

GREENT PILOT DELIVERY IN BULGARIA – REPORT COMPILED BY THE GREENT PROJECT TEAM

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I. Teacher feedback after individual lessons delivery

A total of 14 lesson activity reports were submitted by teachers from Bulgaria. The 7 different lessons piloted by Bulgarian teachers are:

First Name	Last Name	City / town	Name of school	Name of the GREENT lesson you delivered
Hristiyana	Tsenovska	Vratsa	Nikola Vaptsarov Technical Vocational School	4. Natural cycles and flows – material and energy
Hristiyana	Tsenovska	Vratsa	Nikola Vaptsarov Technical Vocational School	4. Natural cycles and flows – material and energy
Katya	Zamfirova	Varshets	Ivan Vazov High School	22. Circular economy
Katya	Zamfirova	Varshets	Ivan Vazov High School	5. Biodiversity and natural systems
Mariyana	Vasileva	Pazardzhik	Georgi Benkovski High School	16. Sustainable solutions and their importance for the environment. Climate, energy and waste handling.
Petya	Peeva	Sofia	23rd High School "F.J. Curie"	16. Sustainable solutions and their importance for the environment. Climate, energy and waste handling.
Rozalia	Dimkova	Veliko Tarnovo	Vela Blagoeva High School	4. Natural cycles and flows – material and energy
Rumyana	Aleksieva	Plovdiv	St. Paisiy Hilendarski High School	16. Sustainable solutions and their importance for the environment. Climate, energy and waste handling.
Shizen	Izet	Kostinbrod	Dr. Petar Beron High School	18. Examples of sustainable businesses
Shizen	Izet	Kostinbrod	Dr. Petar Beron High School	17. Sustainable solutions in everyday life – global and local impact
Shizen	Izet	Kostinbrod	Dr. Petar Beron High School	16. Sustainable solutions and their importance for the environment. Climate,

				energy and waste handling.
Tsvetelina	Ventsislavova	Kostinbrod	Dr. Petar Beron High School	5. Biodiversity and natural systems
Tsvetelina	Ventsislavova	Kostinbrod	Dr. Petar Beron High School	4. Natural cycles and flows – material and energy
Vladimir	Donov	Pazardzhik	Georgi Benkovski High School	4. Natural cycles and flows – material and energy

The students to whom the lessons were delivered ranged from 9th to 11th graders. According to the information submitted in the forms, a total of 276 students participated in the lessons. The actual number of unique students may be lower because teachers who piloted more than one lesson may have piloted it to the same group of students. The teachers who delivered the lessons are teachers in Geography, Biology, Physics, English, Entrepreneurship, Economy, History, as well as specialized subjects such as Biomass Energy Production Systems, Technologies for Using Wind Energy, etc.

Almost all teachers used 1 school hour to deliver the respective lesson, although in 4 cases teachers used 2 or more school hours to teach the lesson. They focused equally on delivering the introduction, the theory, the practical activities, the case studies and the reflection sections of the lessons. They did not focus so much on the entrepreneur profiles and the homework.

In terms of timing, the feedback from the teachers is that in general the time is not enough to deliver all parts of the lessons and they had to skip some parts, although several teachers managed to do all core sections of the respective lessons. This may be due to the fact that lessons 4, 5, 16 and 17 that several teachers chose to pilot are among the most voluminous in the GREENT course. Almost 100 % of teachers thought that the indicative timings proposed for each section in the teachers' manual is a good reference for them when planning the lesson.

The overall assessment presented in Chart 1 below reveals the high appreciation that Bulgarian teachers give to the relevance and appropriateness of the overall content and level of difficulty of the lessons, including their theoretical sections, entrepreneur profiles, and case studies. Moreover, teachers think that the lessons they piloted provide opportunities for real blended learning (4.46 out of 5).

GREENT lessons' content, difficulty, age appropriateness and relevance of presented information according to Bulgarian teachers

■ Average Score N = 14 (1 = No, 5 = Yes)

