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Dedicated to the 30th anniversary of MILSET



ALEXANDER LEONTOVICH
Editor-in-Chief

LETTER OF THE EDITOR

I am glad to greet all the members of MILSET big family on the pages of another issue of our JOSE magazine. This issue is dedicated to a remarkable event: 30-year anniversary of MILSET, and it opens with an article by Rafael Flores Hernández Xalapa. He described in it a wide sight on last 30 years' events in World's Science and Technology, having shown the logic of appearance and development of MILSET in their context. Creating the organization and conducting international exhibitions had a long prehistory and, I think, it has grown on post-colonial space as a result of reconsidering by, firstly, French intelligentsia the human aspects of collaboration between youth of Europe and other parts of the world. Both in those times and nowadays the Movement has been holden by incredible personalities, enthusiasts, who have persistently been

turning dreams into reality. Derek Grey, the founder of South African National Expo for Young Scientists, is an outstanding example of a person of MILSET's formation. He is the person, who the traditional "From the history of MILSET" column, held by Ksenia Salnikova, is dedicated to in this issue.

Since the last issue of the magazine MILSET has been into several memorable events. MILSET community is now reconsidering its part in the world. The strategical development, which defines the Movement's priority DEVELOPMENT directions, is being discussed. That is the topic of the article by MILSET bureau member Reno Barlow who has headed this work.

In his article Monsefrises a very important subject of extremism in the world of nowadays and notes the input of MILSET and other social organisms in involving youth into Science and Technology as the most important tool to develop the common understanding between different countries' citizens and representatives of different religions.

One of the most promising ways to involve youth into Science and Technology and creating international project teams is science camps. The experience of such camps' organization in Russia and Dutchland is described in the article by Yeppe and Dmitry.

The «best practice» section also include information about I EXPO SCIENCES Vostok and recommendations based on the analysis of its results.

Also in the section of the STEM presents information about the projects of Foundation for Glocal Science Initiatives in India by Anuj Sinha.

The world swiftly changes, we are facing new challenges of time. And we see our friendly international MILSET family cooperate for stability in the world and head youth towards high ideals of leisure in Science and Technology.

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Alexander Leontovich	Letter of the Editor	3
	FEATURE ARTICLE	
Rafael Flores Hernández Xalapa	MILSET: 30 years promoting development of science, technology and innovation in the world	7
Moncef Jendoubi	Education versus intolerance and extremism	11
	BEST PRACTICES	
Dmitry Chistyakov	Science popularization in Russia: a size effect	14
Jeppe Willads Petersen	Teaching or tutoring at a science camp?	17
Ksenia Salnikova	Helping youth participants get more benefit from ESI. Recommendations	21
Elena Usadova, Alexander Leontovich	The first EXPO MILSET Vostok	29
	STEAM FOCUS	
Anuj Sinha	The foundation for local science initiatives	31
	FROM THE HISTORY OF MILSET	
	Derek Gray	37

FEATURE ARTICLE

RAFAEL FLORES HERNÁNDEZ

Xalapa, Veracruz – Mexico

Director of the ESI – AMLAT 2006 – Veracruz - Mexico

MILSET: 30 YEARS PROMOTING DEVELOPMENT OF SCIENCE, TECHNOLOGY AND INNOVATION IN THE WORLD

On February 5th, 1987, the Soviet Union sent Soyuz TM-2 spaceship with two astronauts on board to run a permanent space station. On March 5th, 1987, in New York City, USA a U.N.O. experts meeting confirmed that an ozone hole was opening upon Antarctica.

A report “Our common future”, known as “Brundtland report” after the Norwegian minister Gro Harlem Brundtland, the U.N.O. environment committee president (1983-1987), was also published in 1987.

The “Our common future” publication became an important stage of the Development Theory because the Sustainable Development Concept, in which the environment field was studied along with economy and social fields, was framed and registered for the first time in it. The sustainable development was defined as *development in which present generation satisfies its needs without compromising the possibility of the future generations to satisfy their needs*. The resulting statement of the report was astonishing: *the future will either be for everyone or will not exist at all...*

The same year Power Point 1 (at first, it was named “Presenter”) was released. It only showed black-and-white pictures, had only one switch and only worked on Macintosh computers. From 1987 to 1989 the number of facsimile machines in the World has increased more than twice and reached 2.5 millions.

In this international context a group of teachers, who were friends from different parts of the World, gathered together to organize the First Expo-Sciences International in 1987, which passed in Quebec, Canada, aiming to offer their students space where they might show their successful projects in science, technology and innovations; to meet coevals from different countries and thus, to make a contribution into multicultural education. The success reached let them create a movement which could advance development of scientific and technical culture among children and youth through the practice of qualitative experimental activity in extracurricular time. What started as an idea of a group of teachers, in 30 years has grown many times, showing the success of this idea, which drew the collective consciousness and became a base of the whole community which aims to development, economic growth, better quality of life. That is how International Movement for Leisure Activities in Science and Technology (MILSET) started.

Study is the basal constituent of a person’s development and leaves wide opportunities for needs’ satisfaction. My colleagues say that one is born ignorant and the more knowledge he gets the more sense fills his existence. Besides, science is inseparable from culture. For these reasons advance of leisure in science is a very important activity which causes children and youth form a new, wider vision and helps see science as human’s attempt to understand the world which surrounds us. In fact, scientific knowledge and its applying influence social life in general, including the less well-to-do population: poor people get the effect of science and technology development on a global scale too.

Importance of education and critical thinking also accentuates that to create a verily educated society most of the world’s population needs rather books and teachers which lack than access to the internet. Globalization has started the process of great achievements exchange which influences everyone and the new tech make the interrelation in the world strong as never before. But still we must admit that so far many communities and even nations are out of this process and are angry with globalization which enhances economic, social and technical gaps. Hence, Expo-Sciences is an important meeting space where our children can shake their hands, interact in an atmosphere of friendship and respect and thus to accept the cultural diversity which they make part of.

This youth generation is the largest the world has ever known. More than 60 percent of the population in many UNDP program countries are youth aged 15-24. Their opportunities for communicating, acting and influencing are unprecedented. The challenges they face are unprecedented, too, from climate change to unemployment to multiple forms of inequalities and exclusion, in particular for youth belonging to vulnerable or marginalized groups. (Empowered Youth, Sustainable Future – Strategy of the (UNDR) United Nations Development Programme 2014-2017 p.2)

Young people around the world aspire to fully participate in their communities' lives and to become the key-elements for social changes, economic development and innovations in technology. Hence, they should live in conditions which advance their imagination, their ideals, energy and their notion so as to flourish for their communities' good.

During three decades MILSET has offered these opportunities to millions of young people, collaborating with governments, associations and people, connected them and achieved incredible goals, ones which Albert Einstein used to describe: "There is a driving force which is more powerful than steam, electricity and atomic energy, that is our will." Will, passion, enthusiasm and devotion of thousands of teachers, leaders and government representatives let us fulfil events in the most important fields on an international level.

Minimal budget and big deficiency have not become a drawback for achievement of goals put. That also shows knowledge which MILSET has presented to everyone who ever got the privilege to work with us. That knowledge is that the thing that brings the true satisfaction into one's life is serving other people.

