SCIENCE FAIRS INSIGHTS

REFLECTIONS FROM SCIENCE FAIR ORGANISERS AND PARTICIPATING SCHOOLS' REFLECTIONS ABOUT SCIENCE FAIRS

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1. GENERAL DESCRIPTION OF STEMFAIRNET'S SCIENCE FAIRS

STEMFAIRNET consortium members´ profile: all science fair organisations are non-profit private foundations, the schools are public, and MILSET Europe is a non-governmental, non-profit and politically independent youth organisation.

The science fairs one by one

Elhuyar Zientzia Azoka

Elhuyar Zientzia Azoka is a one day event that is celebrated yearly in a popular main square of Bilbao (*Plaza Nueva*). Around 200/300 projects participate throughout the year, but for the fair day there is a limit of 90/100 projects.

It started in 2004 as a contest. It evolved to a science fair, and in 2019 Elhuyar has celebrated the 6th edition in Bilbao. The event is celebrated on the second weekend of May.

Elhuyar is most proud of the community created around the event: students, teachers, researchers, family, general public…

I Giovani e le Scienze

I Giovani e le Scienze is the Italian national contest promoted by FAST, which is held every year in March during three days at FAST venue in Milan . Around 35 teams from all Italy participate in the contest, and there are more than 30 awards. The 2019 Contest has been the 31st edition. It also selects the participants for the relevant European Contest EUCYS, promoted by the EC. Now they receive fewer projects compared to the initial years, but the quality is higher.

Fast is most proud of the contest because it has contributed substantially in Italy to promote the choice of science careers among the participants. This is confirmed by the periodical interviews and contacts FAST has with past contestants, most of whom have joined the Forum of young scientists, in order for them to stay linked with FAST and among them.

Mostra Nacional de Ciência

Fundação da Juventude promotes the "Mostra Nacional de Ciência" (the national science fair in Portugal). It lasts three years, and nowadays it is held in the Centro de Congressos da Alfândega (Porto). In 2019 was the 27th edition this year. The national fair started with the 13th edition; before it was a contest (same as Elhuyar). The 2007 edition started with 70 projects, and now it is limited to 100 projects.

The 13th National Science Exhibition in Portugal was organized from 30 May to 1 June 2019, with the participation of 97 projects by 247 young scientists and researchers, led by 61 teachers.

The Opening Ceremony of the Exhibition was taken place on May 30th and the Award Ceremony and Closing Session was held on June 1st.

The work submissions for the most diverse field of study: Bioeconomics, Biology, Environmental Sciences, Medical Sciences, Social Sciences, Engineering, Physics, Information Technology / Computer Science, Mathematics and Chemistry.

For the sake of being present, young scientists from all over the country, there are also present international projects from Spain and Mozambique

The Portuguese National Science Fair, take part of project Gera Talentos, a strict program of support for qualified and creative entrepreneurship, promoted by the Fundação da Juventude, which seeks to encourage, recognize, distinguish and reward innovation, the creation of talent and two young scientists Entrepreneurs.

Belgian Science Expo

The Belgian Science Expo is organised by the Jeunesses Scientifiques de Belgique, a MILSET Europe member, with its partners within the I Love Science Festival.
In 2019, it welcome about 400 participants and tutors originated from a dozen of countries and showcasing 120 projects. Awarded projects are selected to represent in national and international events.

The programme is extended to include social, cultural and scientific activities.
At it peak, it welcomed over 2500 participants from 6 to 25, through the time it focused on secondary grade and developed side STEAM events in the shape of a festival. The festival coordination has been taken over by the Brussels Capital region and run over 3 days.

EU Contest for Young Scientists (EUCYS)

Although EUCYS Contest is not a partner of the STEMFAIRNET consortium, the partners decided to add EUCYS' basic information and visit the event in September 2019 because it is the reference for most of the science fairs of Europe.

The 31st edition of the competition is being held in Sofia, Bulgaria between 13 and 18 September.

The EU Contest for Young Scientists gives students the opportunity to

- compete with the best of their contemporaries at European level
- meet others with similar abilities and interests
- get guidance from some of the most prominent scientists in Europe
- It highlights the best of European scientific student achievements and attracts widespread media interest.

