Studying Space with Social Networks

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Abstract

The aim of the project is to support the use of technology to encourage the study of science and above all to do research on life in space; it is an opportunity to discover the students' predisposition towards the study of scientific subjects. The project starts from the interest shown by the students in the projects proposed by ASI (Italian Space Agency).
Direct communication through social networks with astronauts, videos published by NASA, the ESA twitter profile, the ***Scientix*** *community website, have supported the participation in competitions for young students of the Aerospace Technology District. The teacher can explain to students how to choose their own sources of information, how to share information and emotions and be creative on the web.*
The training and technological path not only leads to the creation of a new way of storing experiences, but constitutes a cultural heritage available to the student and his/her companions, to be subsequently resumed, revised, modified and eventually improved. The project includes two lines of activity: one oriented to the goal of sensitizing students to the conscious use of tools for educational purposes; a second one oriented to the production and sharing of works realized by the study of experiences focused on space and technology, reported on the websites of the ESA (European Space Agency) and the ASI (Italian Space Agency).
The main phases of the project are basically four: to identify a theme related to life in space, to have an idea and communicate it through posters, web portals, social networks; identify the web tools to create participated activities and stimulate the interest of the students; share the product material; return of the material collected in a narrative and engaging form.
The most modern active teaching techniques are used to stimulate the participants in group work and to understand the problem solving method. The theme chosen, developed by the students and shared on social media is hydroponic vegetation in space. Participant students were aged 14-16, and data was collated through teacher's interviews, classroom observations, students' diaries and concept maps.

Keywords: Space, Science, Social networks, Share

1. Introduction

I became a Scientix Ambassador at the beginning of 2018 and immediately started to develop projects on the study of the STEM disciplines. The aim of this project is to support the use of technology to encourage the study of science and above all to do research on life in space; it is an opportunity to discover the students' predisposition

for the study of scientific subjects. The work starts from the interest shown by the students in the projects proposed by ASI (Italian Space Agency).

Direct communication through social networks with astronauts, videos published on the NASA websites, the ESA social profiles, the **Scientix** community website, have encouraged the participation in competitions for young students of the Aerospace Technology District. **Scientix** promotes and supports a Europe-wide collaboration among STEM (science, technology, engineering and maths) teachers, education researchers, policymakers and other STEM education professionals [1].

Scientix was originally born at the initiative of the European Commission and has, since its inception, been coordinated by European Schoolnet, a Brussels-based consortium of thirty ministries of education, which is a driving factor for innovation in teaching and learning and fosters pan-European collaboration of schools and teachers [1]. The project aimed to inform students about research and topics related to the space sciences and to prove to them that space science can be fun and interesting.

Fig. 1. Scientix 3 flyer 2

2. Scope of the project

"Science gives mankind inspiration and aspiration. Space science makes us look outwards from our planet, towards the stars" [2].

My goals were:

- To make science more accessible to students and teachers (through the **Scientix** community);
- Open the minds of the students, getting them used to problem solving;
- Provide a framework for a new pedagogic instruction in the classroom;
- Develop communication skills through scientific discussions;
- Build collaborations between people from different cultural backgrounds and countries;
- Develop a sense of European and global citizenship;
- Support the desire to explore the universe and the rules that regulate it;
- Understand the mechanisms of cause-effect relationships.

The main idea that guided this initiative was to bring the study of space science to the public in general, and in particular to students, through the most used social networks, offering challenges that stimulate intuition and collaboration, and which lead to the "rediscovery" of scientific studies. Explaining science with social networks has involved a major change in the traditional presentation of scientific concepts.

As an ambassador for Scientix, I share teaching strategies with teachers of STEM subjects; a lot of high quality resources and educational opportunities are available online on Scientix and on partner project websites, so very often students only need a device and an Internet connection to access these resources. But of course, they must be made aware of these opportunities. And this is my role as Ambassador Scientix.

3. Methodology

The methodology and the pedagogical approach are based on modern teaching methods, problem, project and learning based on information provided through e-learning platforms. Social media can help students create and manage a large study community; social media make study and communication more efficient for everyone

The phases of the project were:

- *Create a learning environment.*

Designate a hashtag of the course or a name of the study group, start a list of contacts to collaborate and share the materials and invite students, teachers, experts.

The division of the class in heterogeneous working groups stimulated and encouraged the active participation of all the components, as well as tutoring, processing, reasoning and socialization, integrating the learning of each with the sharing of materials, videos, virtual debates through social media.

- *Starting a collaborative learning network.*

Searching for and following the research groups; thousands of students around the world study life in space. Students become followers of researchers, astronauts, teachers who have written books on the subject and ask questions. They save, organize and share learning resources: using collections creation tools like Pinterest, Google Drive, Dropbox to collect study materials.

Use Google Calendar, Hangouts Whatsapp, Skype, Twitter, Facebook, Instagram, to facilitate group study sessions. Look for YouTube videos and playlists for extra learning on the most challenging topics.