José Vasconcelos who was an intellectual related to education in Mexico said once: "There is something more in each child than soon an adolescent and later an old man: there is a possibility of a soul able to create its own fortune." How many souls have got in touch with MILSET? How many fortunes have been helped to flourish? The human resource is the most important input which the organization have offered while carrying its functions out. It is easy to say now that it has been 30 years since a human being has made an axle which the work, the aspiration and the reason of existence of MILSET spin around. From the distance of 30 years long we should think to evaluate all the efforts taken and to better understand the work done which is now more important than ever. Our input spins around human in sense which we give it:

“Man is conceived as a perhaps unique in the Universe, delicate combination of the physical and the spiritual; A treasure of almost unlimited potential, which the appropriate process can discover it as a sensitive and yet incredibly enduring instrument for discovery, refinement and creative use of truth, beauty, goodness and love; As a remarkably adaptable and vigorous thinker, knower, builder and researcher, who can be guided by love and truth; As a sacred being still in the process of creation, part of which can now be steered by itself.

We do not ignore the dark history of man nor see past his long career of inhumanity towards his fellow men. We are painfully aware of their lavish and proud empires built upon the misery, suffering and exploitation of men; Of his armies of desperate and ignorant men who collide in obscurantism; Of its numerous brothels that deal in bodies and souls; Of its ostentatious wealth, which is coupled with oppressive poverty and deprivation; Of their indignities and cruelties to women, to minorities and even upon their own children; Of his petty pride in his achievements, which approach him dangerously to a cosmic suicidal irreverence; Of the insolence that is always justly punished.

Nevertheless man’s potential is considered more significant by the best he has thought and done. These great achievements of human ingenuity, achieved in many cases individually, give the true measure of human nature; Suggest what the human being can be. Meaning not only to the extraordinary things achieved by so-called geniuses, but also to the best that each of us occasionally achieves in imagination or action. These maximum experiences cast a passing but revealing light, like the flash of lightning on a dark night, about the true potential of man.”(“El Maestro Ideal” V. Pullias, Earl, D. Young, James Editorial 13PAX – México 1999).

We have borrowed this quotation from Pullias and Young to equate ourselves with it. MILSET has become one of these great realizations of human’s genius. It has been many years but the lightning which illuminated Quebec with its idea keeps lighting up the world and spreads its influence on the furthest parts of the planet. How happy we are to have got a possibility to take part in it! How fortunate the generations who have benefited from this work are!

To be objective one has to be poetic. So let’s raise our glasses to long years during which we will be left the possibility to illuminate roads, open fortunes and to advance education which, as Charles Lamb would say, induces:

“An eye awake, a curious mind,
A heart excited...”



FEATURE ARTICLE

MONCEF JENDOUBI

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Congress Committees Glasgow 2016
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EDUCATION VERSUS INTOLERANCE AND EXTREMISM

On July 7th, 2005, when was announced the bad news of terrorist attacks in London underground, I was with Jean-Claude Guiraudon (JCG) in “EstacionMapucho” Santiago Chile, proud, observing hundreds of young people “fidgeting” in a festive atmosphere, with joyful smiles reflecting all the joy filling their hearts, because they were there taking part to an international science fair, happy to meet other “colleagues” coming from different parts of the world, with different color, language, culture, and different way of life!

With JCG, we had the following thought “organizing such events for young people is the best rampart against extremism and terrorism! Learning how to accept others with their differences, working together like a team to achieve a common goal and realize scientific projects, living together some days like a family, are more effective against extremism and hatred than all airports security systems, visas, biometric passports, and police controls!

All national and international scientific, cultural and sports youth organizations, NGOs and clubs, are and should be “nurseries” for tolerance, even if this is not their main purpose or written in their statutes!

Last ten years, religious fanaticism, terrorist attacks, xenophobic and all kinds of discrimination are increasing again. Today, thousands of young men, 15 to 35 years old, from several countries, are active in Syria and Iraq, as well as Afghanistan, Libya, Yemen, Mali, Kenya, Somalia, are involving as terrorist fighters, in these areas. All “extremism instructors and mentors” are using exclusively young men, including more and more girls!

Tolerance as an issue in education sciences, why?

1. Because tolerance is needed as human dream of a peaceful world,
2. Tolerance, which is at the heart of human rights and duties, is not instinctive and must be educated and learned since the early young age.
3. Because at schools (from kindergarten to university), teacher is the master for such education. For example, he is attentive about “unfriendly attitudes” against different race or color, immigrants or refugees, within the classroom!
4. Disseminate principles of tolerance is also ethical purpose, since it’s a contribution to preserve worldwide human values for a mutual respect and understanding between peoples.
5. Finally, because, “intolerance within a community is the sum of the intolerance of its members” as affirmed in a UNESCO report, and young people are the Society members, today, tomorrow and in the future!

A vision shared by the international community:

On 12 December 1996, the UN General Assembly invited Member States to observe the “International Day of Tolerance” on November 16, each year, with activities directed towards both educational establishments had to the general public (resolution 51 / 95).

This followed the United Nations Year for Tolerance, 1995, proclaimed by the Assembly 20 December 1993 (resolution 48/126). The General Conference of UNESCO proclaimed 1995 United Nations Year for Tolerance.

On 16th November 1995, UNESCO’s Member States adopted a Declaration of Principles on Tolerance and an Action Plan. Thus, UNESCO offers ten courses of action to fight against intolerance.

Childhood, adolescence and tolerance:

From the first age of nursery school, to adolescence and beyond, children and adolescents must learn the right way to live with others. Gradually, they should learn the concept that all people are equal in terms of rights and dignity. This is, may be, the first step to know how to live within a group, community, country and a world where cohabit people with different values and beliefs.

It is essential to inspire and help pupils and students to discover other different people, languages, countries, cultures and thoughts. They must therefore learn that “Others” are different and *that difference is nothing but a wealth.*

Educator: First tolerance and moderation promotor.

Any teacher, instructor, youth club trainer, or sport coach must never dismiss his natural role of educator, and human values transmitter. This is the best way to build peaceful Society, respectful for human rights, democracy and tolerance. Schools, clubs and international meetings are the main “laboratories to experiment” understanding of others, respect of different cultures, beliefs and languages. This is indispensable to construct basis for a multicultural Society, and therefore eradication of racism!

Exposciences International: Really “Nice to meet you!”

Youth scientific activities and meetings, as “designed” and organized by MILSET, are good opportunities for youth people to familiarize with persons from diverse horizons and to make them aware of their universal identity as a “citizen of the world”.

Each Science Fair meeting is both multicultural and intercultural, through exchanges and interactions between young people from around the world! My Good....What a worth!

Discussions with participants from other countries, on issues and problems of daily life, on difficulties to achieve a scientific project, sharing ideas, pictures or typical souvenirs, are apparently modest signs of friendship, but in fact they constitute a considerable contribution to the promotion of peace and tolerance!

In conclusion, considering that:

1. “Intolerance in a society is the sum-total of the intolerance of its individual members” (as supposed by UNESCO),
2. And that Intolerance is often a result of ignorance (as we fear what we do not know!),

So, international youth exchanges, connections and interactions between young people from all over the world, under the umbrella of culture, sport, sciences and knowledges, are the best way for bridging people and cultures and thus to prevent all risks of intolerance.

MILSET and ExpoSciences International are plenty accomplishing such objectives!



