



### **Report on the virtual mobility in Serbia “Art in everywhere”**

The overall purpose and goal was to combine MATHS and ART, PHYSICS and ART.

**17. 10. 2022. / 18. 10. 2022.**

Learning about Fibonacci and applying his mathematics to ART is a terrific way to encourage STEAM learning and that is exactly what we succeed to do throughout our workshops.

Students, monitored by their teachers, did the researching and made a presentation about Fibonacci. Presentation covered the following topics:

- Who is Fibonacci?
- What is the Fibonacci Sequence & the Golden Ratio? Simple Explanation and Examples in Everyday Life
- How to reach the golden ratio with Fibonacci numbers? Why is the golden ratio more pleasing to the eye?
- What kinds of artworks can we design using Fibonacci numbers? - Artworks made in history with the golden ratio.

Students worked in pairs of two, in 5 groups. Each group got the assignment but in the end all groups worked together, exchanging information and photos they found on the internet. Some students made a presentation in their native language while some of them did it in English.

Students explored how to make the Fibonacci sequence and discovered how its unique characteristics create the Golden Ratio. Then they used the Golden ratio created from the Fibonacci sequence to identify how it appears in nature. They explored phenomenon of the Fibonacci sequence and saw how the sequence is related to the Golden Ratio in the world that surrounds us.



### **20. 10. 2022.**

Students demonstrated their presentation via Zoom to the students from Bulgaria, Turkey and Serbia.

The first workshop was “Coloring activities using Fibonacci numbers”. Students worked together (around 30 students participated in a workshop, and there were a lot more interested, too) and created paintings based on the knowledge and information they gathered.

Activities done: Drawing a golden Rectangle and Fibonacci Spiral using the Fibonacci sequence, Creating the Fibonacci Spiral, Fibonacci Fractals, Drawing & Coloring Fibonacci tree....

The works as well as the presentations are presented to a wider audience via social media, website, YouTube channel...

### **21. 10. 2022.**

#### **Photography workshop – Golden ratio in photography**

Teachers and students made a short presentation about golden ratio, spiral and the rule of thirds in photography. Teachers gave a short presentation about ideal proportion of a human face. Students selected a few photos suitable for accurate facial analysis then they tried to identify a number of golden ratio dimensions in these photos. Students learned that there are so many ideas and measurements done with facials, not just the one we explored on our workshop.

During the weekend students took photos where they showed the use of a spiral, golden ratio or the rule of thirds in the world around us. The photos were put into the presentation and everything was shared on social media, website, YouTube channel etc.

The teachers from all countries organized a photo competition. Students voted and Bulgarian photo won.



### 25. 10. 2022.

With the help of their teachers, students made presentations about pendulum. The researching included questions:

- What is a Pendulum,
- How to make a pendulum
- How to use pendulum to create paintings

They talked about other objects that move back and forth such as swings and see-saws. They found out about famous artists making pendulum paintings, but also they learned great things from Physics, such as gravity, motion, oscillation. They were learning Physics without even realizing it. They also explored how pendulums work and why they are useful in everyday applications.

After this lesson, students were able to explain theoretically:

- 1) How weight, length and angle of swing affect the period of a pendulum (most of the students)
- 2) Relate the study of physics and Galileo's experiments with the creation of clocks. (some of them)
- 3) Describe how the conservation of momentum relates to pendulums. (some of them)
- 4) Give examples of the use of pendulums in real life (everyone)

Students practiced English all the way throughout the workshops and in conversation via Zoom with students from other countries but this topic was a bit abstract for some of the students and they worked with the Physics teacher in their mother tongue to clear things out.

Presentations are posted on social media, website and YouTube channel.



### **27. 10. 2022.**

Workshop: Painting activity “Using a swinging pendulum to create art”

The classroom looked so alive during this workshop.

With the help of the teachers students made a pendulum and used it to create their own works of art. When the pendulum was set-up they experimented with different sizes of weights, different lengths of string and different angle of release. They loved experimenting with speed, force, gravity, and studying the direction of the pendulum. It taught them a lot of STEAM concepts. They learned that after enough practice and work they could predict the movement of the pendulum and what patterns it can make. According to students, this was the workshop they enjoyed the most, a workshop they would love to repeat as it takes time to get circular motion and to get better.

They added a rock in the can to check if it will make any difference and they found out that the only difference is made by using short or long rope/string. It was a great activity that made some great artworks and the results were fascinating.

Activity was shared with students from Bulgaria and Turkey via Zoom.

Artworks are shared on social media, project website and YouTube channel.

### **28. 10.2022.**

Kahoot quizz

The last day students took the quiz to check their knowledge. Quiz was done in several classes with the students who participated in workshops and those who didn't. The difference in their knowledge is noticeable. The interesting thing was that so many students who didn't have the chance to participate directly into the mobility found the quiz to be so interesting and learned basic things about the topics which is always one of the biggest priority of every project. A lot of students benefits from these workshops which in the end made this whole virtual mobility successful and teachers' time and effort worthwhile.



