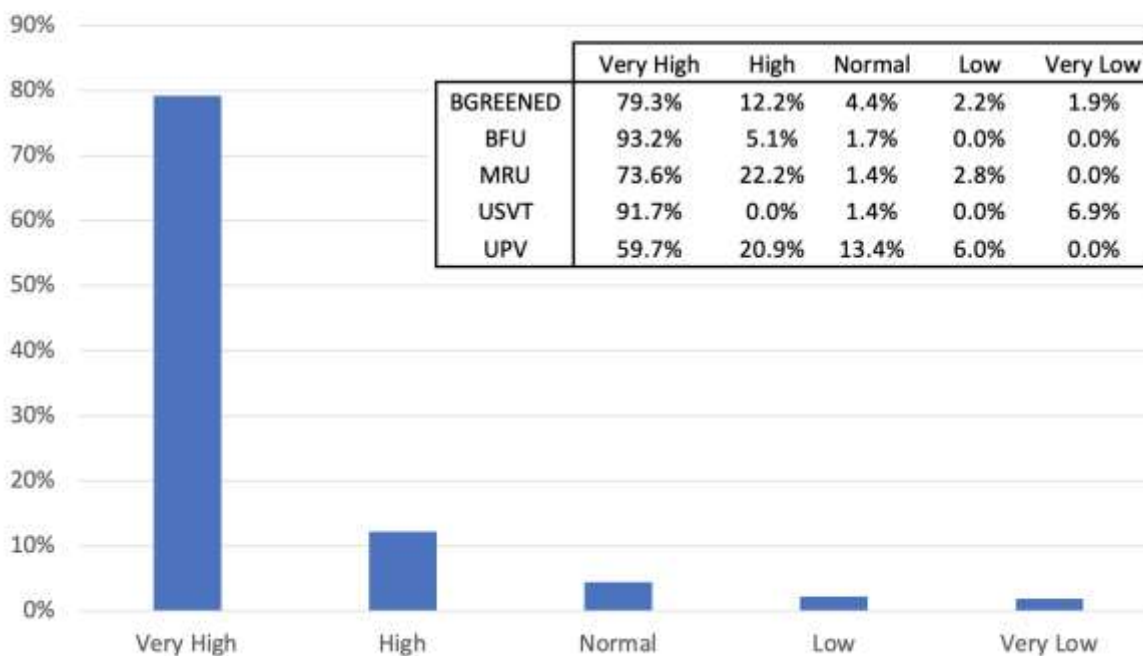


Figure 17.- Distribution of marks given by the satisfaction surveys to Question 6 aggregating the results for the overall set of 12 courses

Results of the satisfaction surveys about Question 6, shown in Figures 16 and 17, lead to the following conclusions:

- 270 students provided answers to Question 6 “My expectations were met in this course organized on microcredits”, as shown in Table 7.
- More than 79% of the students marked the answer to Q6 as “Very High”
- More than 91% of the students marked the answer to Q6 as “High” or “Very High”
- Only 2,2% of the students (6) marked the answer to Q6 as “Low”
- Only 1,9% of the students (5) marked the answer to Q6 as “Very Low”

1.3.4.- Section 3: Suitability, efficacy, and quality

Figure 18 summarizes the results obtained for the questions included in Section 3 by each one of the partners:

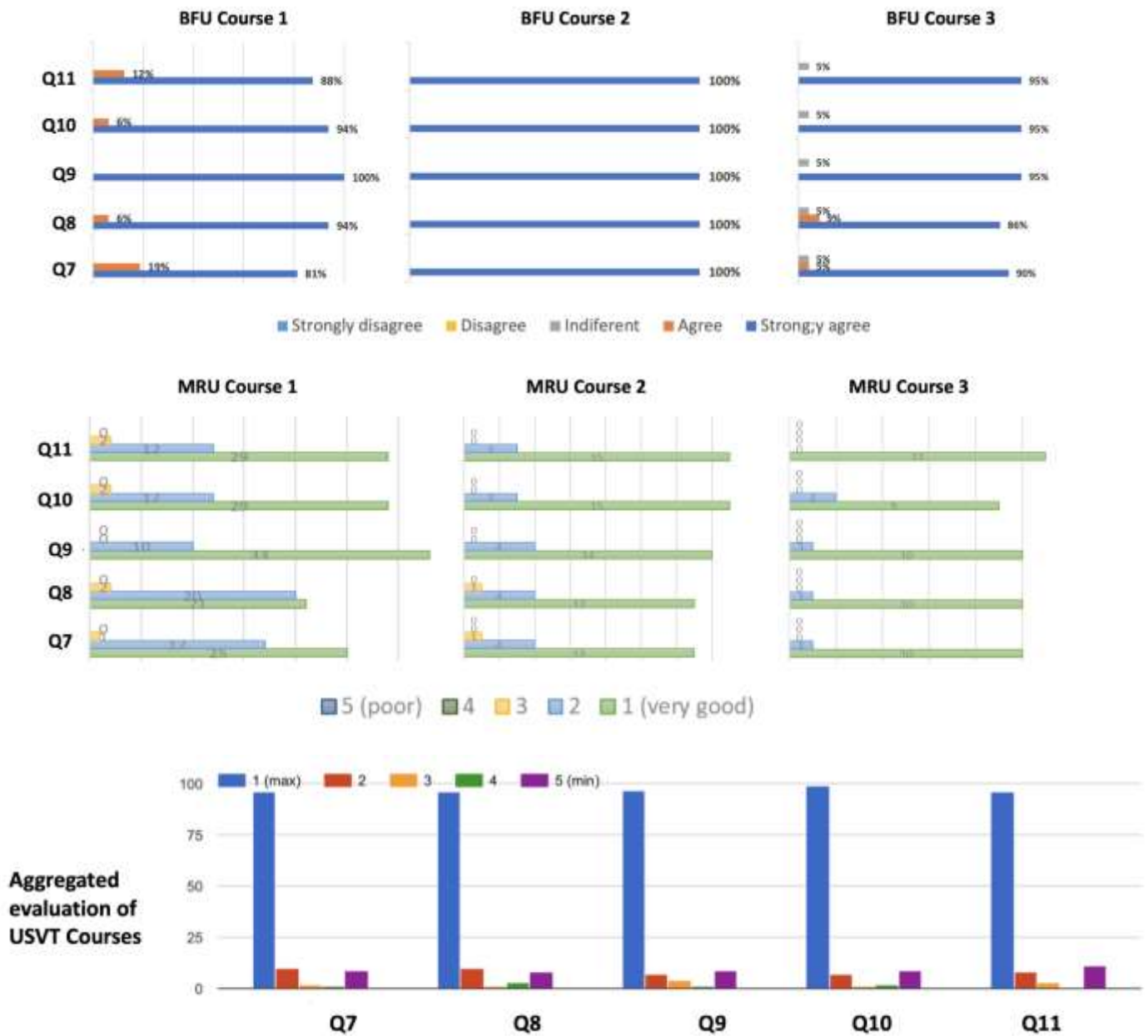


Figure 18.- Summary of the results obtained for Section 3 by each one of the partners