Send video notes, questions or reminders to fellow students.

Students are grouped together and have a research to do with the use of social

networks. The topics chosen and developed were: the life on I.S.S. (International Space Station), hydroponic vegetation, the tardigrades, the study of orbits.

- *Leading Discussions*

Teacher introduced numerous high quality resources through blogs and social networks. Students are given a topic, decide what problem to examine, and design the procedures to follow. Students are expected to think like an experts. It can also be difficult to implement in typical university settings.

By engaging students in discussion, teacher can help them think about the subject matter in previously unexplored ways, learn to evaluate their own and others perspectives, articulate what they've learned or what needs to be clarified, and even provide motivation to study the topic further [3].

I asked the students some questions, to help them to reflect on what they have learned: What have you learned while developing this activity? Which difficulties did you live?

- *Social networks*

The rise of social media technology has revolutionized the interactive sharing of ideas using online communities, networks and crowdsourcing [4].

I conducted a content analysis of social profiles of scientists who actively discuss about space science. I identified the scientists on the basis of the information listed in the Twitter profiles and the educational sites.

I started by presenting some projects reported on the **Scientix** website as ARCturus (Astronomy Resource Center) or Up There ... How is it? How to live on the International Space Station?

The students used posters, movies or extracts from a reading that was assigned.

Teachers of physics, mathematics, biology and chemistry who have collaborated with me have provided demonstrations , shown videos, slides or examples from dedicated websites (Scientix, ESA, NASA, ASI). Students who wanted to learn more about the most challenging topics, could search for videos and playlists on YouTube for or follow NASA on Instagram. Among the videos of the latest discoveries and historical archives, NASA posts are guaranteed to teach you something new every day. The agency has over 25 million followers.

Twitter is a micro-blogging social media platform for short messages that can have a long-term impact on how scientists create and publish ideas [5].

Social media tools such as Twitter can be incredibly valuable for students. Twitter makes it possible for students to follow the research also on the other side of the world, to directly share their expertise and to get feedback from experts: (@astro_luca, @ ESA, @ASIspazio, @scientix_eu, @ESAEducation, @NASAEarth, @ISS_Research, @Avamposto42, @AstroSamantha, @Telespazio, @astro_JFrancois).

- *Worksheets*

Students study how plants grow "hydroponically" in nutrient enriched fluid. The activity involves the use of *the hydroponic greenhouse*, a technique of cultivation of plants out of the ground and with low environmental impact characterized by reduced water consumption. The research uses this tool to activate innovative laboratory teaching and introduce the scientific method in the classroom.

Students deepened the tardigrades on the NASA website dedicated to the international space station. They conducted further research on orbits.

4. Conclusion

The method used proved to be effective and useful for teaching, sharing and discussing astronomy topics, but above all to increase young people's awareness of the importance of space research. Recent credibility of this theory derives from a study [6] that identifies the factors that lead to success for university students. The project lasted eight weeks, we attended conference with ESA astronaut JeanFrancois Clervoy, we shared videos and interviews with experts on social media. My students appreciated and committed themselves to the project chosen by winning a prize for the experiment on hydroponic vegetation. A visit to the Matera Space Center offered by the DTA (Aerospace Technology District) concluded the activities.

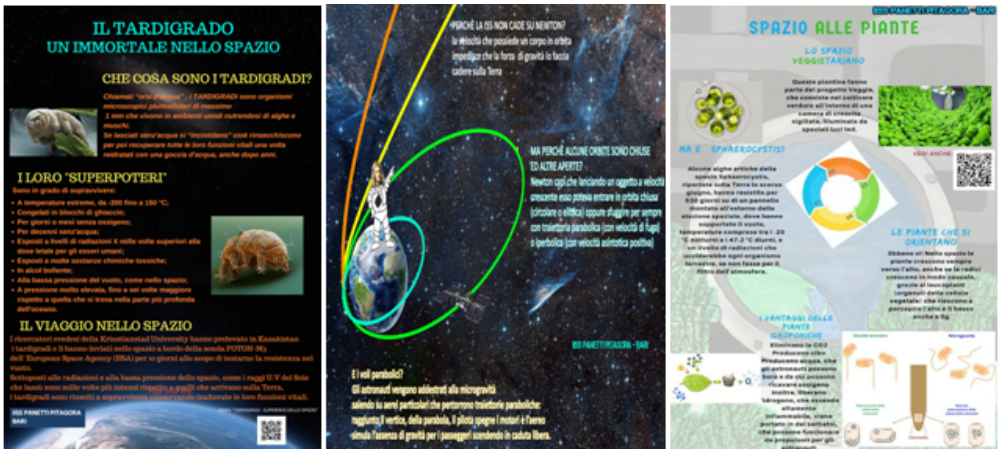

Fig. 2. Worksheets

Fig. 3. Our working group at the C.Colombo space station in Matera (ITALY)

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