BEST PRACTICES

DMITRY CHISTYAKOV
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SCIENCE POPULARIZATION IN RUSSIA: A SIZE EFFECT

Multiple methods and approaches are utilized within the field of science popularization among schoolchildren as well as among adult audience. All over the world scientific festivals, competitions of research works, cycles of lectures are being constantly conducted. Russia is not an exception and a number of significant events are being organized here as well.

Nevertheless, geographic peculiarities of Russia attribute specific features to the process of development of science popularization. For instance “science festivals” with invited scientists and inquiring experiments generally take place in large cities and are majorly visited by the residents of the central city and its neighboring territories. Noteworthy, in many regions of Russia distances between a republic/regional center and another large city may comprise as much as thousands of kilometers. Thus a lot of schoolchildren are devoid of the access to science popularization programs.

In order to solve the problem scientific educational project “JustBrain” has combined its efforts with the Faculty of Bioengineering and Bioinformatics

of Lomonosov Moscow State University to develop a program “Scientists to Schools”. As the major feature the project includes visits of young scientists with modern equipment to distant cities and villages of Russia to conduct lessons. The goal of the project is to increase interest of schoolchildren to natural sciences by acknowledging them with modern achievements of science, its concepts and methods, implemented by specialists to investigate the origins of human diseases, their diagnostics and treatment. The ultimate goal of the project is to motivate students to get involved into studying chemistry, biology and medicine, to apply to natural science faculties of the universities.



A practical work in Ulan-Ude, Republic of Buryatia, 2012

For science popularization we implement the approach when schoolchildren are involved into investigation. Within a lesson that lasts 2-3 hours schoolchildren perform all steps of an investigation. One of the lessons, for instance, includes estimation of the thyroid gland hormone in blood samples by the enzyme-linked immunosorbent assay. Schoolchildren try to find the hormone concentration in a given sample by following an investigation protocol that includes building of a calibration curve and measuring optical densities of solutions.



A practical work in Naberezhnye Chelny, Republic of Tatarstan, 2010

The lessons are conducted by young specialists from various natural scientific departments of Lomonosov MSU. Within a study free time they make lectures about modern achievements in science, frameworks of investigation conduction and provide investigative practical courses that allow schoolchildren to work with modern equipment and get practical experience of modern methods of research work. During lessons young scientists actively communicate with students on the topics directly linked to the lessons as well as general social problems that are exciting for children in the regions of Russia.

Over the time of the project since the year 2008 more than 50 lessons have been conducted in 40 regions of Russia, starting from Yakutia and Yamalo-Nenetsky region, ending with Altaysky region, Tambovsky region and Tatarstan republic. More than 1500 schoolchildren have participated in the events by far.



A practical work in Altai Krai, 2014

Among the important features of our project is its scaling. One of our tasks is to motivate regional universities to produce similar scientific educational programs. Their creation would solve the problem of such program availability. Indeed, to get to a central region is much less expensive than to visit Moscow. Thus, more schoolchildren are thought to get opportunity to learn about modern science from the primary sources – modern young scientists and educators from universities.

We are sure that in proximate future the project “Scientists to Schools” will expand and we will visit other cities and villages while the idea of educators from universities and institutions traveling to distant regions of Russia will spread over and get support.

Our website: www.justbrain.ru



BEST PRACTICES

JEPPE WILLADS PETERSEN

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UNF International Coordinator in RungstedCand.Scient

TEACHING OR TUTORING AT A SCIENCE CAMP?

Last year, as I was flying to Malta for the Maltese Science Expo, I was browsing through one of the airline catalogues and fell over one particular sentence about what the Maltese usually did in April. According to the catalogue, April was the month where parents started thinking about what summer schools their children should attend the coming summer.

SCOPE OF THE ARTICLE

In the MILSET family, there are many different kinds of activities. There are of course the expos, which we also organise at the MILSET level, there are science festivals, such as the European Science Day for Youth organised by MILSET Europe, and then there are the science camps. This article will focus on the latter. More specifically, it will focus on the many different ways of both organising and preparing science camps.

CHARACTERISTICS OF A SCIENCE CAMP

Science camps come in many forms: some are weeklong others are just a few days; some focus on a very specific topic others are very broad; some are very expensive others are rather cheap; and some are competitive while others are not.

In the SciCamp interim report a science camp is defined in the following way:

“A science camp is a residential science education programme, which offers various activities for young people between ages 6-20, aimed at supporting and strengthening their science, technology, engineering and math (STEM) skills, and which lasts at least two days with (usually) one overnight within the camp premises”

This I find to be a very weak definition, but it gives us a starting point.

TEACHING METHODS

The teachers at science camps are often quite young. Quite a few organisers of science camps actually have a maximum age level of education for their teachers. During the camp older lecturers might give a talk but they will rarely be there for longer than that. I believe that the relatively close age of participants and teachers is a very important aspect for the success of a science camp. It gives the students an authentic role model someone they can identify with, so that they might be able to more easily see themselves working within the field in the near future.

A teacher relatively close to the student in both age and education may also make it easier for the teacher to find the zone of proximal development as described by Vygotsky. A student learns the most when challenged in a way sufficiently beyond their current abilities, in their zone of proximal development.

I have used the word ‘teacher’ to describe the role of the person leading a group of participants for a session, but often that is actually not the best word. In many cases such as the International Research School, the role is more like that of a guide, an instructor, a coach, or a tutor. The teaching method is more inclusive than traditional classroom teaching. In this sense, it takes on many of the concepts from constructivism where the main role of the ‘teacher’ is to create a scaffolding for the participants’ learning to happen.

The teaching methods of a science camp are also characterised in the many occasions it changes format. Within a week, the students might experience lectures, field trips, workshops, masterclasses, lab experiments, debates, discussions, calculation exercises and others. The work may also be either individual or in teams.

Which teaching method is most useful entirely depends on what the lesson is about and the answer is most likely a combination of many.

SESSION-BASED VS. PROGRESS-BASED

One way to split science camps into two groups is by looking at whether their content is session-based or progress-based. By session-based, I mean that each point on the agenda of the science camp runs more or less independently of the others. An example could be a mathematics camp where complex numbers is a topic covered over one or two days with an introductory lecture, a session of calculation exercises, a lecture on how they are used in physics, a debate on the topic of the realness of complex numbers, and a session on fractals. Most of these sessions could be individually excluded from the whole programme without much of an effect on the rest of the programme.

By progress-based, I mean that there is a reason for the sequence of the content. An example could be, again, the International Research School where the students execute a short research project and afterwards prepare and give a presentation on their subject. Another example could be a forensic science camp I once taught, where the students were introduced to a case on the first day and had to solve a piece of the case in groups each day, with the case developing meanwhile, so that there would be new topics for the following days. In this way, it was not the content of the science that developed over the week, but rather the story, which led to the content of each day.

I have taught at both kinds of science camps and I must say I prefer the progress-based ones. They both have their advantages. The session-based are able to cover a wider area and is easier to guide in a certain direction. The progress-based is more focused and more easily able to draw on a larger set of competences when working with a certain topic. Due to its modular programme the session-based science camps are easier to plan but will often as a direct consequence lack a clearer direction.

WHAT HAVE I NOT COVERED?

Science camps are not just about teaching a group of students about science. It is about showing them what science is all about. It is about empowering students with a greater level of influence on their own learning process. It is about creating a social setting where having an interest for science, being curious, is not only acceptable, but also encouraged. It is about showing them the power of collaboration and understanding.