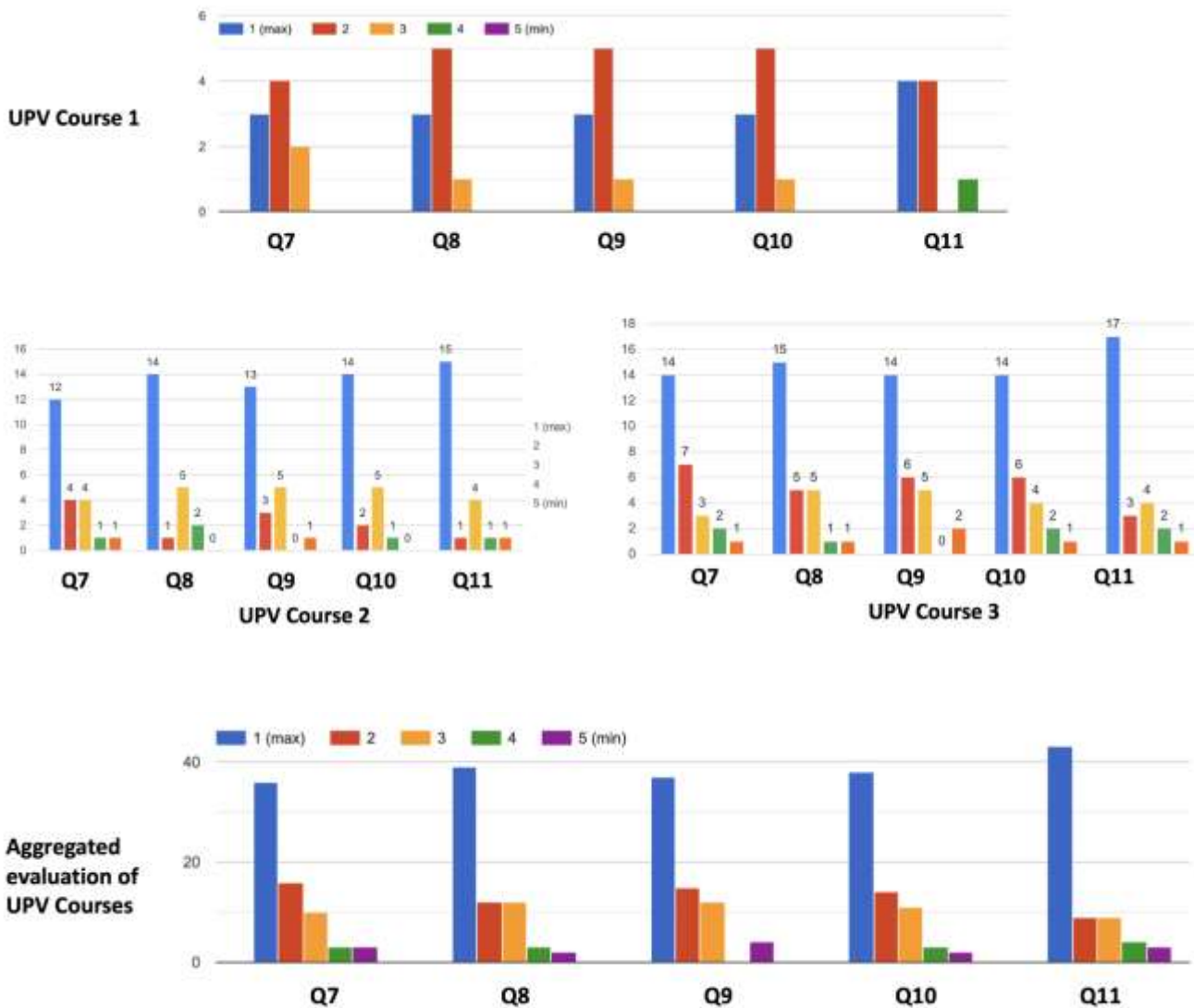


Figure 18.- Summary of the results obtained for Section 3 by each one of the partners (cont.)

Table 8 shows the aggregated results obtained for questions Q7, Q8, Q9, Q10 and Q11, for the set of 3 courses organized by every partner.

Table 9 shows the aggregated results obtained for questions Q7, Q8, Q9, Q10 and Q11, for the set of 12 courses organized inside the B-Green-Ed project.

Table 8.- Satisfaction survey results for Q7, Q8, Q9, Q10 and Q11, aggregated by partner

	Set of 3 BFU Courses					Set of 3 MRU Courses					Set of 3 USVT Courses					Set of 3 UPV Courses				
	Very High	High	Normal	Low	Very Low	Very High	High	Normal	Low	Very Low	Very High	High	Normal	Low	Very Low	Very High	High	Normal	Low	Very Low
Q7.- The course provided me with a significant amount of useful and practice-oriented information	54	4	1	0	0	48	22	2	0	0	96	10	2	1	9	37	16	10	3	1
Q8.- My knowledge and understanding related to the ecological and management standards of the European and international sector/industry addressed in the course improved and expanded	55	3	1	0	0	44	25	3	0	0	96	12	0	3	8	40	12	12	3	0
Q9.- The online tools and facilities for interacting with my instructor and other classmates are easy to use	58	0	1	0	0	57	15	0	0	0	97	7	4	1	9	38	15	12	0	2
Q10.- The recommended additional materials and resources are relevant and contribute to a deeper understanding of the concepts	57	1	1	0	0	53	17	2	0	0	99	6	2	1	9	39	14	11	3	0
Q11.- The educational content was presented in a clear and easily understandable language with an appropriate level of difficulty	56	2	1	0	0	55	15	2	0	0	96	10	1	0	11	44	9	9	4	1

Table 9.- Satisfaction survey results for Q7, Q8, Q9, Q10 and Q11, aggregated for the overall set of 12 courses of the project

	Overall set of 12 BGREENED Courses					# responses
	Very High	High	Normal	Low	Very Low	
Q7.- The course provided me with a significant amount of useful and practice-oriented information	235	52	15	4	10	316
Q8.- My knowledge and understanding related to the ecological and management standards of the European and international sector/industry addressed in the course improved and expanded	235	52	16	6	8	317
Q9.- The online tools and facilities for interacting with my instructor and other classmates are easy to use	250	37	17	1	11	316
Q10.- The recommended additional materials and resources are relevant and contribute to a deeper understanding of the concepts	248	38	16	4	9	315
Q11.- The educational content was presented in a clear and easily understandable language with an appropriate level of difficulty	251	36	13	4	12	316

Results shown in tables 8 and 9 allow to extract interesting conclusions about the specific questions Q7, Q8, Q9, Q10 and Q11, as explained below.

1.3.4.1- Question 7. “The course provided me with a significant amount of useful and practice-oriented information”

Figure 19 shows the distribution of marks given by the satisfaction surveys to Question 7 and for every course.

Figure 20 shows the distribution of marks given by the satisfaction surveys to Question 7 aggregating the results for the overall set of 12 courses organized inside the B-Green-Ed project.