The contest is an initiative of the Commission under the Science with and for Society programme. It was set up to promote the ideals of cooperation and information exchange between young scientists.

The criteria used to assess projects are as follows:

- originality and creativity in the identification of and the approach to the basic problem
- skill, care and thoroughness in designing and carrying out the study
- following through of the study from conception to conclusion
- reasoning and clarity in the interpretation of the results
- quality of written presentation and ability to discuss the project with the jury members

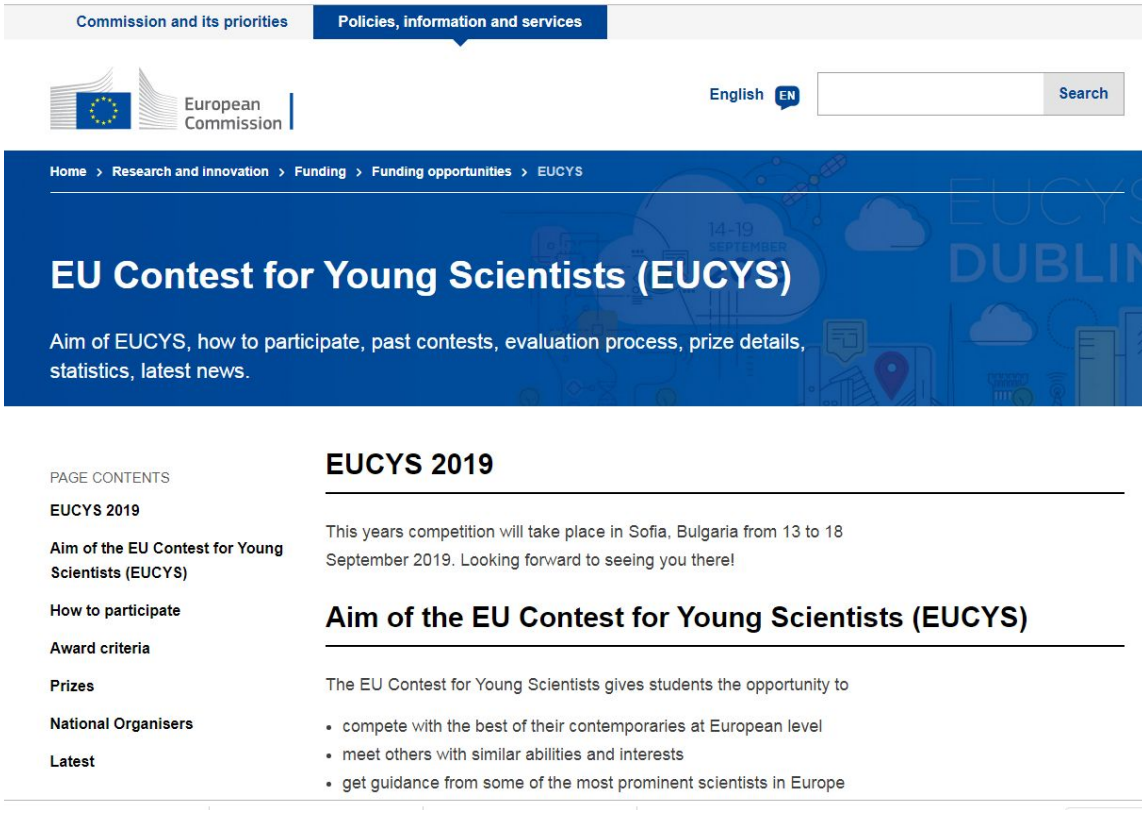
A jury composed of 18-20 members of international reputation, who carry out their duties as individuals and not as representatives of an institution or country, are responsible for the evaluation of the projects following a strict procedure.

2.- RULES FOR THE PARTICIPANTS

Most of the rules of Mostra and Giovani e le Scienze are based on the "EU Contest for Young Scientists" (EUCYS), funded by the European Commission; the reason is that they send groups to EUCYS, so following the same rules makes sense and avoids management problems. EUCYS basic rules are:

- Students must do before starting university.
- Projects can be by individuals or teams of not more than 3 people.
- Each country may submit up to 3 projects, with a maximum of 6 contestants in total.
- Duration of the event: 5 days.