In this article, the focus has been on the teaching part, which is central for the other aspects to happen, but not necessarily the central objective of the science camp. To reach those objectives, however, the science camp must have a solid foundation in the educational programme.

Topics such as the social aspects, the participants' socioeconomic background, the international aspects, the practical aspects, and many other aspects of science camps should be discussed in future articles.

MINI-BIO

Over the previous 11 years, I have been volunteering for the Danish Youth Association of Sciences (UNF) a relatively new member of the MILSET family, nevertheless a rather old organisation tracing its roots back to 1824. My first science camps were in 2007 when I participated in a biotech camp and helped organise a medico technology camp and a mathematics camp. After that, I have both co-coordinated, taught and volunteered at a long series of different camps. My personal experience from this has been that there is not just one way of organising a science camp nor one way of defining what a science camp is.

At this moment, I am conducting a survey among the members and partners of MILSET Europe to identify potential partnerships between the organisations (under the Science Youth Vectors programme) and to create a databank of information, which can be used by MILSET to increase the synergy effects of being in the MILSET family.



BEST PRACTICE

KSENIYA SALNIKOVA

HELPING YOUTH PARTICIPANTS GET MORE BENEFIT FROM ESI RECOMMENDATIONS

Over the past five years, MILSET has undertaken a big work for the strategic development on the organization. It was started in 2015 with the discussion of who MILSET's clients are, how MILSET fits in with and stands out from other organizations, and what MILSET can become the best in the world at, and finally led to such a revised **mission, objectives** in 2014:

MILSET supports its member organisations to engage youth in science, technology, engineering, mathematics and the arts (STEAM) through motivation, cooperation, collaboration, and networking. We do this by:

- *Helping member organisations create a local or national environment to motivate youth to be involved in STEAM;*

- *Connecting, supporting, and representing member organisations around the world;*
- *Stimulating and supporting international youth networking and cooperation through STEAM; and*
- *Providing member organisations with global opportunities to engage youth in STEAM.*

and in 2015 to the **Practical Vision Statement for 2019** where among the highest priorities was stated that:

- *MILSET programs and events are characterized by interactivity and engagement, and directly reflect the mission through a focus on motivation, cooperation, and networking for youth and adult participants;*
- *ESI is the most prestigious non-competitive science event for youth in the world; and*

After ESI2015 the MILSET Executive Committee (EC) conducted an online survey of the ESI youth and adult participants. One of the purpose of the survey was to provide feedback on how effectively the ESI experience reflected the MILSET mission and objectives.

Generally, very positive feedback was received; however, some of the survey results strongly suggested that it was necessary to make the ESI event more interactive, motivational, and to add structure to help participants benefit more from the event.

Mrs. Ksenia Salnikova, member of the MILSET EC has summarized the results of work of a large international team of organizers MILSET events and developed draft recommendations on how the ESI program could be improved to achieve these goals. Some of the ideas proposed in this document were tested at MILSET Expo-Sciences Vostok 2016 in November and also before at ESE 2010, ESE 2012, and annual International Research School, that were held in Russia.

JOSE Editorial Board welcome your comments and suggestions and we encourage you to consult with you regional members about these ideas.

PHILOSOPHY – BENEFITS FOR ESI YOUTH PARTICIPANTS:

ESI could be promoted as the largest and most prestigious international youth science communication and networking event. Students from every participating country attend ESI as ambassadors of their countries' youth science programs.

Participants gain experience in explaining their projects to different audiences (including non-scientific), which is a valuable skill for future scientists who will need to seek grant funding and promote public interest in and acceptance of the research.

Among other benefits, participants have a good opportunity to practice language skills, using special terms and training their ability to discuss science in English or the host country language.

Finally, participants make new scientific (and social) contacts all over the world which may bring opportunities for their future scientific career (e.g., choosing a university, finding a supervisor or expert, developing a joint project with a colleague from another country, etc.)

Here are some recommendations on how MILSET could make ESI and regional Expo-Sciences event more interactive and engaging:

1. Consider icebreaking activities on the first day, before beginning any other programs, intended to help participants overcome their shyness, nervousness, and language concerns. Activities should take the form of a game aimed at completing several tasks like:

- greeting each other in different languages and traditions;
- lining themselves up in order of their birthday dates;
- holding hands in a circle of 5 or 6 students to keep a balloon (and later, 2 and 3 balloons) aloft within the circle;
- the game “knots” in which students join right hands with someone in a group of 5 or 6, join left hands with someone else, and then try to untangle themselves without releasing hands.

2. Consider (may be as a part of the icebreaking activities) a master class of traditional games and dances of the host countries. Many cultures have “getting to know you” types of activities, so they could be included as part of the sociocultural exchange programming for ESI and regional ESIs. Where cultural norms restrict or prohibit social interaction between boys and girls, select activities that work equally well with single gender groups.

3. Schedule the time of presentation and visiting other projects: Determine times when participants must be at their stands and when they can visit other projects. We could put the schedule of sitting and visiting at every stand, so everyone who wants to visit a project would know when the author will be at the stand. We suggest that the visiting breaks shouldn't be too long; we don't want participants to leave the exhibit hall. Consider three 30-minute breaks. The breaks should be at different

times for different groups of participants projects – for instance, group participants with even and odd stand numbers) – one group sits while the other visits.

4. Marking projects with stickers: Encourage participants to visit other projects by giving them a number of ESI-stickers and asking to put them on the project they like the most. We can suggest some categories to consider: For example “A personal discovery” or “A real solution to a real problem,” or “The best presentation” etc. Each category could be identified with a different sticker color and symbol.

5. Project Viewing - “Scientific guests” (not to be confused with experts): it is important to attract scientists, engineers, teachers and educators to visit ESI and regional ES events to talk with participants and discuss their work more substantively than other participants and general public visitors. “Scientific guests” could be provided with conversation guidelines emphasizing that their role is not to evaluate, but to engage in scientific conversation. (An example of such a guide, developed by Alexander Leontovich, is included as an addendum.) Guests would be encouraged to discuss areas such as question development, background knowledge, methodology, results, data analysis, relevance, and communication, with the goal of highlighting “next steps” that the student(s) might consider in these areas. This approach could provide the engaging scientific conversation usually associated with judging, but without the pressures and expectations – for both youth and adults – of evaluation and awards. Delegation leaders and supervisors could be invited to serve as “scientific guests” at the ESI, and their contribution could be recognized with a special certificate.

6. Make the Cultural Evening more interactive. The Cultural Evening shouldn’t be organized as a concert, where one delegation is performing on stage and the rest are just sitting and watching. This event is not a competition in performing; few of the participants are professional performers. Instead the Cultural evening should become a platform of intercultural communication. In order to realize this goal, we suggest organizing the Cultural Evening as a party. A performance area could be created in the center of the hall with tables and seats around, and a buffet against the walls. Each delegation would be invited in advance to prepare an activity that involves other participants. It could be a performance (i.e., dancing together, singing a song together, playing music together, participating in traditional games or a short quiz. In addition to the central area, delegations could set up activities around the hall for participants to visit – like a fair or carnival, and similar to Brussels Night at ESI 2015. That way, delegations that want to perform (and involve the audience) would use the central stage, while others would have the option of creating an interactive stand.