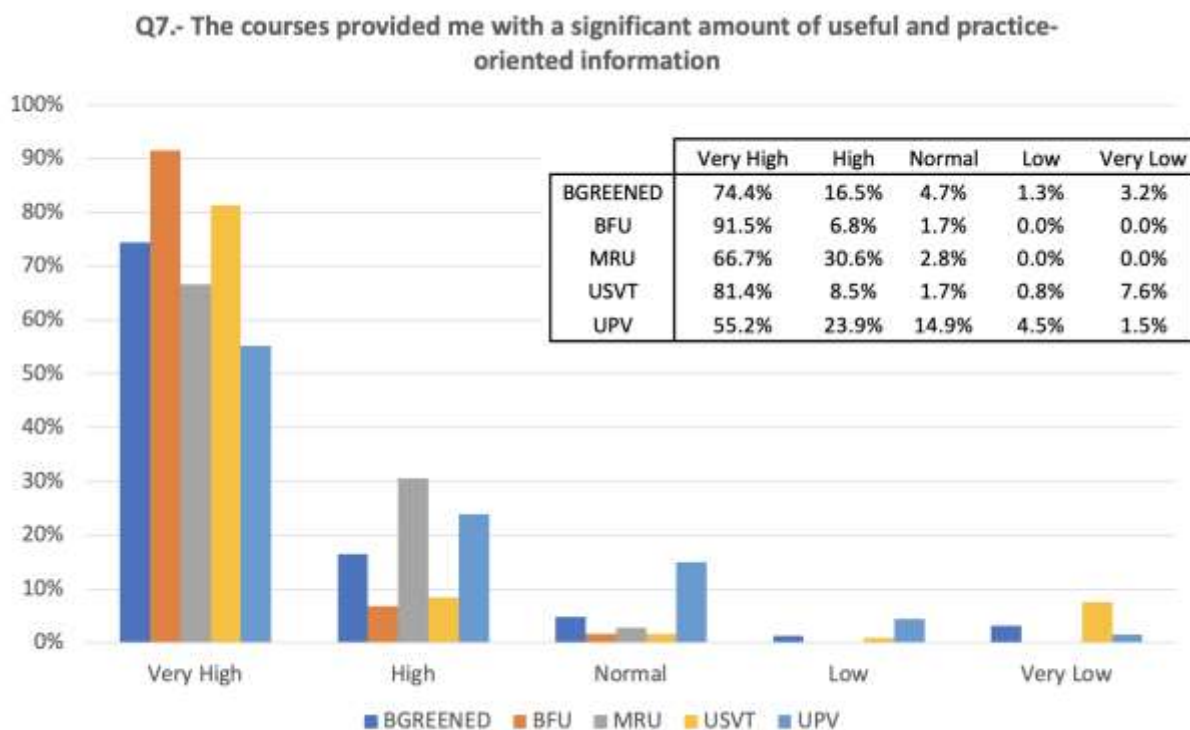


Figure 19.- Distribution of marks given by the satisfaction surveys to Question 7 and for every course.

Overall set of BGREENED micro-credential courses

Q7.- The courses provided me with a significant amount of useful and practice-oriented information

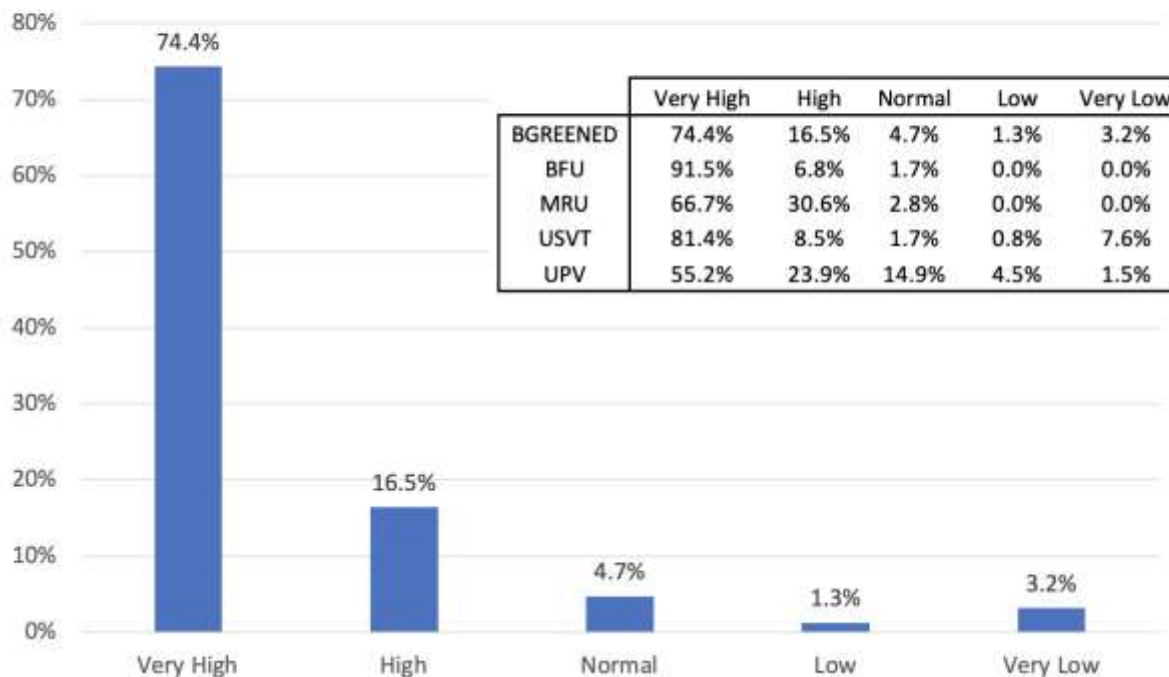


Figure 20.- Distribution of marks given by the satisfaction surveys to Question 7 aggregating the results for the overall set of 12 courses

Results of the satisfaction surveys about Question 7, shown in Figures 19 and 20, lead to the following conclusions:

- 316 students provided answers to Question 7 “The course provided me with a significant amount of useful and practice-oriented information”, as shown in Table 9.
- More than 74% of the students marked the answer to Q7 as “Very High”
- More than 90% of the students marked the answer to Q7 as “High” or “Very High”
- Only 1,3% of the students (4) marked the answer to Q7 as “Low”
- Only 3,2% of the students (10) marked the answer to Q7 as “Very Low”

1.3.4.2- Question 8. “My knowledge and understanding related to the ecological and management standards of the European and international sector/industry addressed in the courses improved and expanded”

Figure 21 shows the distribution of marks given by the satisfaction surveys to Question 8 and for every course.

Figure 22 shows the distribution of marks given by the satisfaction surveys to Question 8 aggregating the results for the overall set of 12 courses organized inside the B-Green-Ed project.