More information about EUCYS:
https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/eucys_en



Although all the fairs are for students, there are slight differences among them. For example the attendees age (Elhuyar: 12-18; FAST: 14:20; FJ: 15-20). Besides, Elhuyar's fair groups need to be formed by at least two students and top four students.

Finally, EUCYS fair is organised by twelve categories: economy, biology, mathematics, health sciences, environment sciences, bioeconomy, physics, earth sciences, chemistry, engineering, social sciences and computer sciences.

Mostra organizes its fair based in the same categories as EUCYS as well as FAST (even if in Italy they do not receive much projects of social sciences category). EUCYS gives prizes per category, but FAST doesn't. Finally, Elhuyar is organized based on age groups (12-14 / 14-16 / 16-18).

3.- SELECTION OF PROJECTS TO ATTEND THE SCIENCE FAIR

Each organisation has a custom system to choose the attendants, due to large amount of students that want to attend the fairs.

Elhuyar Zientzia Azoka

Elhuyar asks the schools about how many teams they have willing to assist. Based on the capacity of the fair (90/100 stands), Elhuyar answers to each school with a proportional number of stands. When one school has less stands than teams, the teachers have to decide who is attending, based on their own criteria (ideally a school-science fair that is organised previously).

I Giovani e le Scienze

The deadline to present the project (by mail) is normally the beginning of February. The organisation splits the projects in different categories and sends them at least to 4-5 jury members. The first time they evaluate the written report, choosing the first 30/35 projects that will participate in Milan.

The jury are members of associations of ST, university professors and personalities engaged in the different science sectors and specialized in each category. They also try to involve the previous fair participants who specialized in STEM, asking to help with the evaluation too. The jury members are volunteers and very engaged.

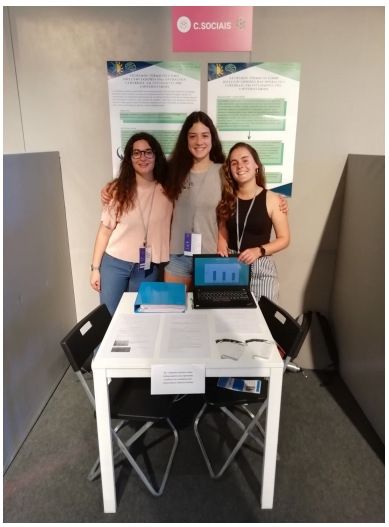
Awards are only participation at fairs for young scientists around the world. There is a difference between local and international participants. The international participants only can win gold and silver medals.
At least one interview is in English (it is an idea that could be implemented by Elhuyar in its fair).

Mostra Nacional de Ciência

For the evaluations: Institutional support from Ciência Viva (national science education agency, it is public): they contribute with researchers for the management of the evaluation: selection of the projects, organise the visits, select the winners... The coordinator of the jury is managed by Ciência Viva. There are jury coordinators in each category (Biology, Environmental sciences...). The fair is organised by categories.

Evaluator groups: FJ president of the jury choses but they have the opportunity to change… it depends; there is not a strict rule. As they organise the fair in categories, it is easier to organise, based on the background of the evaluator.

Information given to the evaluators: Instructions for the jury for the first evaluation and the table with the labels for the evaluations. And sheet for interviews for the evaluation.
If the project could be nominated to an international trip, the evaluator could ask a question in English. Besides, they ask before the English level. Jury give the prizes without being face to face. In the presentations, it is better if the teacher does not interact.



Belgian Science Expo

All applicant Belgian projects are authorised to join the fair at the moment the content has been validated as related to STEAM education.