7. Workshop on Science Communication. This is new type of activity that was developed by the MILSET Vostok team and tested during ESV2016. It could be included into the ESI program as an optional activity. The workshop aims to teach young scientists to express complex scientific issues in a more understandable way. It starts with an interactive teaching presentation on science communication and continues with the active part when participants conduct a creative project in international teams of 5-10 people. Possible examples of projects:

- develop a “scientific tale” searching for analogies of scientific processes in social life;
- draw a “scientific tale” using infographics or present it as a performance;
- film a short media interview with each other about their ESI projects. Students should aim to describe their project in 15-30 sec. in a popular way without scientific terms or acronyms.

8. Instruct participants and delegation leaders beforehand on how they could obtain the greatest benefit from the ESI experience through an ESI Participation Guide (that would have to be created), website sections, information letters, or a mobile event app.

The instructions could contain:

- 1) ESI activity descriptions;
- 2) Recommendations on project presentation best practices:
 - include a short project summary in the host country language on the poster;
 - use less text and more visual (graphics, photo, video, models etc) materials in posters to make them easier to understand for an international and non-specialist audience etc.
- 3) Advise to prepare and bring pins, coins and small souvenirs from their country to exchange at the ESI; many delegations already do this and it helps to promote interaction and communication.

9. Instruct and train delegation leaders at a special meeting at the beginning of the event:

- how to help their participants explain their projects without using too much scientific jargon and acronyms. “Native Science” specialists could be invited to share their strategies.
- how to encourage students to interact with each other using different opportunities: exchanging pins, learning words and phrases in different languages, being active at the Cultural Evening, marking projects with stickers, looking for new project ideas, or even forming an international project team.

ADDENDUM**“SCIENTIFIC GUESTS” CONVERSATION GUIDELINES**

Developed by Alexander Leontovich for ESV2016

Dear Colleague!

Thank you very much for participating in the examination of the projects at the first EXPO SCIENCES Vostok!

Our exhibition is a part of the network of the international public organization МИЖИСТ (in French MILSET - Mouvement International pour le Loisir Scientifique et Technique). This organization includes scientific associations, organizations, centers, clubs and museums of more than 80 countries which work in the area of scientific and technical creativity in the sphere of children’s leisure time. The main field of MILSET work is the hosting of international expositions.

The programme of the exhibition suggests that the participants present their projects (in free-form, the presentation of visual aids, models and the information about the organization, where the work has been done, are greatly welcomed).

Also there will be the night of national cultures where the participants will perform their folklore and present the dishes of national cuisine; an excursion day with a visit to the most significant sights, the MILSET Assembly, the event held by the host organization. Usually there is no preliminary selection of works, the participants are nominated by the organization - the official members of MILSET due to the results of national competitions and exhibitions.

Unlike the majority of conferences and contests in the sphere of students’ research and project work, the MILSET exposition is non-competitive, there are no winners. The main point is to motivate the participants to improve their creativity and develop their projects. The ideology of MILSET is based upon the fact that there is a meaningful communication between the participants in the field of scientific creativity and that the qualified expert support is more effective for children’s progress than an intellectual rush. It is also very important to organize the discussion between the children and the specialists to speak about the result of the work, as it is expected in the scientific community.

That is why the examination of our Expo-Sciences is not evaluating but educational – it is SCIENTIFIC CONSULTATION how to make THE NEXT STEP in project. The main goal of an expert is to figure out the essence of the project, to discuss the strong and weak points of the works with the author and to make a

plan for the future work. It is necessary for the author to understand the rules of scientific research and project activity.

During the conversation with the authors, the expert is recommended to use the following criteria and should understand that they are the key milestones in the scientific consulting which an expert performs.

Criteria	The subject of the analysis	Result ADVISE IN THE NEXT STEP!
Work structure	Work structure, its correspondence: grounding - aims and goals - method - realization- result - presentation	To give advice to the author on correcting and improving the structure of the work
Authors' knowledge	Awareness in the field of science and practice of the accomplished project	To identify areas where the author should expand the theoretical knowledge, recommendations for studying specific sources
Method of work	Subject methodology of realization of the research or the experiment, its correspondence to the aim of work, restrictions	To discuss the matter of method, the adequacy and the limits of applicability of the methodology, recommendations on correcting or applying other methods
Results	Size, statistic reliability, completeness of results	To discuss the sufficiently of data or created products for achieving the goals, methods of processing the results, the adequacy of their interpretation, plans for the future development of of the works.
Relevance	Opportunity to apply the results in practice, the circle of possible users of the result	Tips on possible ways of using the result, the discussion of the range of possible interested individuals and organizations
Design	Demonstrativeness, structure, the completeness of the report, usage of infographics, visual aids, interactive method	The discussion of the winning parts and the shortcomings of presenting the work for professionals and ordinary visitors

NOMINATION:

- For the best interdisciplinary research
- For the best poster
- The youngest participant
- For the best collection
- For the best working installation

- For the best experimental research
- For studying of socially significant objects
- For the best project in the area of sustainable development
- For the best research on the highly protected natural area
- Your own nomination.

Please, add 3-4 explaining words after chosen nomination.

Every participant will receive certificate in certain nomination. The objective of experts is to choose the most suitable nomination among the proposed ones or to propose nomination by oneself. (On the certificate will be written: "For the best project in nomination....").



BEST PRACTICE

ELENA USADOVA
EXPO SCIENCES MILSET-Vostok executive director
The first EXPO MILSET Vostok,

ALEXANDER LEONTOVICH

THE FIRST EXPO MILSET VOSTOK

I ESV (Expo-Sciences Vostok 2016) was held in Moscow in November for 4 days. This event was devoted to greatest historical dates: the 120-th birthday anniversary of Russian genius of psychology Lev Vygotsky and the 55 years since the first man Yuri Gagarin flew to space. This exhibition was the first for the youngest branch of MILSET – MILSET-Vostok, so the organizers put a lot of effort to make it successful. Almost 100 participants from India, Brazil, Mexico, Belarus and different regions of Russia presented their projects during ESV 2016. Reni Barlow, MILSET vice-president, visited EXPO.

The main task of the organizers was to increase the interactivity of the EXPO, the involvement of all the participants in the different activities, their motivation to continue working. We felt the need to engage with projects many specialists

as experts, to determine the subject of their conversation with the participants, but to keep non-competitive way of EXPO. In discussions with Reni had the idea to call the experts “scientific guests” in order to emphasize their main task to motivate participants to develop their themes, and the main task of the expertise to suggest the “next step” in the development of the project. Thus, the main idea of the expertise was to involve the participants into constructive discussion on their projects and to suggest possible prospects of further development, so we called this procedure “project viewing”. While discussing the projects we adhered closely to our principle “every participant is a winner in a nomination”. The scientific guests could either chose a nomination from the list of nominations they were given before the viewing or invent a new one. Most scientific guests were creative people, and so we had over 50 new individual nominations. Also, the participants could get acquainted with each other’s projects. To help them was carried out «Science communication master class», where they learn to present their projects and lead a scientific discussion.

In addition, traditional events such as Youth Citizens Conference, cultural evening etc. were held during the EXPO.