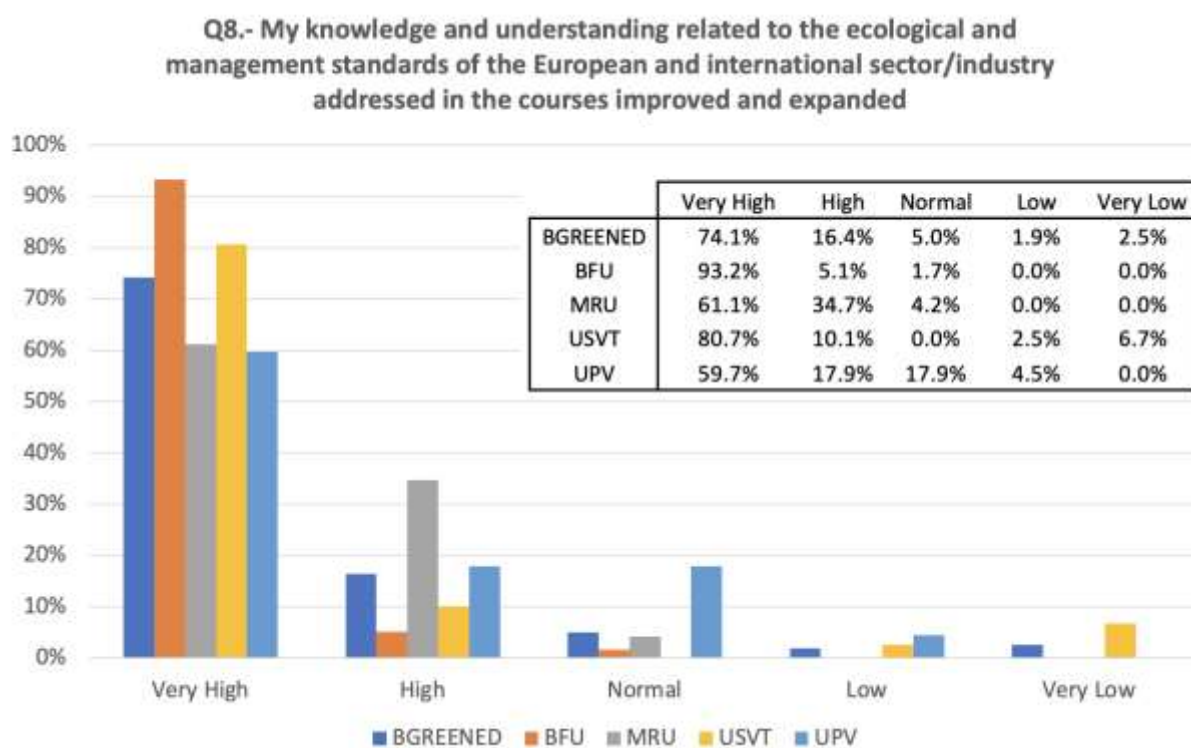


Figure 21.- Distribution of marks given by the satisfaction surveys to Question 8 and for every course.

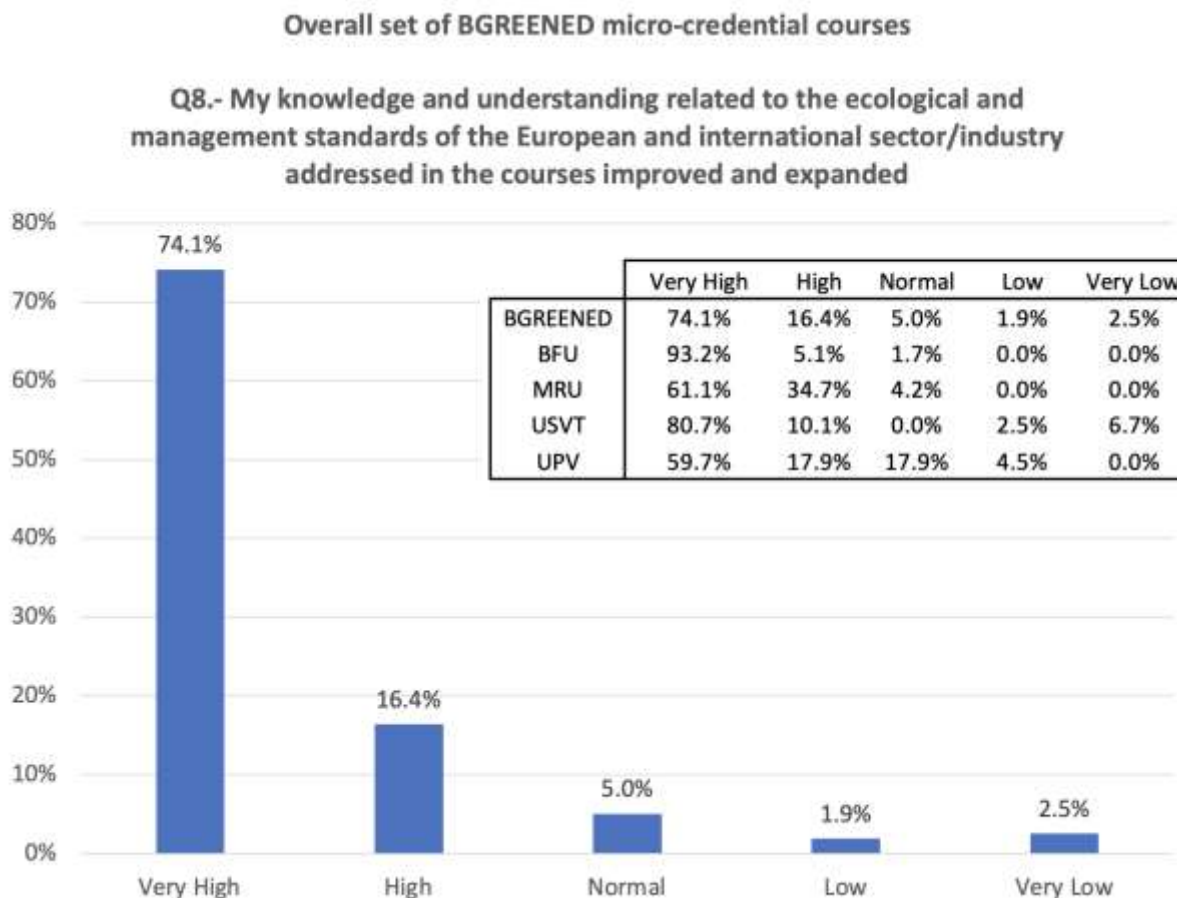


Figure 22.- Distribution of marks given by the satisfaction surveys to Question 8 aggregating the results for the overall set of 12 courses

Results of the satisfaction surveys about Question 8, shown in Figures 21 and 22, lead to the following conclusions:

- 317 students provided answers to Question 8 “My knowledge and understanding related to the ecological and management standards of the European and international sector/industry addressed in the courses improved and expanded”, as shown in Table 9.
- More than 74% of the students marked the answer to Q8 as “Very High”
- More than 90% of the students marked the answer to Q8 as “High” or “Very High”
- Only 1,9% of the students (6) marked the answer to Q8 as “Low”
- Only 2,5% of the students (8) marked the answer to Q8 as “Very Low”

1.3.4.3- Question 9. “The online tools and facilities for interacting with my instructor and other classmates are easy to use”

Figure 23 shows the distribution of marks given by the satisfaction surveys to Question 9 and for every course.

Figure 24 shows the distribution of marks given by the satisfaction surveys to Question 9 aggregating the results for the overall set of 12 courses organized inside the B-Green-Ed project.