4.- EVALUATION OF THE PROJECTS

The science fair organising committee have shared the evaluation criteria to assess the projects via email after Brussels' science fair. All of them are very similar to EUCYS criteria:

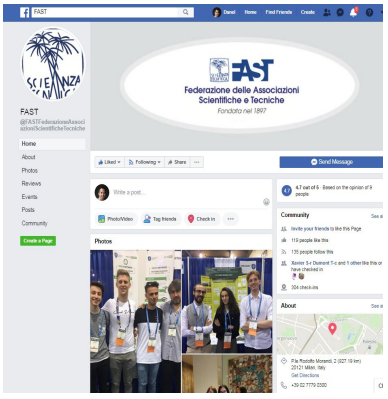
- Originality and creativity in the identification of and the approach to the basic problem
- Skill, care and thoroughness in designing and carrying out the study
- Following through of the study from conception to conclusion
- Reasoning and clarity in the interpretation of the results
- Quality of written presentation and ability to discuss the project with the jury members

5.- HOW DO THEY DISSEMINATE INFORMATION ABOUT THE FAIR?

Dissemination of the science fairs have several target-groups: schools, stakeholders and general public. The communication with each one is planned to obtain as much impact as possible: participants (from schools), sponsors (from organisations) and visitors (from general public). Timing, content and tools are chosen based on those groups.

Specific dissemination actions are taken by the organisations, such as…

- FAST: Facebook page: “The forum of young scientists”. From time to time FAST sends a questionnaire to students so they have information about how they are doing, what they are studying etc. and to know if they have chosen a STEM career or not. Recent data showed that 80-90% of the students who sent back the questionnaire have chosen STEM fields careers.
- FAST uses Facebook to send information about the fair too. They invite those ex-participants to different events, involving them in speeches with students etc. Moreover, they do different kind of parallel activities to foster their participation in the fair. The questionnaires after the event are usually very inspiring.



- ELHUYAR: A press conference is scheduled 3-4 days before the fair. All the sponsors (30 more or less) participate in the press conference besides the inauguration event.

The organisations have experts in dissemination that work specially on the science fair crunches. For example, FAST has one external journalist for dissemination during part of the year (March).

Besides the ICT tools, all the organisations try to have a much face-to-face contact with schools to engage them, since participating the first time is one of the most stressful times for them.

6.- TASKS PREVIOUS TO THE FAIR AND SUPPORT FOR PARTICIPANTS

In the following paragraphs each organisation explains briefly the tasks to fulfill prior the organisation of the science fair and some best practices experienced in the last years:

Elhuyar Zientzia Azoka

The project starts in September and ends in July. During the process, Elhuyar offers support to teachers via email and telephone when it is required. Otherwise, Elhuyar has a network of professional researchers that offer their time to help and inspire the students and welcome them in their organisations for one morning. Elhuyar manages the contacts between voluntary researchers and students.

Best practice: Elhuyar offered workshops about the basics or inquiry learning to teachers once, and the participation was doubled.

I Giovani e le Scienze

The students have to send a report before attending the fair (max. 10 pages).

They do not offer training to teachers, but they could offer one-time help sometimes; for example when students ask which the best topic for their research is. Moreover, organizers go to the schools and talk to the students etc. to engage them for the fair.

Best practice: Some students are helped by students that have already participated in the science fair. Normally this is organised by the schools.. It is a win-win solution: a) it helps with the thesis, and b) it supports the development of the project, and the young students have the opportunity of visiting the university into the bargain.

Mostra Nacional de Ciência

The project starts in September/October, finding the sponsors and preparing the graphics for the fair. Deadline to send the projects is the middle of April, through the web. The jury members do the first evaluation online, based only on the reports; they select the projects that will attend the fair. Before the Fair we organize the stands, accomodation and meals to all students and teacher to attend.

Best practice: The group of “JC Alumni” was created in 2017, with the participation of the previous contestants. The JC Alumni during the National Science Fair help the participants during all activities during the fair and organize some activities too.
The program of the fair includes every year a Conference, last year was “The path from young scientists to successful entrepreneur”, in order to raise awareness young scientists to the opportunities and ways forward for sustained achievement of your ideas and projects in the future.

Belgian Science Fair

Most of the projects attending the fair are following a scholar schedule, starting in September/October with the idea, and finalising during the easter holidays their stands and presentation. The projects are often conducted with the support or overview of a teacher. Jeunesses Scientifiques de Belgique staff of animator is available to assist and/or connect with researchers those requiring for some extra support.