STEAM FOCUS

ANUJ SINHA

Chairman (Hony) Foundation for Glocal Science Initiatives, Mumbai (Section 25 Company)
Chairman (Hony), Governing Body, NCSTC Network, New Delhi- leading over 90 organizations across the country to effectively promote innovation, science and technology

THE FOUNDATION FOR LOCAL SCIENCE INITIATIVES

For ten years he was involved in initiating, conceptualizing, evaluating and monitoring interventions in societal development through inputs of science and technology. He has worked with local societies, leading development organizations and academic institutions to promote partnerships for accelerating development of excluded people.

LEARNING SCIENCE IS EXCITING

We have avenues in india for study camps and scientific tourism with prospectives to understand science not just as another subject in classroom study but understand science as field where we venture to the world by applications and with personal efforts to learn always something new.

Away from book study to new ventures in science learn it by applications.

Preamble:

School education in India aims at developing necessary analytical skills and subject knowledge. It aims at encouraging creativity and nurturing talent. Continuous developments in the syllabus, teaching methods, text books, progress evaluation and enriched class room experience are the hall mark of progressive schools.

Memory training, hand eye coordination, keen observation and documentation are broad objectives of field exercises and laboratory practicals. There is scope for improving experience of the high school years and transform learning into an open laboratory. Foundation for Global Science Initiatives, Mumbai has been formed in this context and to meet such objectives.

Some Opportunities:

We Invite World around to India which has a prospective of perfect balance of study and adventure. The text of History shows the value of India and its diversity to which countries around the world venture to India and put efforts to establish its civilization here. With those perspective of History we propose to world around for the science camps and tours which are designed here as Hands-on experience and its topics and schedule is in a way so that participants learn a number of topics related to their curriculum while enjoying in some of the finest and most serene tourist places in India. Our USP is that these programs are organized as per specific requirements of participating schools in terms of timing, duration, choice of topics and of course, cost.



Welcome to CSCA-2017-18 the first and unique of its kind Children Science-study Camp & Adventure ventured in India. Here participants see and experience on their own topics related to ecology, environment and sustainability that they learn in books/see and experience environment sitting in the lap of Majestic Himalayas. Here, they experience the Himalaya's unique ecology, will see and analyze environmental interactions, will make their own robots, will analyze the

impact of developmental activities on people and environment and will learn the art of thinking differently. All this while enjoying mesmerizing treks and amazing surroundings that they wish to know.

DESIGN FOR STRUCTURED PROGRAMMES

Interactive sessions covering environment, ecological interactions, biodiversity, evolution, adaptation, river ecology and evolution of Himalayas. Only brief introduction about the topic will be given and students will be encouraged to go out and learn directly from nature.

THE PROPOSAL FOR PROSPECTIVES VENUES IN INDIA

1. TEHRI DAM:



Tehri Dam is among the world's largest dams and is constructed at the place where the Old Tehri submerged. This place is of great interest to both environmentalists and geologists. Geologically This dam is located exactly over a fault and hence poses a risk to a number of cities including Delhi. Students will experience how Dams and similar mega projects impact local's life and environment. Interactions with eminent environmentalists will also be arranged and participants will be encouraged to present their own conclusions.

2. DHANULTI:



Dhanaulti is a hill station 24 km (15 mi) from the popular hill station of Mussoorie, and 29 km (18 mi) from Chamba, as it is situated between the two.[1]

It is situated at an altitude of 2286 m, and is known for its quiet environs amidst the alpine forests of Deodar, Rhododendron and Oak. Like Thihri this is also a perfect place for learning directly from nature about ecology, environment, evolution and commercial activities while enjoying the snow and stunning view of Garhwal Himalayas. A number of adventure activities are available at Kanatal while Eco Park and surrounding areas will inspire many ideas in children's minds.

3. LAVASA



Lavasa is India's smartest city at present. It is also India's latest and finest hill station and is located very close to Pune. It is an ideal choice for getting an in-depth understanding of urban planning, factors making a city 'smart'. Simultaneously, students can see the impact on environment and local economy. It has the country's finest water sports facilities and the best part is that students will also visit some of the industries located around Pune.

4. BHEEMESHWARI, BANGALORE



Bheemeshwari is located at a distance of 100 km south of Bangalore. Bheemeshwari is situated on the banks of the River Kaveri. Lying between Shivanasamudra falls and Mekedatu (Goat's Leap) is Bheemeshwari, a perfect picnic spot where nature has created a natural habitat for the Mahseer fish and a variety of exciting animals. Bheemeshwari in Mandya district is a perfect place for viewing wildlife like elephants, deer, wild boars, monkeys, jackals, crocodiles, otters and leopards. Variety of birds such as Sirkeer cuckoo, green-billed Malkoha, white-browed Bulbul, and the pigmy woodpecker are found at Bheemeshwari.

Participants will get a chance to visit campus of some of India's finest IT companies like Infosys along with lab visits and interactions with some of India's finest scientists. NCBS, IISc, RRI etc will definitely ignite their interest.

TOPICS IN SCIENCE WE COVER:

- Bio Diversity
- Biological adaptation by plants
- Biological adaptation by animals
- Environmental impact on lifestyle
- Impact of development on environment
- Benefits:
 - Unique approach to learn many important topics and issues
 - Sensitizing towards environment and sustainability
 - Developing fine observation skills
 - Sharpening independent thinking ability
 - Learning scientific approach.

PROJECT INNOVATION-TRAINING PROGRAMS

Students are trained to become innovative in a systematic way. First e young minds are encouraged to generate and explore innovative ideas and then they are guided to convert it into reality. Our team shall be guiding them in synchronizing the Idea generation, Project planning, initiating experiments, Data analysis, Presentation, Report writing, Filing at international events and arranging for international participation. Students guided by our Mentors have reached to Intel International Science & Engineering Fairs and won accolades.

Benefits:

- Transformed minds
- Innovative research right at school level
- International awards and recognition.

FROM THE HISTORY OF MILSET

DEREK GRAY

One of the most important MILSET Awards that usually is presented during the MILSET Expo-Sciences International is Derek Gray Medal. It is handed to an individual for an outstanding contribution to the movement.

This award was created in memory of Derek Gray - a prominent enthusiast, one of those who compose the backbone of our movement - MILSET.

Derek Gray raised first in England and then in Rhodesia (Zimbabwe), in the early 80 she moved to South Africa wherehe managed to create the national “Expo for Young Scientist”. From a single small exhibition launched at Pretoria Boys’ High



in 1980 with only 198 students the expo grew to encompass 30 regions in South Africa. It involved over 22000 learners all over the country, where the majority represented historically disadvantaged communities. From the beginning until nowadays Expo has maintained its apolitical stance refusing to take cognizance of questions of gender, color or creed and thus contributed to democratization of the country, to building its human capital.

In addition, Expo developed strong African connections, with Namibia, Swaziland, Botswana, Malawi, Reunion and Zambia also participating, sent winning delegations to MILSET Expo-Sciences. Derek Gray was the president of MILSET Africa during his lifetime and his wife, Prof. Rosemary Gray, took over his position after his death in 1998 until the end of 2007.

Derek Gray, commonly known to South African youth as “Mr. Expo”, was fully devoted to his lifetime project. And even the car accident that happened in 1981, when he was coming back from an Expo meeting, and condemned him to a wheelchair didn’t slacken his efforts. He and his wife Rosemary Gray were inseparable in every moment of their lives, their struggles, and their successes.

Prof. Rosemary Gray recollected lots of documental materials, reminiscences and testimonies and in 2014 published the book “Light Comes Out of Darkness: The history of Escom Expo for Young Scientists”, dedicated to the Derek Gray’s life-work.