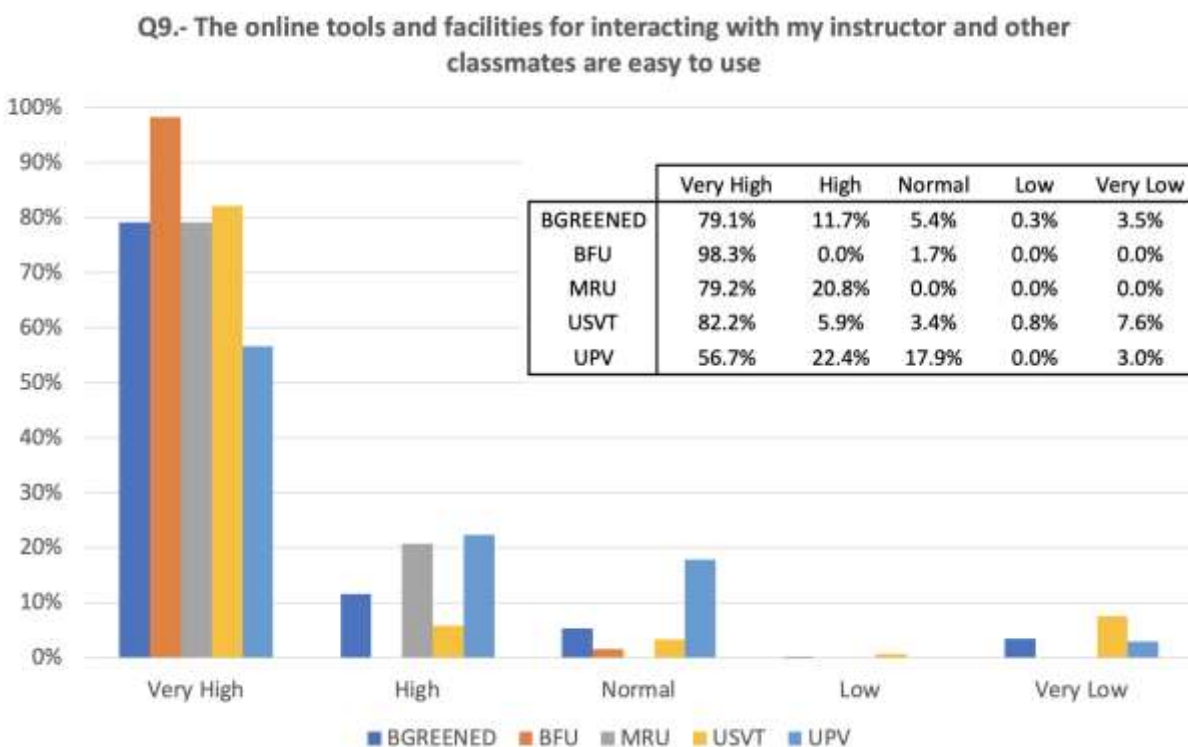


Figure 23.- Distribution of marks given by the satisfaction surveys to Question 9 and for every course.

Overall set of BGREENED micro-credential courses

Q9.- The online tools and facilities for interacting with my instructor and other classmates are easy to use

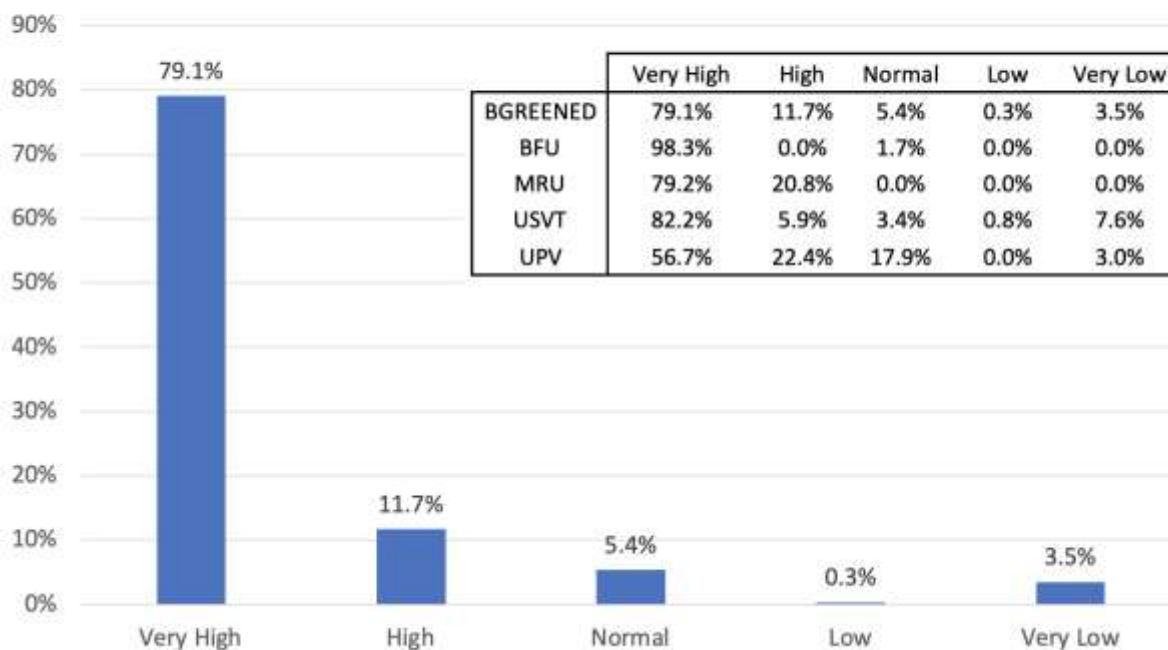


Figure 24.- Distribution of marks given by the satisfaction surveys to Question 9 aggregating the results for the overall set of 12 courses

Results of the satisfaction surveys about Question 9, shown in Figures 23 and 24, lead to the following conclusions:

- 316 students provided answers to Question 9 “The online tools and facilities for interacting with my instructor and other classmates are easy to use”, as shown in Table 9.
- More than 79% of the students marked the answer to Q9 as “Very High”
- More than 90% of the students marked the answer to Q9 as “High” or “Very High”
- Only 0,3% of the students (1) marked the answer to Q9 as “Low”
- Only 3,5% of the students (11) marked the answer to Q9 as “Very Low”

1.3.4.4- Question 10. “The recommended additional materials and resources are relevant and contribute to a deeper understanding of the concepts”

Figure 25 shows the distribution of marks given by the satisfaction surveys to Question 10 and for every course.

Figure 26 shows the distribution of marks given by the satisfaction surveys to Question 10 aggregating the results for the overall set of 12 courses organized inside the B-Green-Ed project.