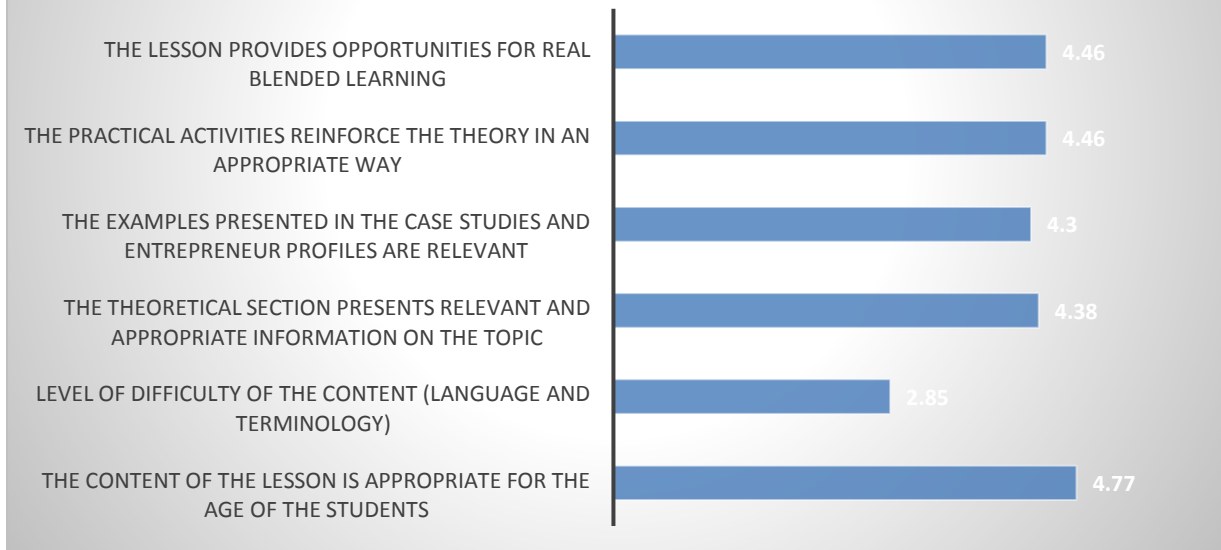


Chart 1. Assessment of Bulgarian teachers related to GREENT lessons' content, difficulty, age appropriateness and relevance of presented information.

Results show that teachers in general are not comfortable with the fact that the online videos that the lessons link to are in English and have no subtitles in Bulgarian. This was a problem in 8 of the cases, while it was not a problem for 6 of the cases. The situation becomes even more complicated when teachers are asked whether the English language in the videos is a problem for their students – according to teachers, this was a problem for their students in 10 out of 14 cases.

An important aspect of the GREENT lessons is their influence on fostering and/or changing students' attitudes. The teachers were requested to give their assessment of whether the lessons they piloted have an impact on students' creativity, environmental responsibility and willingness to generate their own sustainable business idea. The scores are presented in Chart 2 below:

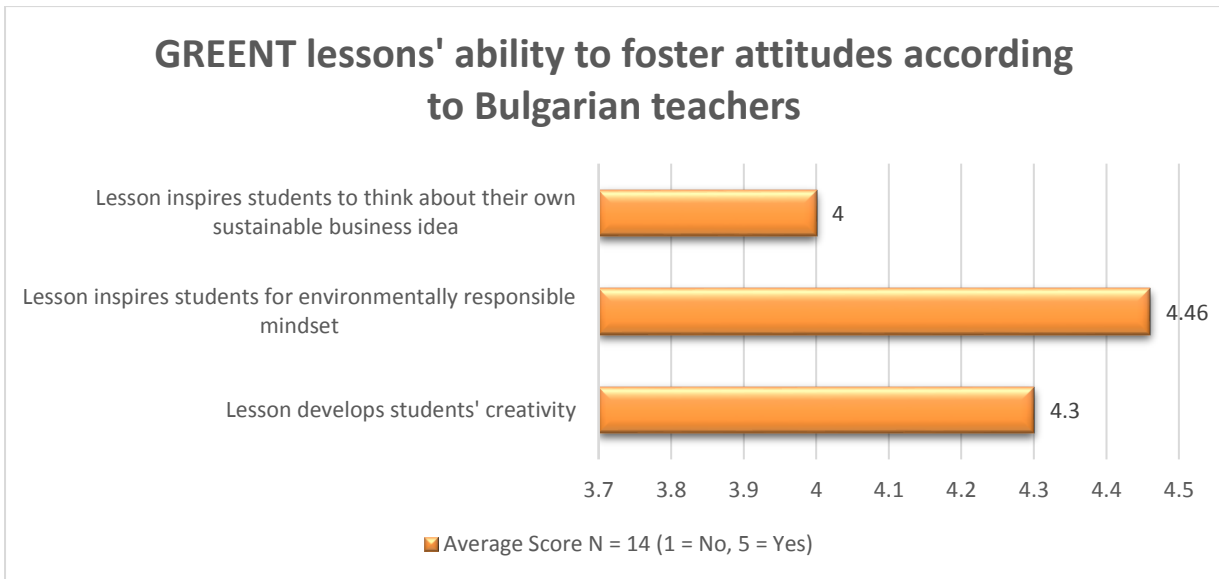


Chart 2. Assessment of Bulgarian teachers related to GREENT lessons' ability to foster attitudes and creativity.