## **Evaluation and benefits of the virtual mobility**

At the end of the mobility, the evaluation questionnaire was developed online and participants of the mobility were asked to fulfil the questionnaire. It contained thirteen items for rating and two open answers. The participants from all of the countries had possibility to fulfil the questionnaire online while only students who had closer involvement with the project were asked to fulfill the questionnaire on paper (10 from each country).

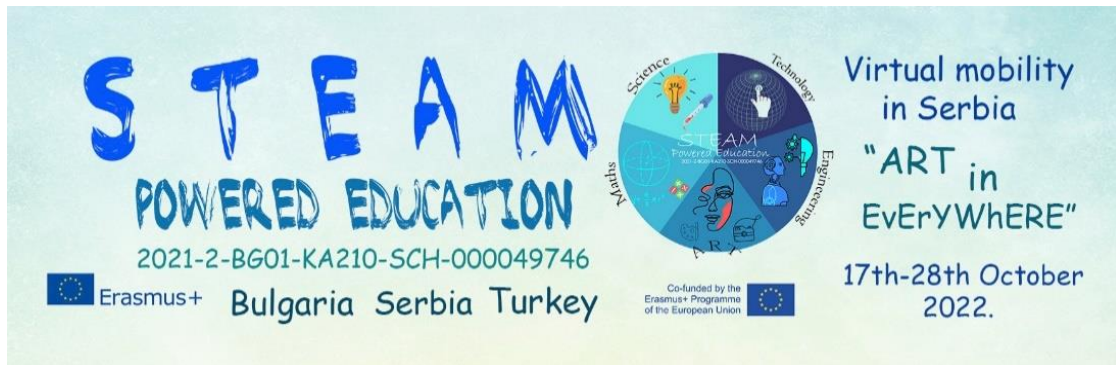
As for the teachers, 10 of them answered the questionnaire. It contained eight items for rating and three open answers.

Teachers who participated in this mobility –Mathematics teacher, Physics teacher, two Art teachers, English and French teachers, and the principal of our school – IT and Mathematics teacher as well.

Overall impression of the mobility is positive. The only disadvantage is the time which for some participants wasn't enough, and problems with internet connection.

All expected results were achieved. Students didn't just hear the lectures about the topics mentioned here, they learned by researching rather than just listening about it, they've discovered facts by themselves, they've been working together by experimenting and experiencing, helping each other and learning from each other. They developed their tolerance by working in a team, and each of them found its place in a group. They felt as a valuable member of a team where each of them contributed in learning process and in making the final products.

Students improved their presentation skills by explaining the topics they've been working on, both to their friends from school and to students from partner schools. They were stimulated to develop their own ideas on design and express their thoughts and feelings. They were given the opportunity to be innovative and to display their potential through creativity.



Students improved their photography knowledge and skills which at the same time boosted their self-esteem. They were challenged as individuals but inside the group to compete with the students from partner schools. They gave their best as individuals working for one team and they learned that winning is not always the sole or primary objective of the work we do. In a supportive environment this competition taught them to accept non-winning without losing self-esteem and embrace ideas and effort they put into work.

Apart from these expected benefits, both teachers and students developed and improved IT skills by making presentations, making videos, taking photographs and then combining it into a presentation or a video. By doing the research on specific topics they expanded their knowledge on “googling” and finding information on different websites.



### Dissemination of the mobility

Dissemination of the mobility is done via social networks, through the website and via media. The works are also disseminated via official school's Facebook page and school's website.

Apart from that, the whole town and the region are aware of our project mobility as our works have been presented through local and regional media newspapers and online portals.

<https://bujanovacke.co.rs/2022/10/31/brankovci-sa-vrsnjacima-iz-turske-i-bugarske-umetnost-je-svuda-foto/?fbclid=IwAR1aXX7yAGlceqEbgAHYww5Qr-si6lR19lyBJFQQNGWtr8fucJ6RD6PG9hY>

<https://www.vranjenews.rs/news/%C4%91aci-bujanova%C4%8Dke-%C5%A1kole-se-u%C4%8De-umetnosti-kroz-prizmu-matematike-i-fizike?fbclid=IwAR3peej3ubAyDcSgcafHN0Q1A7shFJE0Yx7VX7GKdHGtEVc9sYeW9Jxmc74>

<https://vom.rs/vesti/drustvo/umetnost-kroz-prizmu-matematike-i-fizike/>

Our project website is **being promoted on these internet portals as well.**

All students' works will be presented on an exhibition at school which will be open for one week at the end of the month (November) so all the students and teachers who didn't have the chance to participate directly can see the results and the final products.

The final product except for the lots of paintings and presentations, the most valuable one, is students' knowledge which they proved in the Kahoot quiz.

In the end, all students and teachers who participated in the virtual mobility will receive a thematic certificate as a product and reminder of our work and the mobility.

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