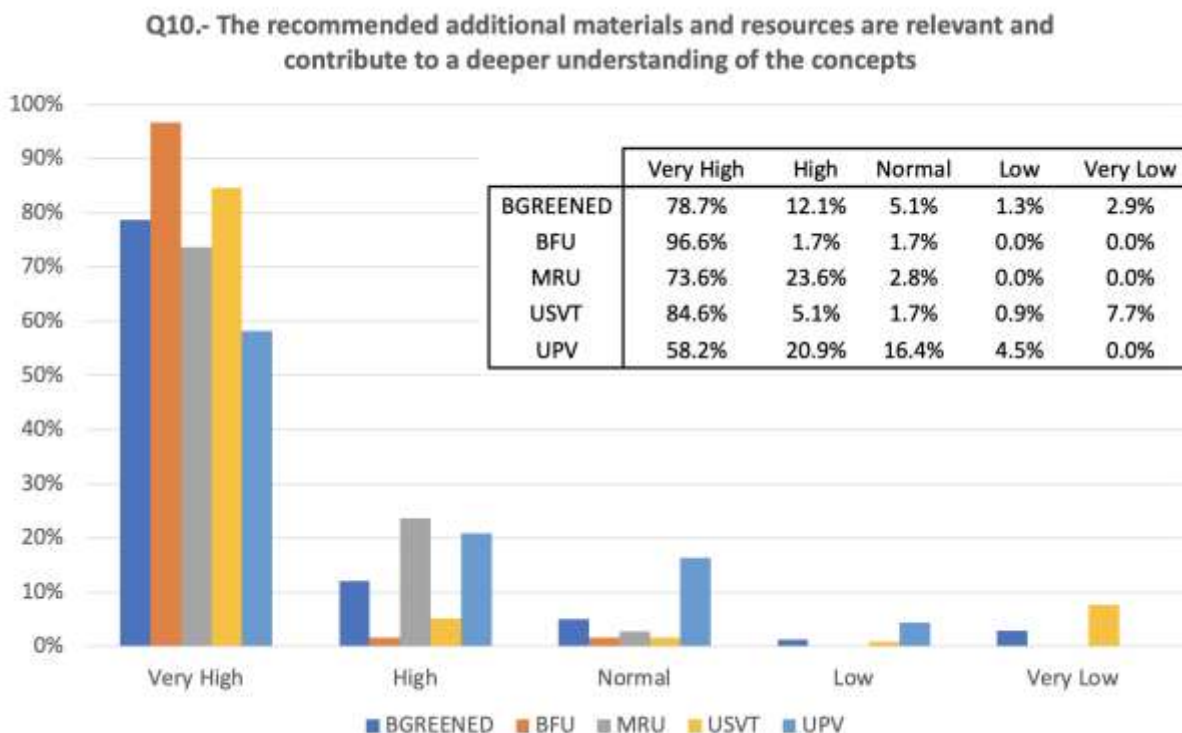


Figure 25.- Distribution of marks given by the satisfaction surveys to Question 10 and for every course.

Overall set of BGREENED micro-credential courses

Q10.- The recommended additional materials and resources are relevant and contribute to a deeper understanding of the concepts

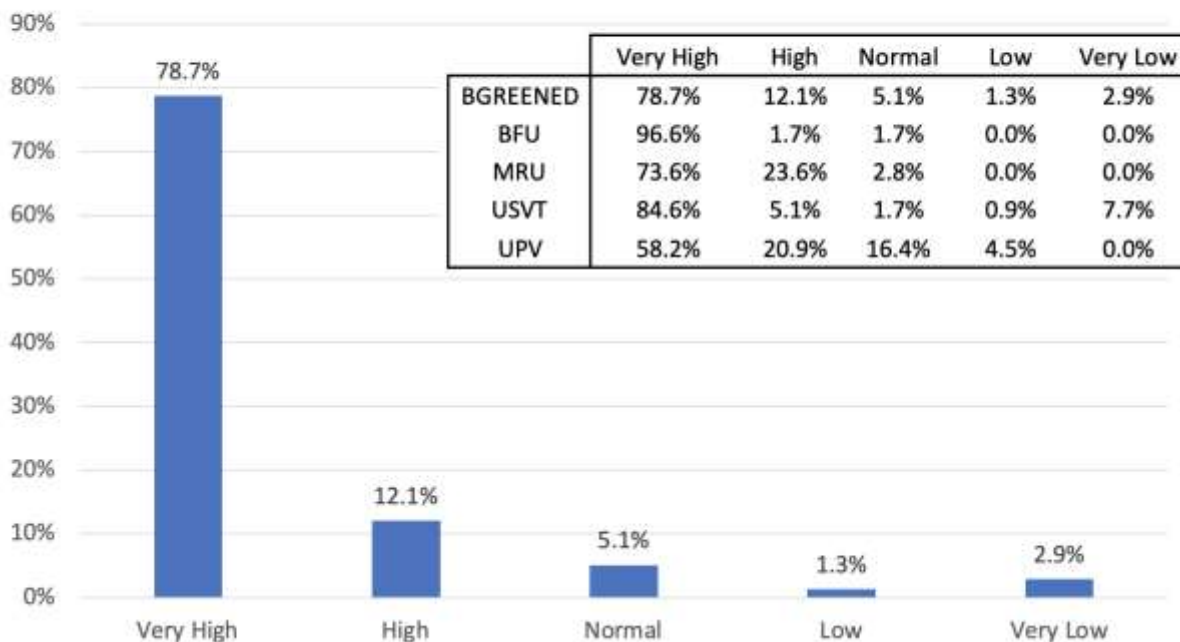


Figure 26.- Distribution of marks given by the satisfaction surveys to Question 10 aggregating the results for the overall set of 12 courses

Results of the satisfaction surveys about Question 10, shown in Figures 25 and 26, lead to the following conclusions:

- 315 students provided answers to Question 10 “The recommended additional materials and resources are relevant and contribute to a deeper understanding of the concepts”, as shown in Table 9.
- More than 78% of the students marked the answer to Q10 as “Very High”
- More than 90% of the students marked the answer to Q10 as “High” or “Very High”
- Only 1,3% of the students (4) marked the answer to Q10 as “Low”
- Only 2,9% of the students (9) marked the answer to Q10 as “Very Low”

1.3.4.5- Question 11. “The educational contents were presented in a clear and easily understandable language with an appropriate level of difficulty”

Figure 27 shows the distribution of marks given by the satisfaction surveys to Question 11 and for every course.

Figure 28 shows the distribution of marks given by the satisfaction surveys to Question 11 aggregating the results for the overall set of 12 courses organized inside the B-Green-Ed project.

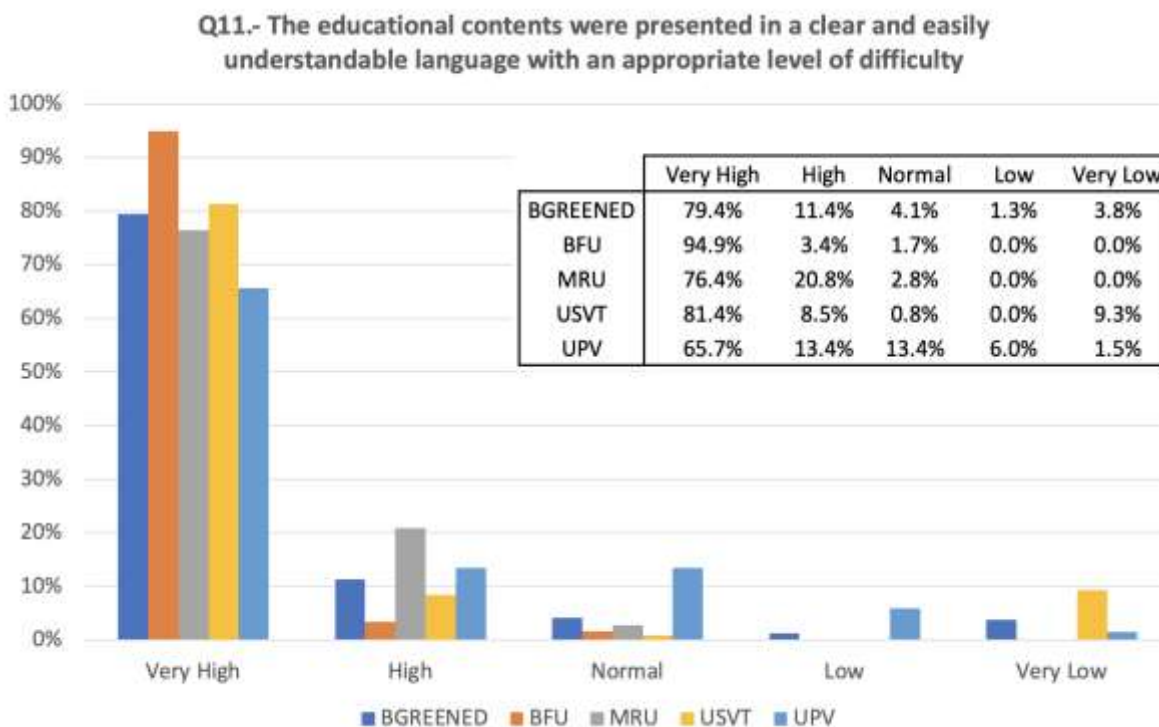


Figure 27.- Distribution of marks given by the satisfaction surveys to Question 11 and for every course.