In terms of skills that piloting teachers thought were mostly developed by the GREENT lessons piloted in Bulgaria, reflection and self-assessment stands out as the leading skills. Critical thinking, analysis of information and environmental responsibility were also among the leading skills to be developed by the GREENT lessons. Data is summarized in Chart 3 below:

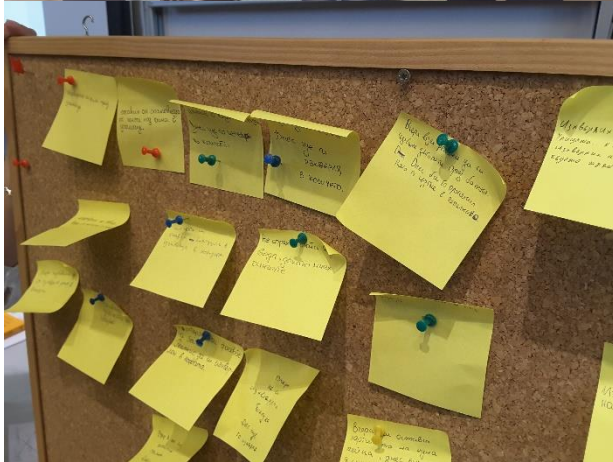


Chart 3. Skills developed by GREENT lessons piloted in Bulgaria, according to piloting teachers.

It is reassuring to see that the teachers who piloted the content saw a number of cross-curricular links of the respective piloted lesson with the other subjects from the compulsory educational curriculum. English language teachers, for instance, saw good connections with vocabulary practice, listening and reading comprehension, speaking skills. Lesson No. 4 was thought to make very good interdisciplinary connection with the "Biosphere" section from the Biology textbook for the 9th grade. In general the content was seen to link particularly well with general subjects such as Geography, Entrepreneurship, Biology, Chemistry, as well as with more specialized subjects such as Facilities and installations for biomass energy production.

A lot of the more general recommendations focus on the English language in the videos. Several teachers requested that we subtitle the videos so that they are more easily understandable both for the teachers and the students.

One of the good practices in Bulgaria was the delivery of a public lesson from the GREENT course during an extracurricular educational day organized by 23rd High School in Sofia. Students and teachers from 4 other Sofia schools were invited too. One of the sessions during the day was devoted to piloting Lesson 16. Sustainable solutions and their importance for the environment. Climate, energy and waste handling. The public lesson was initiated and delivered by Petya Peeva - teacher at 23rd High School "F.J.Curie" in Sofia. The GREENT team is grateful for the flexible way in which the lesson was presented, using our materials as a foundation from which further activities were initiated by the teacher. The students learned about sustainability, unsustainable extraction of natural resources, the impact of their everyday decisions on the planet, plastic-to-fuel technologies, etc. In the end, every student made a pledge of one thing they would change in their lives starting from tomorrow so that they decrease their negative footprint on the planet.



II. Teacher recommendations on individual lessons

Lesson 4. Natural cycles and flows – material and energy

- The visualization of natural cycles and flows is really helpful.
- Students could cooperate and share, the lesson gave the opportunity for students with different types of intelligence to be actively engaged.
- The lesson gives a good opportunity, provided every student can be seated at an individual computer desk, for self-paced learning.
- For some students in specialized vocational schools the content was too easy and a recommendation is to add schemes and definitions that would increase the complexity of the lesson and make it more attractive for students on a more advanced level.
- The practical activity and the reflection part went particularly well.

Lesson 5. Biodiversity and natural systems

- As I liked all of the three cases, I divided the class in groups and let the students go over their case study and then the three groups shared what they had learned.

- The practical activity went particularly well.

Lesson 16. Sustainable solutions and their importance for the environment. Climate, energy and waste handling.

- The lesson gives a lot of opportunities for team work and ways to link theory with practice and everyday life.
- Case study 2 is quite difficult to solve, it requires specific knowledge.
- The best part were the case studies.
- It was difficult to do the quiz with all students.
- The practical activities were really interesting and the answers to the questions were very creative. The group discussion were very good.
- The theoretical part was a bit difficult for the students and took longer to deliver.

Lesson 17. Sustainable solutions in everyday life – global and local impact

- The video in the theoretical part was very interesting for the students. They also thought the concept about Gross National Happiness was quite interesting.
- The time was not enough to reach the practical activities part.

