Physics Communication through Science Festival- From Bottom to the Top of the Educational Piramide

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Introduction

The general aim of the Science Festival is to increase public awareness regarding science, to present its results in a popular and appealing way, to connect the public, the youth, science and the media, or stated shortly, to communicate science. Communicating science is highly significant particularly for physics and mathematics, in which a decline in interest has been observed in recent years.

The Science Festival took place for the first time in Croatia in 2002, at the British Council's initiative (www.festivalznanosti.hr). Since then, the Festival activities have been organized every year in all major Croatian cities (Zagreb, Rijeka, Osijek, and Split) usually during the last week of April.

The organization of the Science Festival has two levels, national and local. National board provides some general solutions about the programme issues (year's main topic) and general logistics (logo design, wallpapers and large exhibitions), while the final programme definition and organization of all Festival events is responsibility of local organization boards.

Figure 1: The organization board with the Rector and Vice rector of University of Reject, Ministry of science and education representative, Mayor and County Mayor at the opening of 2005 Science Festival in Rijeka.

The Science Festival is supported and sponsored nationally by the Ministry of Science, Education and Sport of the Republic of Croatia, while our local sponsors were the City of Rijeka, the County of Primorje-Gorski Kotar and Hypo-Alpe-Adria Bank.

The organization of Science Festival in Rijeka has some particularities. Apart from the University of Rijeka, other societies such as the Golden Section (whose mission is the promotion of teaching and enhancing the popularity of natural sciences and mathematics) and the Society of Mathematicians and Physicists of Rijeka, participate in the organisation. Therefore, although the Festival Programme usually features numerous subject matters, physics and mathematics are always held in high regard, especially concerning educational issues of the subjects. The organization board of Rijeka Science Festival consists of eight enthusiasts (women) who are all professionally involved in the field of education, but with the notion that, regarding their professional vocation, they do not only belong to the field of natural sciences (physics, chemistry, biology, astronomy) and mathematics, but also to the field of humanities (pedagogy, psychology).

Communicating science through Science festival

This year 2005. the Science Festival in Rijeka offered an abundance of subject matters; some drew attention just by their title in the media announcement, some by the unconventional realization and some simply impressed at the location of the event. Here are just some of the examples: *scientific performances* (Gorazd Planinšič and Luka Vidic: Physics Nocturno, Petar Pervan: Foam – from soap bubbles to quantum gravity, Franka Miriam Buckler: Topology – Maths with Bands, Ropes and Ties), *acting performances* (Mathematics, the Birth – or How I Was Brought into This World), lectures as *multimedia spectacles*, for which the special equipment was made at the theatre (S. Ostojić: Do You Need Genetic Counselling Too?), rarely shown performances which demand special preparation, such as *Cabaret* with a scientific topic, the *quiz show* with astronomy topics, based on 'Who wants to be a Millionaire?', a *workshop of cultural confrontation* with a scientific theme, in which the public actively participated and influenced its course.

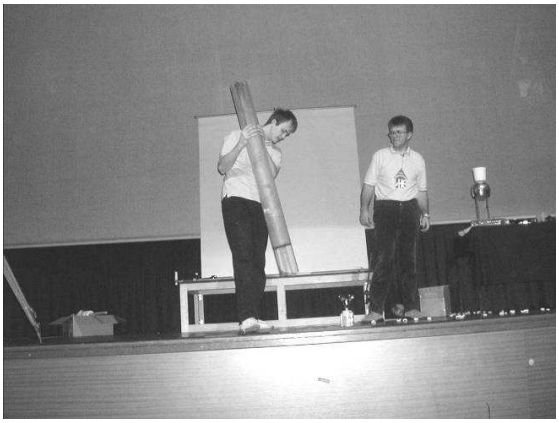

Figure 2: A scene from the Physics Nocturno, performance by Gorazd Planinšič and Luka Vidic.

Furthermore, the lectures that treated intriguing topics, received exceptional attendance: SETI - Search for Extraterrestrial Intelligence (K. Korlević), Artificial Life & Artificial Intelligence (Z. Car), Technologies of Modern Communications (N. Stojković), as well as the themes related to the Day of Planet Earth: North-Eastern Wind (bura) and Caribbean Hurricane (D. Belušić), Tsunami (M. Herak, M. Orlić) and Climate Change (V. Vujnović).