JOSE Editorial Board by special authority of Prof. Rosemary Gray would like to share some extracts of this book that reveal the brightest facets of Derek Gray’s eminent personality.

ENGAGING

One of the Derek Gray’s team-mate, with whom he started to build the Expo, Dr. George Stoop reflects back on their acquaintance in 1979 and further work:

“A few shuffles and clicks outside my office were warning enough to make me look up just as Derek Gray lowered himself into the chair just in front of my desk, and stuck out a hand: ‘You’re George and you run the CSIR¹’s schools visitors’ programme,’ he said. ‘I’m Derek from Boys’ High and I’ve come to meet you chaps at the CSIR.’ Within half an hour, he has me and colleagues Keith McCusker and Bob Newman as enthusiastic about his plans for an interschool’s science projects competition as he was.

1 CSIR – the Centre for Scientific and Industrial Research- conducts multidisciplinary research and technological innovation to foster industrial and scientific development. The organisation focuses its research and development on national priorities in the areas of health, industry, defence and security, the natural, built and digital environments, as well as energy. In addition, the CSIR invests in and explores new research areas to help shape future applications.

A few weeks later, I attended the first science Expo at Boys' High with a fair number of boys participating and even a handful from Afrikaan se Höerseunskool. Great fun, and soon Derek had us and a number of other enthusiasts sitting around a table, discussing some kind of constitution and the formation of a formal Expo for Young Scientists, although the name only came later (the late Malcolm Armstrong's brainchild). There was much discussion as there always was at his meetings, but Derek knew exactly what he wanted and where he was going, and easily steered most meetings to where he wanted them. His enthusiasm and keenness inspired all.

Derek made friends easily and the scholars loved him. Always a friendly word; often sharp criticism, but delivered with his own touch of good will: ever ready for a joke or a bit of bantering. '*Derek, joutwak,*' I told him more than once, '*jy's'nbakgatou, netjammerjy's 'n donnerserooinek.*' And he would laugh with us and retort something about, 'You hairybacks are learning, but hell, does it take time!'

We managed to get the Centre for Scientific and Industrial Research (CSIR) involved for many years, providing necessary supportive facilities and staff time, mostly because Denys King-will² (Director of Information and Research Services) was also enthused by Derek and the excellent work he was doing in promoting science among South African high schools. When the CSIR also had to face the harsher realities of the coming new era, this assistance unfortunately had to be curtailed and eventually ceased. By then, however, Derek had many friends and supporters in industry, state departments and other organizations.

Keith and I, and Bob I am sure, are proud to have been associated with this movement in the dawn days. It gives me goose bumps whenever I now visit the regional and final Expo exhibitions and see how great this activity has become and how well it has inspired boys and girls of all races and ages to participate. The initiative, inventiveness and resourcefulness exhibited by pupils from all over the country now are monuments to the leadership and the inspiration emanating from Derek Gray. Already now, and even more so in days to come, will South Africa see and appreciate achieving scientists, researchers and technologists who have come up through the ranks of Derek Gray's Expo for Young Scientists.

² In 1984, Denys Kingwill was awarded an LLD (honoris causa) by Rhodes. He held a firm belief that 'one of the main responsibilities of a scientist is "to provide the best possible information in the most useful form". ' (meson, June 1984: 1) On a lighter note, in his publication *The Book of the Boabab* (D.J. Gray, 1990), the narrator defines a scientist as follows: 'n. — one whose errors can be faithfully reproduced following a scientific method' and sciences: 'n. a mysterious accumulation of knowledge whereby politicians can demonstrate that the most arrant nonsense is irrevocably true.'

When I now think back over these many years and say, '*Ja, Derek, oomaarjy het niesleggedoennie, al wasjyook 'n donnerserooinek!*' I can still see his wide smile and twinkling eyes, and I gratefully 'hear' his repartee: 'Yes, you *domboertjie*, I see you too.'

From the start, Derek began networking with potential partners and also invited the now late DrMeiringNaudé, CEO of the CSIR and a prominent local scientist, to become Expo's first president. Other prominent South African scientists brought into the Expo fold to share the warmth of the Expo fire were Dr. Peter Spargo, National Chair of the South African Association of Teachers of Physical Science in August 1980 and Professor FriedelSellschop, Director of Nuclear Physics at the University of the Witwatersrand in 1981.

Overtures were made to the then Transvaal Education Department, and although the organization wished Expo every success, political expediency initially prevented open alignment with this ground-breaking endeavour. The Foundation for Science and Technology (FEST) and S2A3 lent their support and, as early as 1982, the Minister for National Education tacitly endorsed Expo by writing the Foreword to the Expo prospectus for that year, stating, 'I am impressed with the interaction between schools, universities and industry that has occurred as a direct result of these exhibitions...'³.

The late Prof. Peter Geerthsen (professor emeritus, Genetics, University of Pretoria, founder member) wrote:

"I was present at the first meeting that led to the creation of the Expo for Young Scientists and was intimately involved with, this effort for a number of years. The outstanding impression that has stayed with me was that the success and the incredibly pleasant and vibrant atmosphere was due to the leadership and charisma of Derek Gray. The inevitable crises were solved by Derek Gray in his imitable enthusiastic way. Those involved in the Expo for Young Scientists were leaders in a diversity of fields. Nevertheless, Derek Gray managed to form them into a cohesive and extremely successful group. Derek Gray ignited the enthusiasm of this group with incredible results."⁴

³ "Light Comes Out of Darkness: The history of Escom Expo for Young Scientists", Oxford University Press SouthernAfrica (Pty), 2014, p.24-26

⁴ "Light Comes Out of Darkness: The history of Escom Expo for Young Scientists", Oxford University Press Southern Africa (Pty), 2014, p.40

OVERCOMING

A fortnight after the snow-filled Expo⁵, Derek was back at the CSIR for a think tank on fundraising for Expo. On his way home, a car jumped the stop street at King's Highway and hit an oncoming car travelling due north along Meiring Naudé Drive. Both cars went into a spin and smashed into Derek's VW Kombi, which was travelling south towards Lynnwood Road. As any young scientist will tell you, the force of a speeding Ford Cortina ramming into a likewise speeding Volvo must result in both vehicles spinning out of control. Moreover, the combined weight of both cars must crush whatever is in its path. The Kombi crumbled like a paper cup! Derek's hips and both legs were smashed, and he spent the next five years in and out of hospital. Nonetheless, true to Derek's determination, the Expo show went on⁶.