Lesson 18. Examples of sustainable businesses

- Students created a very good poster as a homework. They were impressed by the videos in the lesson and definitely started thinking about their actions and impact on the environment.

Lesson 22. Circular economy

- The students easily understood the idea behind circular economy and came up with ideas how they can be part of it.
- The entrepreneur section is too long to be carefully read and discussed. Maybe, it's a good idea to give it as a homework assignment.

III. Overall teacher self-assessment after delivery of all planned lessons

Apart from the feedback and recommendations teachers gave after piloting each lesson, they were asked to fill in a short self-assessment survey designed to gauge their perception regarding possible improvements in the level of their teaching skills and knowledge as a result of participating in the pilot. A total of 6 teachers filled in the survey although more teachers participated in the pilot. Although by no means representative, the results show a marked improvement in the way teachers see their green entrepreneurship and blended learning knowledge and skills after the end of the pilot:

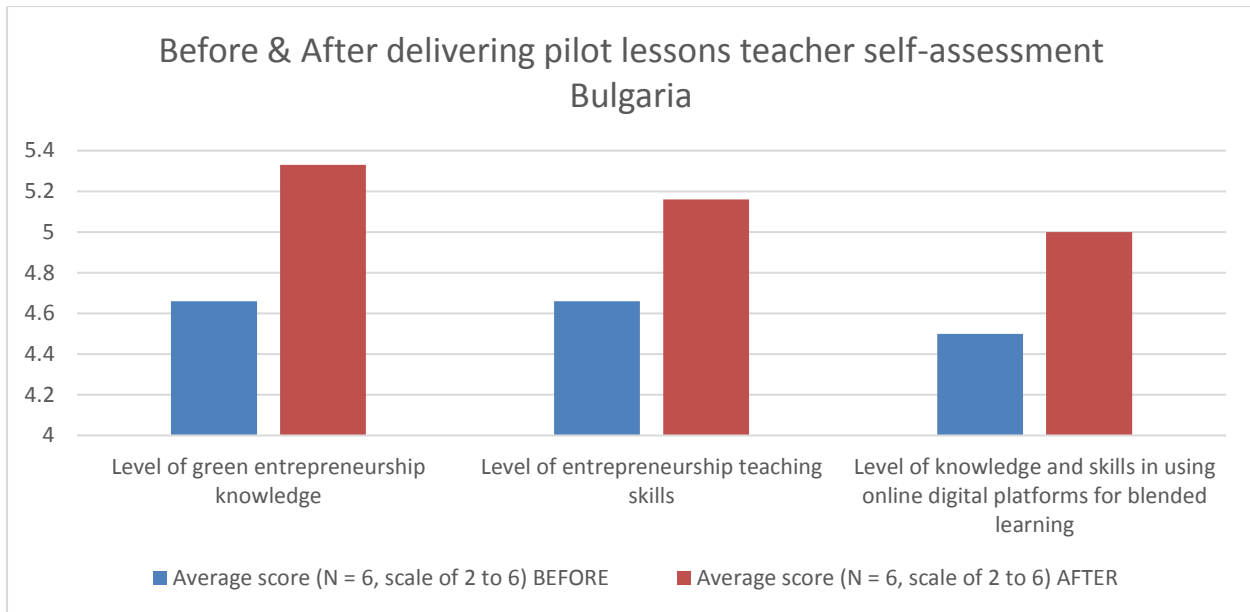


Chart 4. Before & After delivering pilot lessons teacher self-assessment for Bulgaria