7.- THE FAIR EVENT: PROGRAMME

Elhuyar Zientzia Azoka

Prizes are trips (to research centres, technology companies, Science museums… and accreditations to participate in other fairs). Sometimes students need to find complementary funding for trips.

Programme example:

Saturday, “Plaza Nueva” square of Bilbao

12:00 Opening of the Fair

12:00 - 15:00 and 16:00 - 18:00
In the arches and the central tent, students present their projects. Meanwhile some experiments and workshops are offered to children, and professional researchers from universities present their projects.

19::00 - 20:00
On stage, awards ceremony.

I Giovani e le Scienze

Prizes are accreditations to participate in fairs. Sometimes students need to find complementary funding for trips. High schools use to help with that, because the fair motivates students and offers great opportunities (and image for the high school).

During the fair, one or two scientific conferences are organised on a specific theme, or FAST invites a scientist to talk about his/her activity. FAST also organises a visit at either the Science and Technology Museum or the Museum of Natural History. In some cases, they have also offered guided visit to art museums or Milan downtown.

PROGRAMME of 2019 edition

Saturday 16 March

09.00-13.30	Arrival of contestants and setting up stands
12.00-13.30	Light lunch (at ristorante Cavour, Fast, underground floor)
13.30	Welcome address and opening session
14.00-17.00	Jury interviews
14.00-19.00	Exhibition open to public
17.30-19.15	Guided visit to the Natural History Museum (for students only)
19.30	Dinner with typical Italian regional food (at ristorante Cavour, Fast, underground floor)
21.00	Return to hotel (accompanied by the student helpers)

Sunday 17 March

09.00-12.30	Free time to visit Milan
12.00-13.00	Arrival of former finalists of “I giovani e le scienze”
12.30-13.45	Lunch (at ristorante Cavour, Fast, underground floor)
14.00-19.00	Exhibition open to public
14.15-16.30	Conference of Paolo Nespoli, ESA former astronaut with 3 space missions
16.45-18.30	Arts and sciences, interactive workshop
18.45	Handing out of attendance certificates

19.00	Vote the stand you prefer
19.30	Dinner (at ristorante Cavour, Fast, underground floor)
21.00	Return to hotel (accompanied by the student helpers)

Monday 18 March

08.00	From the hotel to FAST (accompanied by the student helpers)
09.00-13.00	Exhibition open to public
11.00	Award ceremony
13.00	Lunch (at ristorante Cavour, Fast, underground floor)
14.00	Dismantling stands and departure of the contestants

Mostra Nacional de Ciência

During the event the have schools visits and public visits. Schools have to register to attend to the fair, and general public have timetable for visits.

FJ organizes activities made by young scientists. They are interesting workshops for students and teachers. The teachers have the opportunity to attend different workshops such as how to protect your idea (patents, why and how to do it). In other times they invite scientist to do a conference (30 minutes): bio plastics, sustainability, artificial intelligence…

In 2019 FJ included another topic: why the students and the teachers could follow the project to the market, how to monetize the project results, and how to find investors. The idea to convey to the students is that they should continue with the project, not to stop when they go to the university: create a start-ups, research entrepreneurial opportunities, check for commercialization options… advised by experts. In Intel ISEF 99% are patented before the fair (Patenting can cost around 75€). It is important for students to know how they can protect their ideas, and patent the idea before the fair, because after it is more complex.

Prizes: cash for students and trips (international participation are the best prize). Honorary mentions to projects with good quality but not enough for a prize.

The ministry of Science and technology and well-known researchers/scientists visit the students, and that motivates them, specially when the researchers say that they participated in the fair when they were younger and explain the impact that it had in their career.