Overall set of BGREENED micro-credential courses

Q11.- The educational content was presented in a clear and easily understandable language with an appropriate level of difficulty

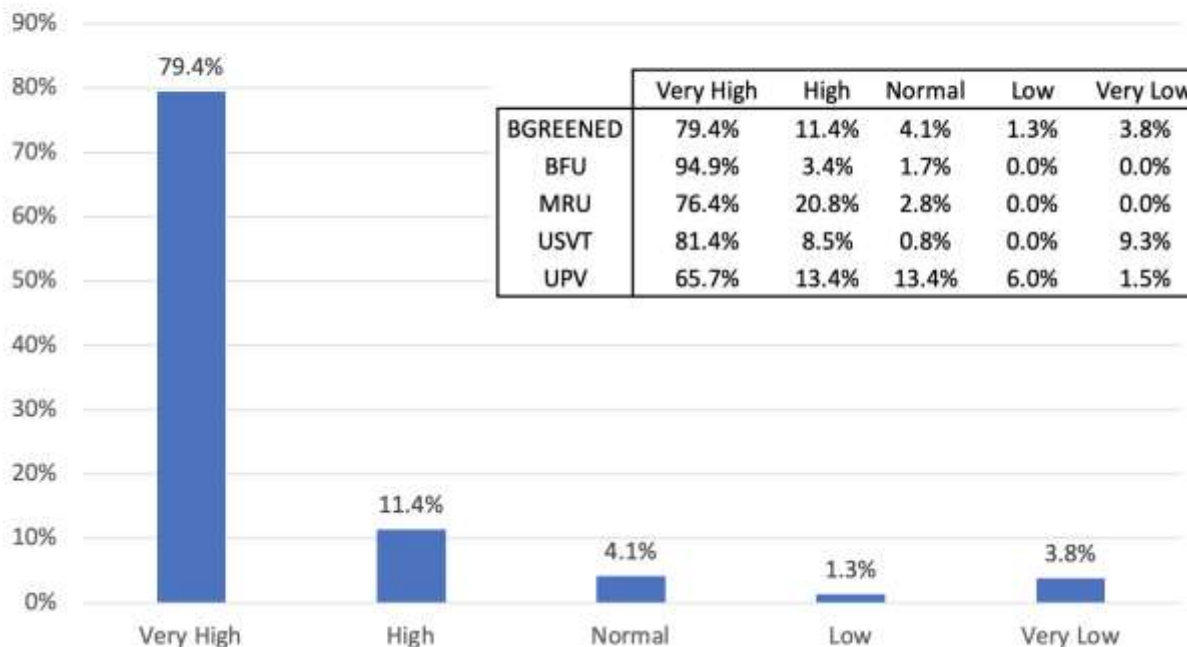


Figure 28.- Distribution of marks given by the satisfaction surveys to Question 11 aggregating the results for the overall set of 12 courses

Results of the satisfaction surveys about Question 11, shown in Figures 27 and 28, lead to the following conclusions:

- 316 students provided answers to Question 11 “The educational contents were presented in a clear and easily understandable language with an appropriate level of difficulty”, as shown in Table 9.
- More than 79% of the students marked the answer to Q11 as “Very High”
- More than 90% of the students marked the answer to Q11 as “High” or “Very High”
- Only 1,3% of the students (4) marked the answer to Q11 as “Low”
- Only 3,8% of the students (12) marked the answer to Q11 as “Very Low”

Part 2 – Recommendations

2.1.- Introduction

The micro-credential courses may be improved based on the result of the recommendations generated from the previous activities and data collection, the data from stakeholders, and the received feedback during the pilot.

Overall, the B-GREEN-ED courses have been very well-received, but there are still areas where improvements can improve the learning experience for future students. Participants recognize the following areas when reflecting on their learning experiences: Empowering Students Through Skill Enhancement and Career Development, and The Transformative Impact on Education and Society.

Participants (students, trainees) reported significant gains in specific skills relevant to their fields. They highlighted how these new competencies enhanced their personal and professional capabilities, making it easier to grasp and apply concepts quickly. Trainees pinpointed areas where they can become more engaged and develop better strategies for learning. The practical and interactive aspects of the courses kept them highly engaged and motivated, encouraging improvements.

2.1.- Recommendations

Based on the results of the different satisfaction surveys performed by each one of the partner universities, below follow some recommendations to improve the quality of the micro-credential courses:

1.- Adapting the content to the specifics of the audience:

While the course design was well received, a small percentage of students expressed that the content did not directly address their specific needs. To bridge this gap, it is important to consider the following items.

- By informal discussions with participating students, we can delve deeper into this feedback and understand specific areas of discontent.
- Conducting pre-course surveys to gauge students' knowledge on the topic and common expectations and adjust the content accordingly.
- Better selection of the target audience based on their knowledge and proficiency on the subject.
- Potentially developing multiple course tracks with varying levels of depth or focusing on specific areas of interest within the broader topic.

- Clearly describing the proficiency level needed for the topics included in each MCC – whether it provides basic knowledge or offers more in-depth and professional information to students/trainees who already have some relevant knowledge or experience.

2.- Enhancing the selection of topics:

As per the survey, some students found the chosen topics to be less relevant to their interests or lack the depth they desired. To tackle this:

- Examine student feedback to identify well-received topics and those that need improvement.
- It's worth considering adding guest lectures or expert interviews from different sub-fields to the broader environmental and management standards.
- Students can select from a range of elective modules to customize their learning experience.

3.- Boosting the sustainability of micro-credentials:

While the micro-credential format was generally well-received, a small portion of students expressed concerns about its effectiveness. To deal with this:

- Conduct discussions or targeted surveys to gain insight into the reasons why some students found the micro-credential format unsuitable for learning this subject matter.
- Consider exploring other micro-credential structures or adding extra learning resources or activities to the micro-credential.
- It's important to communicate the advantages and learning outcomes associated with the micro-credential format to manage expectations.

4.- Enhancing practical application:

The course provided a solid foundation of knowledge, but some students expressed a need for more practical information or a better way to communicate existing practical elements. To address this matter:

- Evaluate student feedback to identify areas in which the course could benefit from including more hands-on exercises or case studies.
- Make explicit the practical skills students will acquire by the end of each module or unit by creating clear learning objectives.

5.- Provide additional materials

Additional materials, such as industry reports, real-world application examples, or opportunities for project-based learning will provide a real-life-based valuable experience to the already existing micro-credential educational material.

Overall, students believed that micro-credentials provided a competitive advantage in the labor market. Job prospects and career opportunities can be improved using these credentials by demonstrating continuous learning and practical skill application. According to the students, micro-credentials were crucial for fostering a more knowledgeable and skilled workforce, leading to societal advancement.