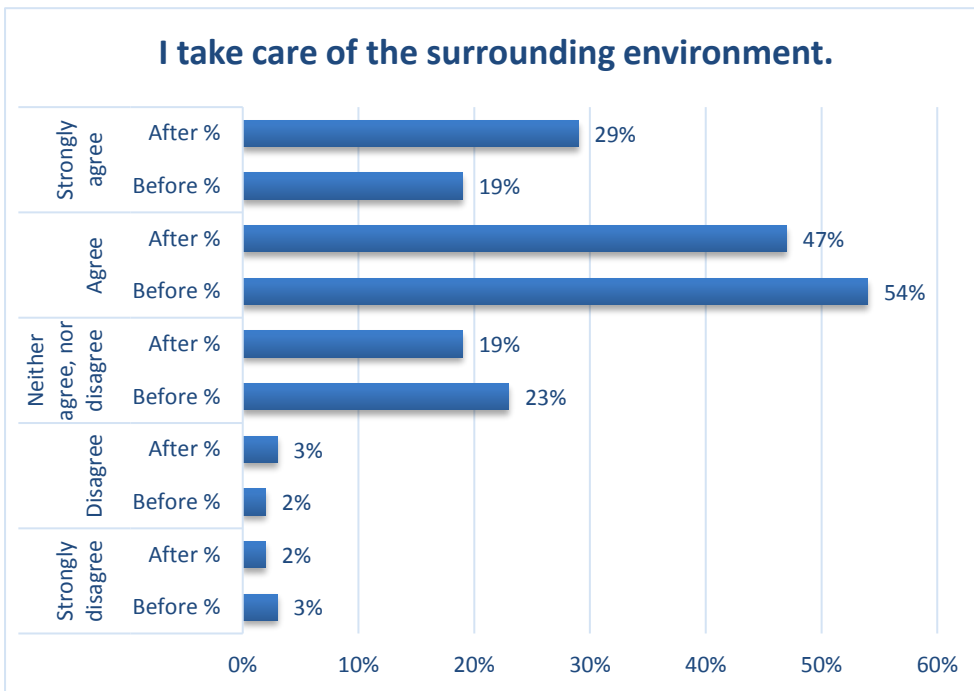
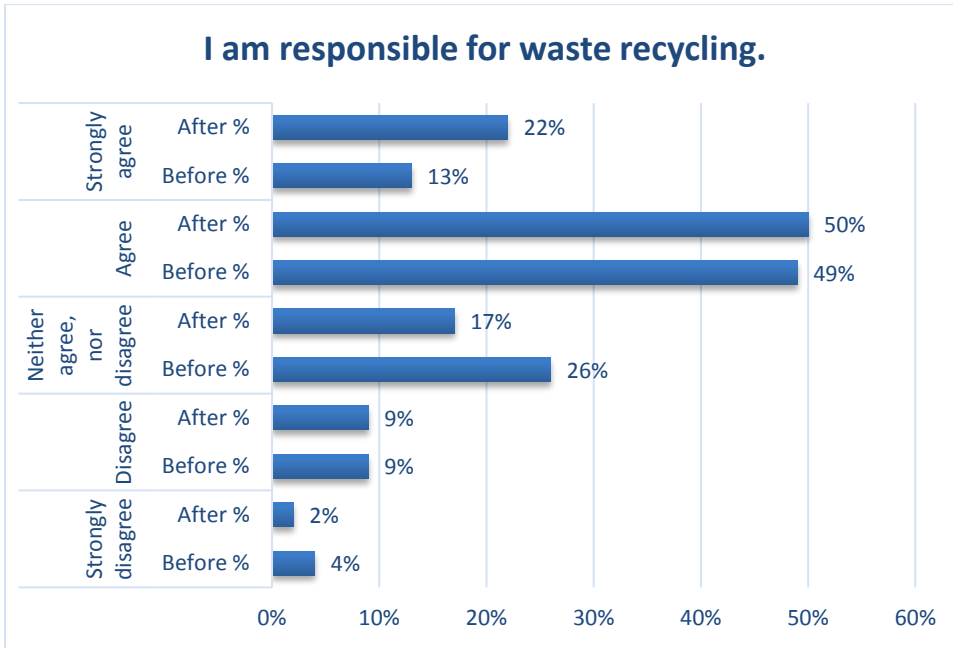
Teachers evaluated positively the fact that blended learning helps students understand topics that they are not familiar with in an accessible way and makes them think critically on subjects they have never heard of before. They also thought the lessons present useful and up-to-date information which helps develop their environmentally-friendly mindset and culture. The video materials were assessed as appropriately chosen and interesting for the students. The lessons in general are well structured and innovative, they manage to “catch” the students’ attention. Even if a difficulty arises with the English language in the videos, therein also lies an opportunity for cooperation in the classroom because the students with more advanced levels of English comprehension translated for the others.