The 1982 Expo was held in the Rautenbach Hall at the University of Pretoria. At this time, the Rautenbach was entirely inaccessible to wheelchairs. Derek had both legs in plaster and had to have four helpers lift his chair down the flight of about fifteen stairs. Later, a couple of curious staff members popped their heads in to see what was going on as the youngsters were setting up their projects. One accosted Derek, 'What about the toilets?' he asked in consternation. 'Are they blocked?' was Derek's rejoinder. With a serious look of concern, he added, 'They were fine yesterday when I inspected them. I can take another look if you can get six strong men to carry my wheelchair back up the steps. Not wanting to cause further embarrassment, the somewhat abashed member of staff walked away shaking his head, not noticing Derek's broad smile. How do you tell a recent immigrant, doomed to spend the rest of his life in a wheelchair and with both legs in plaster (looking not unlike a phantom of the opera at the time) about separate facilities?!⁷

(...) Early in 1983, it was time to expand Expo, and Derek... flew to Cape Town to sell the Expo idea. After Derek's presentation, a shocked member of the audience at their alma mater, the University of Cape Town, blurted, 'You mean it's multiracial?' Again, the broad smile and the retort, 'No, I am talking about kiddies who are as passionate about things scientific as I am. It's about any South African school child and his or her project. You, apparently, are talking about politics! Forgive me! I cannot quite see what an enthusiastic young innovator has to do with things political⁸

5 Expo for Young Scientists 1981 held in Johannesburg

6 "Light Comes Out of Darkness: The history of Escom Expo for Young Scientists", Oxford University Press Southern Afrida (Pty), 2014, p.36

7 "Light Comes Out of Darkness: The history of Escom Expo for Young Scientists", Oxford University Press Southern Afrida (Pty), 2014, p.38

8 "Light Comes Out of Darkness: The history of Escom Expo for Young Scientists", Oxford

INSPIRING

Prof. Walter Meyer (Department of Physics, University of Pretoria) writes:

I can still remember my first Expo. It was an unusually cold day in October 1981 with snow reported in Johannesburg. Derek drove me in his minibus from Pretoria to the Johannesburg College of Education, the venue of the Expo. I remember him as a friendly, cheerful man, not at all overbearing and, despite him walking on crutches, full of energy. I was in Standard 5, rather shy and very uncertain about where this all would lead to. In school I was not particularly happy; I had very little interest in most subjects except maths and science, and did not have much of an interest in sports. However, despite not really working hard, I achieved reasonable marks.

Two years earlier, I found my passion for electronics when I discovered an electronics hobbyist magazine at the corner stationery shop. I remember buying the magazine and paging through it, enthralled by it, but not understanding most of the content. My parents, although keen to help, did not have the technical background. Noticing my passion, my father bought me electronics kits and my mother tried her best to help me through the technical jargon (which she did not understand herself). I found the new field fascinating and learnt surprisingly fast, but got no recognition for this achievement at school, and my school life remained rather frustrating and unhappy⁹.

A family friend introduced me to Derek Gray, with the suggestion that I make a project for Expo. I remember visiting the Gray household, being introduced to the family and given some background and tips on approaching Expo. There was a lot of excitement about Peter Gray's gerbil project as well as a competition about building a contraption that would be able to transport a can of condensed milk the furthest using only its gravitational potential energy.

At that stages Expo was aimed at high school students, and it was considered unusual for a primary school student to take part. I can't remember if a special category was made for us, but in the end there were only two of us in the category. I met other participants and soon discovered that I was not the only person with a passion for electronics. I exchanged ideas and suggestions with other participants and looked at their projects. It was a wonderful feeling to find a place where I could share my passion with like-minded peers. And we didn't leave it at serious science; at some stage we also decided to go out and play in the snow.

University Press Southern Afrida (Pty), 2014, p.38

⁹ *"Light Comes Out of Darkness: The history of Escom Expo for Young Scientists", Oxford University Press Southern Afrida (Pty), 2014, p.40*

I can't recall much of the adjudication — I was probably too stressed — but what I did appreciate was somebody actually taking notice of what I had done and understanding my interests. The prizegiving ceremony was the next day. It was preceded by a lecture by Marinus Wijnbeek. This was probably the first 'scientific' lecture I had attended, which I enjoyed thoroughly. At the ceremony, both my fellow participant and I received a prize, over which I was delighted.

In the following years, I saw Expo grow and the number of projects increase. Later, Pretoria got its own regional Expo. I entered a number of projects and received a number of prizes, but what counted far more than the prizes to me was the atmosphere at Expo. Although slightly competitive, there was the feeling of camaraderie and the excitement of showing one's project off to somebody who actually knew something about the subject. This is a motivation few other organisations could provide.

Expo meant a lot to me — I learnt many skills — from technical skills, to knowledge gained by looking at other projects, to presentation and communication skills. (The latter were mainly owing to my mother's help in making posters and typing up notes.) Expo gave me an area in which I could excel and grow and receive recognition. Furthermore, it gave a focus and legitimacy to my hobby; I planned projects and set goals and received official recognition for what I did. It was not just 'playing around'. I believe that the bursary I received after school was as a result of distinguishing myself through Expo.

I still have fond memories of my Expo participation and frequently think back to those days, especially when helping participants with their projects or adjudicating. It is hard to imagine that there ever was a time without Expo or a time when school authorities doubted the value of such an endeavour. In retrospect, I realize what a huge input Derek Gray made in organizing those first Expos, in terms of time, organization and energy. Back then, I only did what children do naturally: I had fun and discovered the world. In this, Expo was an important motivating factor that led me on the path to where I am today¹⁰.

10 *"Light Comes Out of Darkness: The history of Escom Expo for Young Scientists", Oxford University Press Southern Africa (Pty), 2014, p.42*

ATTACHMENT



> Above: The Taiwanese participants with Alexia Scott, Derek Gray and Malala Fung (right), the Taiwanese delegation leader



> Above: A delegation leader presents the South African Expo Chair, Derek Gray, with a Golden Gate Bridge



Thumbs up: the four students representing South Africa at the International Science Expo '89. Paul Obermayer, Angela Yeast, Paul Bauer and Nina Goppel, have high hopes for their projects entered in the expo. With them is the tour leader, Mr. Derek Gray.

- > Above: 1989: The first South Africans from the Expo to participate in MILSET's ESI
- > Right: South Africa's participation in ESI has been unbroken since 1989.



Mr Derek Gray — champion for South African scientific educational standards.

Derek is a real live wire

BRENDA WILMOT

IN the science laboratory of Pretoria Boys' High School power is generated by far more than electrical apparatus and chemicals.

Before the class sits human dynamo, Mr Derek Gray — champion for South African scientific educational standards, widely respected teacher and paraplegic spokesman and sportsman.

Mr Gray, who is presently working on his MSc degree through the University of York, already holds a degree from the University of Cape Town, a teaching diploma from the University College of Rhodesia and the equivalent of a Bachelor's degree of Education from the University of London.

Sportsman

Yet he has not always been academically orientated — "I was a great sportsman but at 16 I was paralysed which changed my life to things academic," he says.

Even as a paraplegic he remained a successful sportsman, winning 35 South African paraplegic titles, 22 medals and swimming in the 1972 Olympics.

It was in 1979, with a move from Zimbabwe to South Africa, that he became more committed to the cause of education — in particular scientific education.

"I was involved in the young scientists' exhibition in Rhodesia, but my main interest was paraplegic sport," he says.

However, once in South Africa, he saw the need for action in the field of science education.

"This place is heading for disaster in terms of technology manpower," he says. And it was this which prompted him to start Expo for Young Scientists in 1980.

Partial

"Expo is not a solution — it is a partial solution. There is no universal way out," he says.

He expressed dismay at "the lack of initiative and innovation" among those involved in science education.

Of his teaching career, this father of three says "I teach because I want to."

Yet in his classroom he hopes to teach more than only science.

"I hope the boys I teach who may become handicapped remember me, as a paraplegic, having led a full life ... I lead a very full life," he says.



> **Above:** Derek Gray at the Expo '91 prize-giving at the University of Pretoria