Program

THURSDAY, MAY 30

11H00 - 13H00 Assembly of projects / stands

15H00 - Opening Ceremony

16H00 - 18H00 Exhibition open to public and schools visits

16H00 - 18H00 Science Show, AJC

16H00 - 18H30 Jury Interviews

FRIDAY, MAY 31

10H00 - 17H30 Jury Interviews

10H45 - 13H00 Conference “Make Code: Program Your Future”

11H00 - 13H00 Science Show, AJC

10H00 - 17H30 Exhibition open to public and schools visits

15H00 - 17H00 Scientific Challenges, AJC

13H30 - 16H30 Presentation Pint of Science

18H00 - 19H00 Conference Generating Talent “The Path of a Young Scientist to a Successful Entrepreneur”

18H00 - 21H00 Final Jury Meeting

20H30 - 22H00 Peddy paper, AJC

22H00 - 24H00 Science party

SATURDAY, JUNE 1

10H00 - 15H00 Exhibition open to public

10H00- 15H00 Activities JC Alumni

11H00 - 13H00 Lecture PubhD Porto

15H00 - 16H30 Awards Ceremony

16H30 Dismantling of projects / stands

17H00 Departure

Belgian Science Expo

Programme 2019 of the expo (not the festival)

Thursday 25

All day - Arrivals

12:00-19:00 - Brussels discovery

13:00-16:00 - Fair set up

19:00 - Dinner

20:00-21:00 - Transfer

Friday 26

06:30 - Breakfast

07:30-08:30 - Transfer

08:30-09:30 - Project installation

09:30-10:00 - Hubs launch

10:00-16:00 - Expo*

10:30-12:30 - Greenhouses of Laeken (for supervisors only)

13:00 - Lunch

16:30-17:30 - Transfer

17:30-20:00 - Cultural evening

20:00 - International Dinner

Saturday 27

06:30 - Breakfast

08:30-09:30 - Transfer

10:00-17:30 - Expo*

11:00-12:00 - Supervisor drink

12:00-13:00 - Life hub party

13:00 - Lunch

13:00-14:00 - Society hub party

14:00-15:00 - Fundamental hub party

15:00-16:00 - Molecular hub party

17:30-18:00 - Awards ceremony

16:00-17:00 - Technology hub party

17:30-18:30 - Dismantling

17:30-18:30 - Certificate distribution at the info stand (for Belgian participants only)

18:30-19:30 - Transfer

19:30-21:30 - Gala Dinner

Sunday 28

All day - Departure

06:30 - Breakfast

09:15-10:00 - Transfer

10:30 - Natural sciences visit

11:30-12:30 - Lunch

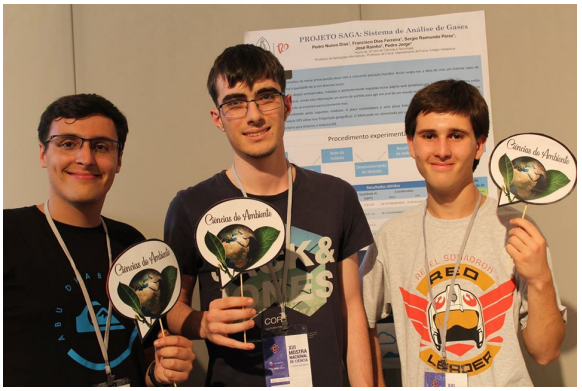
12:30-19:00 - Brussels discovery

13:30-21:00 - Bruges discovery

19:00-20:00 - Dinner

Monday 29

All day - Departure



[Video](#) of 13ª National Science Fair.

8.- BUDGET AND SPONSORS

Elhuyar Zientzia Azoka

Financial: The participants do not pay.
The project is funded through public funding calls (Spanish, Basque governments and Bilbao town hall). The science fair does not have much funding from private companies (banks, communication companies...). It has negative balance, so it is stressing. Because of that, dissemination to stakeholders is very important.

Some organisation sponsors do not give money but work hours of their researchers.

I Giovani e le Scienze

Budget: One person (staff average) work per year.
Seven years ago they had a lot of sponsors and they paid for everything. Now things have changed, sponsors are limited, organisations pay one part, and the schools pay the other part or find funding somewhere else.

It is celebrated in FAST building because they do not have budget to pay a venue.