Additional particularities of Rijeka's Festival were the workshops for the youngest ones, which were held during the festival week in numerous schools around Rijeka. Workshops were held by scientists and/or university lecturers in collaboration with students of educational courses. Some of the workshop titles were: Maths – Path to Victory, Surface Tension, Tale about the Air, How Do We See Objects?, Centre of Mass and Equilibrium, Golden Section, Experimental Determination of the Ludolf Number, Models of Molecules, and so on. One of the most attractive events for pupils was an organised sailboat trip and fishing with a net, within which biology, chemistry and ecology workshops were held.

During the Festival Week, four Café Scientifiques were held, the gatherings of scientists and public in a relaxed café atmosphere, in which immediate communication regarding scientific topics was encouraged. The open discussions intended for scientists of the University of Rijeka regarding the prospects of the development of Croatian science and education, while considering the process of Croatia entering the EU, were also visited extensively.

Apart from exceptional attendance, which is a qualitative indicator of the festival's success, the most significant qualitative outcomes of the event are considered to be the encouraged enthusiasm of the youth, the students and the future teachers, who were actively involved in the Festival's organisation, who were carried away by the enthusiasm of their teachers – the organisers, and the magnificent positive atmosphere of the event. Their engagement is the guarantee of holding future Science Festivals in Rijeka.

Communicating Physics with youngest

A special value to the physics communication is brought about by organizing physics workshops for school pupils of all age groups, including pre-physics teaching children.

Workshops on simple experiments in physics use the constructivist approach, through which the experimental methodology is applied for building concepts and models that make linkage between physical quantities and the natural phenomena.

Workshops were held on six themes with titles *A tale about the air*, *A tale about the equilibrium*, *How do we see things?*, *Surface tension*, *The flow of fluids* and *Sink or swim?*. Workshops use a serial of simple experiments with everyday materials and objects, upcoming in a line of growing complexity, but with a constant demand that every experiment should be repeatable at home. The first presented experiments usually deal with preconceptions and misconceptions that are frequent for the subject, and are followed by serial of experiments where the new, correctly formed concepts can be employed to shape the models of presented phenomena. The learning environment is pupil centred, collaborative and interactive – participants are just pushed to observe and answer simple questions (while having a possibility to repeat the experiment themselves during the workshop), which help them to form a logical concept and build a model that relate simple phenomena together.

The workshops are run by two moderators, one being a scientist and/or university teacher and the other a student, a future physics teacher that participated in preparation of the workshop. Such a team work serves a good purpose of active engagement for the university teacher and the student in the classroom work with children, providing a valuable and new experience for all parties in the process of education.

Figure 3: Workshops with school pupils.

The success with workshops (schools do constantly demand the workshops to be held in schools regularly, not only within the Science Festival week) encouraged the authors to prepare and transform the material to form virtual interactive web workshops that would be uploaded to e-school of physics managed by Croatian Physical Society (http://e-skola.hfd.hr).

Science Festival in Rijeka – an event that evolves into brand

The 2004. Festival in Rijeka had already accomplished an extraordinary public interest, especially in the youth. This year, 2005., the number of visitors of the Festival Week increased by 45% in comparison to last year's attendance, and exceeded the number of 5,000 visitors, which we believe is an extraordinary success for the area of some 250 000 inhabitants. Hence, our choice of the biggest city hall (with 400 seats) was justified for the central events. The most laconic way to express this year's guiding concept of the Festival would be 'to impress', which has also contributed to the good marketing of the event. Through over sixty Festival's subject matters, aiming at communication, gatherings, lectures, performances, shows, workshops and so on, to be an occasion, an impression, a delight, an unforgettable experience, featuring the enthusiasm and laughter of the participants.

Figure 4: The auditorium of the Science Festival Hall was crowded with visitors.

This event also carried an educational value, even though this value was not put in the limelight this year, nor was it set as a priority, as it was written by Plutarch a long time ago: *'... the human mind is not a container which should be filled yet a fire that should be lit.'*

We wished to make the Science Festival 2005 in Rijeka an event that everybody would talk about and think we have succeeded. Already now, after just 3 occasions of Science Festival events, people expect next Science Festival and do ask about next year's happenings.