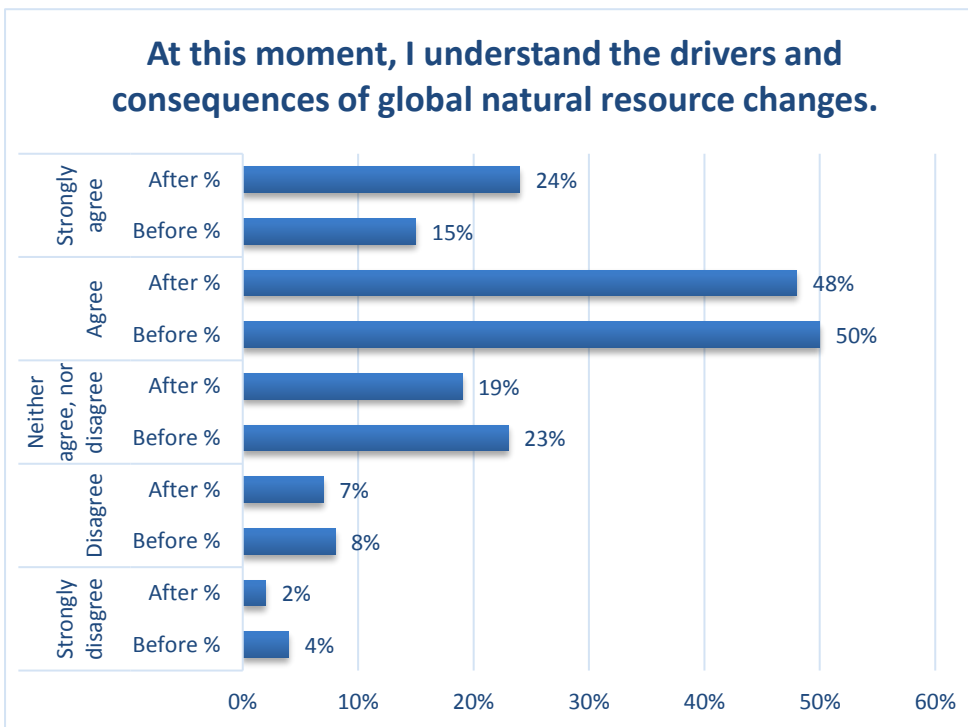
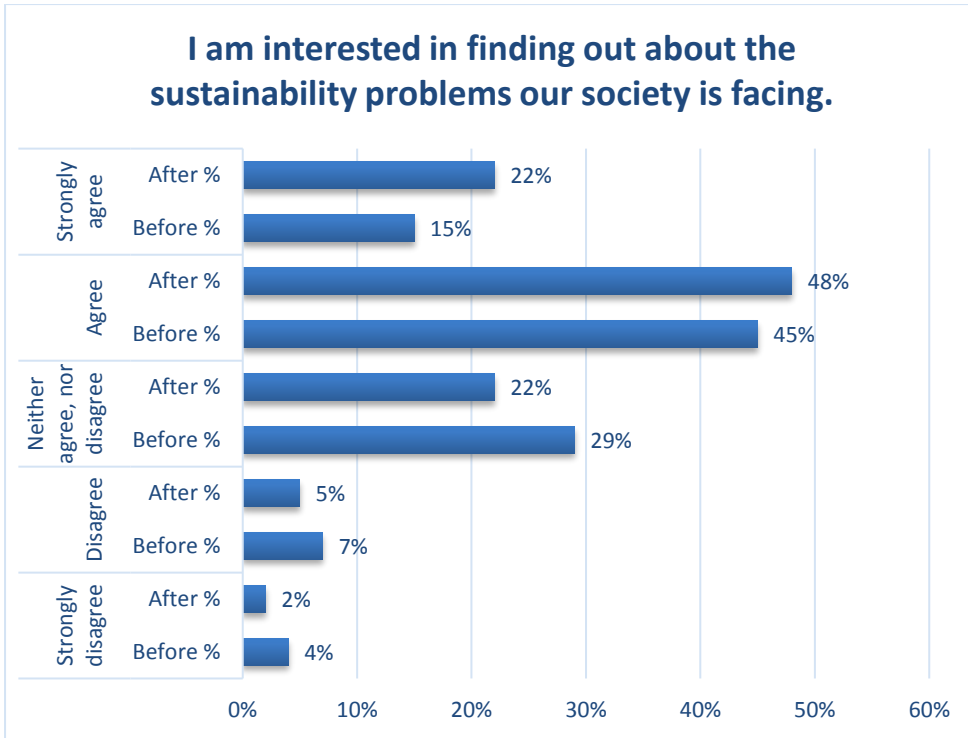
All teachers expressed their desire to implement the full GREENT course in the 2017-2018 school year.