Mostra Nacional de Ciência

Main sponsor is a public agency for science in Portugal (Ciência Viva) and the Municipality of Porto. In 2019 we receive the sponsorship of Fundação Calouste Gulbenkian, IPDJ - Instituto Português da Juventude, Astrazeneca, Bial, Fundação Luso Americana para o Desenvolvimento.
First 10 editions were in Lisbon, sponsored by the electricity museum. After that, the municipality of Porto became a sponsor and thanks to them they have free space for the fair. Three days for the fair, two for setting up and one for dismantling it (six in total).
Sponsorship philanthropy Society American (with Portuguese roots), and companies (Chemical, Intel...). Small amounts, but they are necessary.

FJ pays the accommodation and meals to students and teachers. The attendees only pay for the travel.

Belgian Science Expo

The main sponsor is the Brussels Capital region which provide the venue and cover most of the stands. Some extra institutional and industry sponsors are completing the incomes as well as a large volunteer work.

9.- STRATEGIES AND PROCEDURES TO FOSTER INCLUSION

Inclusion in science fairs participation involves[1]:

- Valuing all participants equally.
- Increasing the participation of students in.
- Restructuring the science fairs so that they respond to the diversity of students.
- Reducing barriers to learning and participation for all students, not only those with impairments or those who are categorised as `having special educational needs'.
- Learning from attempts to overcome barriers to the access and participation of particular students to make changes for the benefit of students more widely.
- Viewing the difference between students as resources to support learning, rather than as problems to be overcome.
- Acknowledging the right of students to an education in the public events.
- Improving science fairs for organisers and teachers as well as for participants.
- Emphasising the role of science fairs in building community and developing values, as well as in increasing achievement.
- Fostering mutually sustaining relationships between science fairs and schools.
- Recognising that inclusion in education is one aspect of inclusion in society.

Deaf students experience in Agrupamento

"The participation of deaf students: the necessary equity

The presence of the Portuguese Sign Language interpreter assumes special relevance during the presentation of projects promoted by or with deaf students since this professional guarantees their full participation, closing communicative gaps and allowing access to all the surrounding information.

Only in this way is it possible to provide a truly inclusive environment for all."

[1] Adapted from: http://www.csie.org.uk/resources/inclusion-index-explained.shtml

Common problems managing inclusive practices

Not all the fairs can cover all the financial requirements of having someone with a wheelchair, we will discuss it during the workshops.

Real case: Two students arrive at a class on February, when the rest of the students have already started with their projects, and the rule of the fair is the top four students in each group. The teacher talks with the organizers and they decide to make an exception to the rule and allow two teams with five members, so the new students can participate with the rest of the colleagues.

FAST

The issue of inclusion is strictly connected to the problem of gender equality and gender dimension in research as supported by EC within Horizon 2020 and other European initiatives (e.g. the old “Science is a girl thing!”). Therefore, STEMFAIRNET could include this aspect within the project’s inclusion-related aim. Very simple data to support this proposal: this year (2019) we have in Milan 68 Italian contestants, of which 26 are girls and 42 are boys. In 2018 we had 42 boys and 20 girls.

FAST participates every year with ad hoc events in a programme supported by the Milan Municipality called “STEM in the city” with the aim to reduce this gap (which is often of a cultural nature).

I Giovani e le Scienze

Challenge: include more and more technical schools, other regions, developing regions and areas. Try to be more inclusive. For example, if there are doubts selecting the projects that will attend to the fair (e.g.: same scores but only one to be selected), they should give preference to those with more difficulties, or poorer regions.

UNAMUNO

It is the first time participating in a fair for the teacher, he does not have experience, but his school has experience in Elhuyar Science Fair.

From January to May they organise a robotics workshop for 15 students (not all the class participates); some students do not finish a project. This year they decided that the third project was not good enough, so they have participated with two.

Teachers at Unamuno miss information about science fairs, he is the only one participating in a fair. Participating in science fairs is not mandatory, so public schools do not participate so much. It is a challenge how to motivate public school teachers. He has to convince that it is interesting and worth it. But he does not have enough time, and has content to teach. The

main issues are that the teachers are very alone, and do not have much information. It could change because the government will propose to schools to prepare stem plans, fostering the participation on this kind of activities. It is seminal that teachers hear about it soon (and email does not work). They should see that it is not that difficult.