Making education more accessible and relevant through micro-credentials is a way to achieve social progress and economic growth. Making education more accessible and inclusive was attributed to the versatility of micro-credentials. They offer chances for individuals who may not have the time or resources for traditional education paths. The perception of students was that micro-credentials were innovative educational tools that provide flexibility and focused learning, which is a contrast to traditional educational models. Today's learners can have more customizable and tailored learning experiences thanks to this modern approach.

Despite this, the survey highlighted several areas where the course could be improved to meet the needs of students and improve the learning experience. The course provided a good foundation of knowledge, but some students indicated a need for more practical tasks, head-on exercises or case studies. Gaining more knowledge about the experiences of other European countries is a good idea.

By including real-world case studies and interactive self-assessment components that incorporate gamification principles in future courses, the learning experience could be enhanced. Incorporating these elements would improve the understanding of the course material and encourage trainees to critically evaluate the presented concepts and paradigms.

Part 3 – Conclusions

The EU Council adopted a recommendation on June 16, 2022, regarding a [European approach to micro-credentials for lifelong learning and employability](#). The recommendation aims to help develop, implement, and recognize micro-credentials across institutions, businesses, sectors, and borders.

To ensure everyone has the knowledge, skills, and competencies they need to thrive in their personal and professional lives, it is crucial to have an effective culture of lifelong learning.

Shorter forms of learning opportunities than traditional qualifications, such as micro-credentials, are being developed rapidly across Europe and around the world. In response to the demand for more flexible, learner-centered forms of education and training, a wide variety of public and private providers offer these opportunities. Furthermore, they are capable of offering education and training opportunities to a wider range of learners, including those who are disadvantaged and vulnerable.

Unless there are common standards that guarantee their quality, transparency, cross-border comparability, recognition, and portability, micro-credentials will not be able to reach their full potential.

Testing digital micro-credentials in the standardization domain has highlighted significant opportunities for enhancing their effectiveness and value. The findings underscore the importance of aligning micro-credential content with current standards and involving experts (industry, university) in curriculum development. Robust assessment methods and third-party validation are essential for ensuring the credibility and comprehensiveness of these credentials.

Standardizing credential formats and leveraging technologies like digital badges and blockchain can enhance the portability and verifiability of micro-credentials. Additionally, creating interactive, engaging content and providing continuous learner support can significantly improve the learning experience and outcomes.

Ensuring accessibility and inclusivity, offering flexible learning paths, and actively engaging stakeholders—including students/ future employers—are crucial for maximizing the relevance and impact of micro-credentials. Effective marketing and awareness campaigns, along with highlighting success stories, can further promote the adoption and recognition of these credentials.

Regular evaluation and a commitment to continuous improvement based on feedback from all stakeholders are vital for maintaining the quality and relevance of micro-credentials. By addressing these key areas, virtual micro-credentials in the standardization domain can play a pivotal role in meeting workforce needs, enhancing professional development, and supporting lifelong learning.

Moreover, testing digital micro-credentials in the domain of standardization can provide valuable insights into their effectiveness, relevance, and impact.

Based on such testing, here are some recommendations to improve and standardize these credentials:

Curriculum Alignment and Relevance

- **Align with Industry Standards:** Ensure that the micro-credentials are aligned with current industry standards and practices. Regularly update the content to reflect changes in standards and emerging trends.
- **Engage (Industry, University) Experts:** Collaborate with experts to validate the curriculum, ensuring that it covers essential knowledge and skills relevant to the standardization domain.

Assessment and Validation

- **Robust Assessment Methods:** Implement diverse and rigorous assessment methods, including practical tasks, case studies, and real-world problem-solving scenarios, to ensure a comprehensive evaluation of competencies.
- **Third-party Validation:** Use third-party organizations for validation and accreditation of micro-credentials to enhance credibility and acceptance among trainees/ students – the future employers and HEI.

Interoperability and Portability

- **Standardize Credential Formats:** Adopt a standardized format for issuing micro-credentials to ensure they are easily recognizable and verifiable across different platforms and HEI.
- **Digital Badges and Blockchain:** Utilize digital badges and blockchain technology for secure, verifiable, and portable credentials that can be easily shared and validated.

Learner Support and Engagement

- **Interactive and Engaging Content:** Develop interactive and engaging content, including videos, simulations, and interactive modules, to enhance the learning experience and retention.
- **Continuous Support and Feedback:** Provide continuous support and feedback mechanisms for learners, including access to mentors/, discussion forums, and regular feedback on assessments.

Accessibility and Inclusivity

- **Inclusive Design:** Design micro-credentials that are accessible to all learners, including those with disabilities, by adhering to universal design principles and accessibility standards.
- **Flexible Learning Paths:** Offer flexible learning paths and modular courses that allow learners to progress at their own pace and customize their learning journey according to their needs and interests.

Stakeholder Engagement

- Partnerships: Build partnerships with employers and industry bodies to ensure that micro-credentials meet workforce needs and enhance employment opportunities for learners.
- Feedback Loops: Establish feedback loops with learners, educators, and employers to continuously improve the micro-credential offerings based on real-world insights and requirements.

Marketing and Awareness

- Promotion and Advocacy: Develop marketing strategies to promote the value and benefits of virtual micro-credentials to potential learners, employers, and educational institutions.
- Success Stories and Case Studies: Highlight success stories and case studies of individuals and organizations that have benefited from micro-credentials in standardization to build credibility and awareness.

Evaluation and Continuous Improvement

- Regular Evaluation: Conduct regular evaluations of the micro-credential programs to assess their effectiveness, relevance, and impact on learners, Higher Education Institutions, and the industry.
- Continuous Improvement: Use evaluation data to make continuous improvements to the curriculum, assessment methods, and delivery mechanisms to ensure high-quality and up-to-date micro-credentials.

In response to the demand for more flexible and learner-centered forms of education and training, many public and private providers are developing learning opportunities that are small compared to traditional qualifications across Europe and the world. Education and training can be described as ongoing and ongoing and can take place in various settings (such as at work, at home, among individuals currently employed, and among those who are not currently employed).

Micro-credentials enable the targeted, flexible acquisition and recognition of knowledge, skills, and competencies to meet new and emerging needs in society and the labor market. It's important to note that micro-credentials are not a substitute for traditional qualifications. They can be a complement to traditional qualifications and provide a lifelong learning opportunity for everyone. Micro-credentials have the flexibility to be designed and delivered by a variety of providers in various formal, non-formal, and informal learning settings.

Currently, there is no consensus on what micro-credentials mean and no guidelines for describing and recognizing them. The portability of their use in education and training sectors, on the labor market, and across countries is causing concern regarding their value, quality, recognition, transparency, and portability. This limits trust, understanding, wider acceptance, and uptake which in turn limits the potential of micro-credentials to support flexible learning and career pathways.

In Europe, it is necessary for people to continuously update their knowledge, skills, and competencies to bridge the gap between their education and training and the demands of a rapidly changing labor market. These recommendations can make digital micro-credentials in the standardization domain more effective, widely recognized, and valuable to learners, including Higher Education Institutions, their students, and employers. A comprehensive approach that includes planning, stakeholder engagement, robust technology, and continuous improvement is necessary to effectively implement virtual micro-credentials. Universities can create valuable and recognized learning opportunities that meet the evolving needs of students and employers by pursuing these recommendations.

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