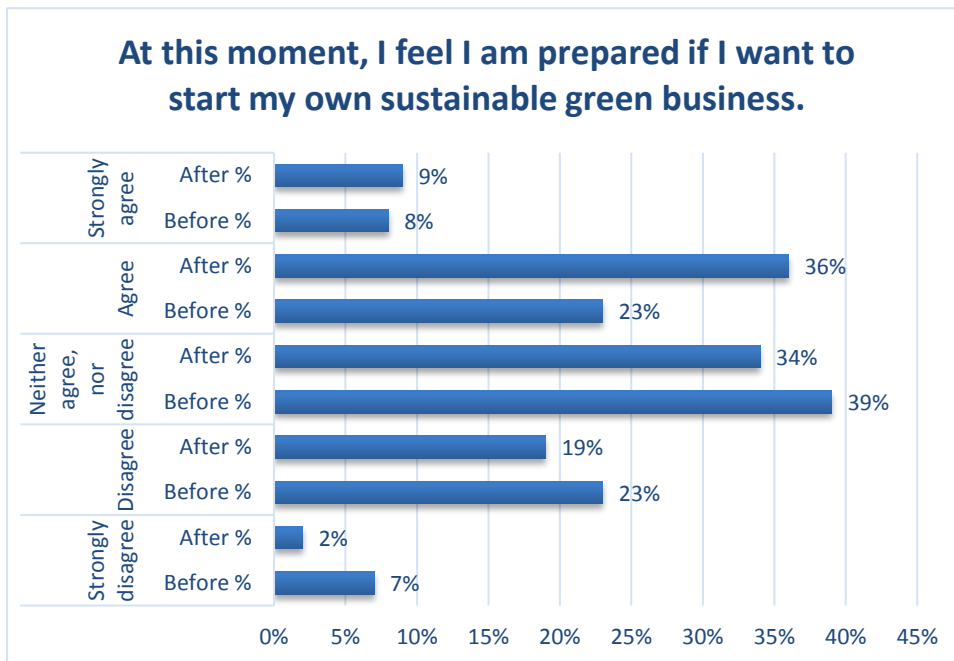
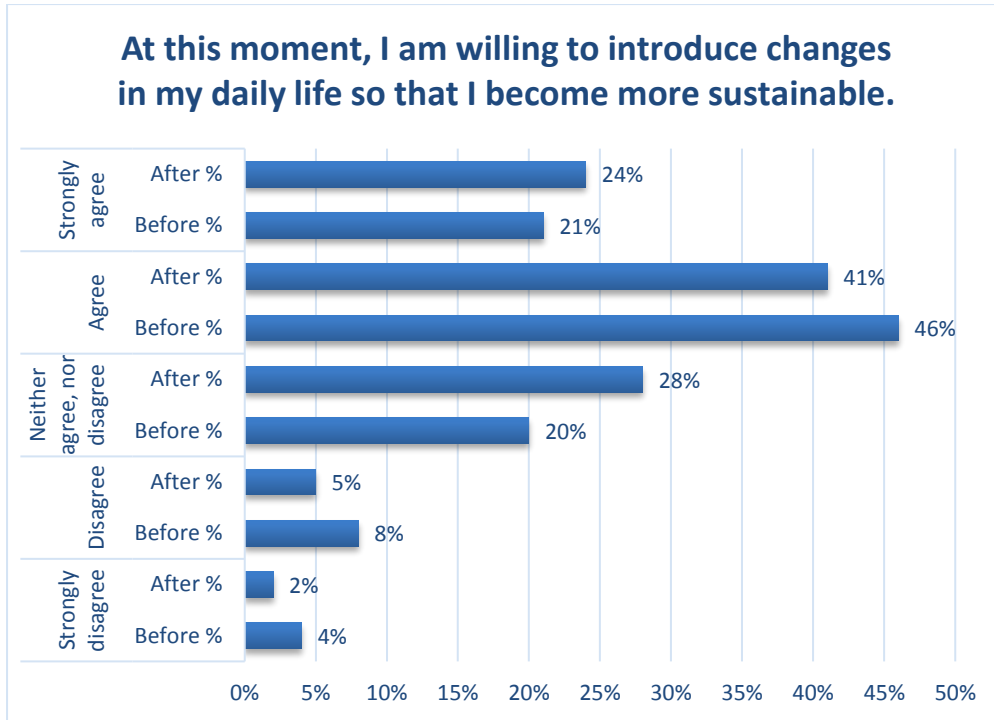
IV. Student pre- and post-test results