Best practice: “We are the protagonist” activity: 13 y.o. show what they have learnt in technology to 12 y.o students. It works very well.

Mostra Nacional de Ciência

This year (2019) participated in the 13ª National Science Fair 247 contestants, of which 134 was female and 113 was male, and 61 teachers.

10.- STRATEGIES FOR THE FUTURE

What we have liked most from the fairs:

- It is fun to be here.
- Different projects by different organisations, joining together the place, making the offer bigger and more engaging.
- The tables to eat, relax…

I Giovani e le Scienze

Success case: Valerio invented a way to have Wi-Fi in his small village (6000 people); he was awarded at EUCYS, in USA and London best fairs. Use the connection of the tower electricity as Wi-Fi. At ISEF in Usa he received a lot of prizes, including. 50.000 dollars to pay the university taxes. After Valerio's experience, his school participated with 21 groups. He also had great impact on press (local and national).

Another strategy for the future is to use LinkedIn to promote young scientist participation, FAST is experimenting with it. Or to write success experiences when participants have become entrepreneurs: What are they doing?

One more idea, but not so easy: help the students to go on with their idea tin order to exploit it in the future. Possibility to help them to patent their idea in some cases where it is very good. The problem is that it is very expensive, and sometimes the schools are not willing to exploit the opportunity, they are shy. We should ask sponsors to support projects. It is not possible to trigger that without the help of the government.

FAST is also committed to develop STEM careers among young people, and has organised specific events to that aim, especially devoted to gender equality (STEM still seems to be a sector for males only). But this engagement has not been "applied" to the Science Contest yet. It could be seen as a form of inclusion as well.

UNAMUNO

Don't show (only) the best projects!

There is the need to motivate students to continue studying. High schools do not support all the students, there is a problem with the "bad" ones, and they do not have the opportunity to learn. At Unamuno they are offering cooking, hand working. Worst students are male. They do not know what to do, they are lost.

Dispersion in school: offer expertise, to be responsible of production, specialized workers.

Message to convey: You need to do STEM, it is not enough to be a genius on computers, and you need to be a scientist and researcher. We want general scientists, not only very specialized. It is important to have social skills too for example. We need young people open to opportunities and change, because an expert now on a topic maybe will not be useful, and will need to upgrade to other fields.

Students motivation - New vs. Old Participants

One of the relevant aspects that the work revealed was an interesting relationship between the "Alumni" and the less experienced young participants. As a result of this motivational relationship, it was possible to verify that the motivation to participate and, above all, the connection between help almost always made possible projects of better quality and with greater development and scientific quality. For this reason over time the quality of the submitted projects is potentially better.
The shared experience is therefore one of the aspects to consider when organizing science fairs. The presence and collaboration between former entrants and young entrants is always an aspect that enhances the quality of the work and often motivates inexperienced young people to participate because they feel more supported.
In addition to new ideas from even the courses that older students take, knowledge sharing always allows for easier access to information, more effective use of project methodology and iteration with institutions and universities. In addition, access to researchers has been facilitated, which in many cases assists students in scientific review of reports and access to scientific instruments, laboratories and data.

Participation in fairs as a way to enhance school results

Our work has made evident a particularity that is fundamental to the success of the students. By attending fairs, even with simpler projects, some students are later much more motivated for learning in the classroom context. It is not uncommon to find students who before doing science projects had poor school results and who then broaden their motivation in some subjects so that their academic success to the subjects directly involved in their work is exponentially improved. For this reason it is necessary to involve all kinds of students, enhancing in those who have more academic difficulties the taste for research, reading and competition.
For some of them, the public recognition of their work becomes an empowering agent leading them to improve their behavior and achievement.
The challenge of prizes awarded acts as an incentive for your participation. In addition we also have public recognition and contact with other students from other schools and realities. This contact is also an empowering agent that leads to greater participation of young students. It was common to find students who participate by coactivity, conviviality and sharing experiences. Many of them fostered relationships for life and even altered the higher education courses that the young students had initially aimed at.
In Portugal, the most evident cases are girls who after science fairs are looking for engineering courses, something that does not happen to students who do not participate in science fairs.