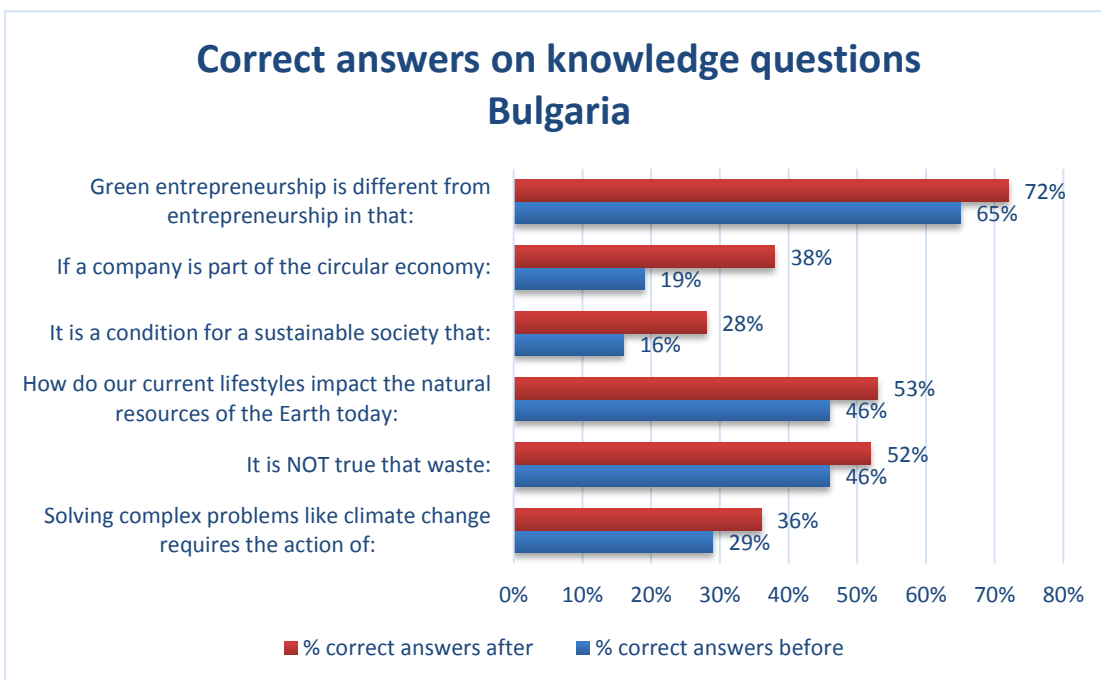
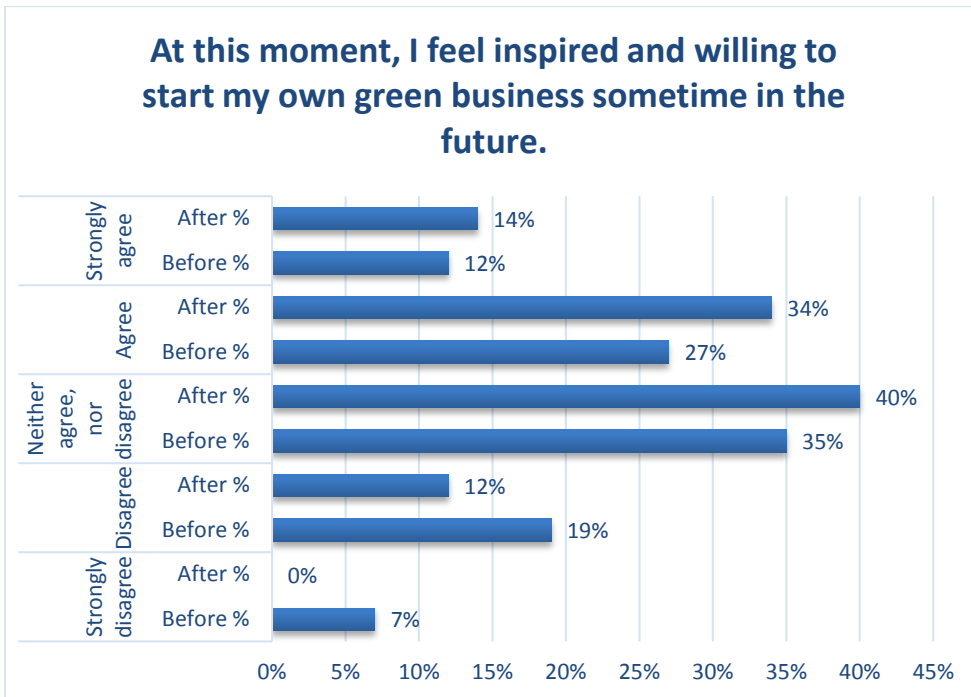
In order to gather information on the improvement of students’ knowledge and perceptions, we designed a test with 10 closed- and open-ended questions which teachers were asked to distribute to students before and after the piloted lessons. The results should not be treated as too reliable, as some students who took the test were exposed to only 1 pilot lesson while other were exposed to 3 and more, thus the level would undoubtedly vary because the test questions cover aspects from several of the GREENT lessons. Also, mainly due to the fact that the piloting was done at the end of the school year, many students did not fill in the post-test (and filled in only the pre-test) which does not allow us to compare like for like. However, we believe it is useful to present the results as a vantage point.

In Bulgaria, a total of 113 students completed the pre-test and 58 completed the post-test.









Students' perception of the value of GREENT Bulgaria

