

## SCIENTIFIC TOY IN INFORMAL EDUCATION

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### *INTRODUCTION*

*Toys and games are traditional and natural educational instrument, which can contribute to non-violent spreading of knowledge and it can increase intergenerational communication.*

*Organising, preparing and providing the exhibition of scientific toys is simpler and cost effective compared to the hands-on-science centre.*

*Scientific Toy is a small civic non-profit association in the Slovak Republic (without employees, registered on January 1995, almost 50 members). Civic Association Scientific Toy (CA ST) is member of International Federation of Inventor's Associations (IFIA) in Geneva.*

### SCIENTIFIC TOY – TERMINOLOGY

Scientific Toy is a small mobile equipment that approximates or even uses natural relations and effects through simple and non-violent forms. It is considered to be a cognitive game for children, youth, families and others.<sup>1</sup>

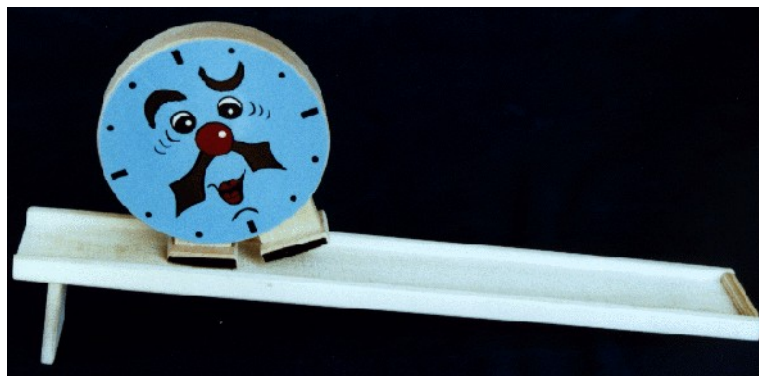
It may sound a little bit controversial for someone to link these two words together:

“scientific” and “toy”. The term “Science Toy” or “Scientific Toy” has been used since July 1991 in Czechoslovakia. It was introduced at the international youth forum for science and technology ESI - “Expo Science International” in Prague. They were children visitors who had used spontaneous appellation “Scientific Toy” at the Schola Ludus exhibition. After that the appellation “Scientific Toy” has been well – known through touring exhibition “Schola Ludus – Scientific Toy”. This exhibition helps Slovak foundation Schola Ludus to promote the idea of creation the “Slovak Science Centre for All” in Slovakia (as a type of hands-on-science center).<sup>2</sup> The term “Schola Ludus-Science Toy” has been applied at national competitions since 1992. Slovak specialists Žbirková<sup>3</sup>, Balažová<sup>4,5</sup> and Holakovský<sup>6</sup> accept this terminology as a relevant term not only in the field of science work.

We think the combination “Scientific Toy” breaks barrier of fixed idea - where science starts, toy finishes. It is well-known from history that toys and games (particularly own constructed) influenced an inventive future of scientists. A few famous personalities, such as Isaac Newton (he threw the stones over the water-level and than observed the light through glass prism), Benjamin Franklin (kite-fly), Richard Feynman (electric circuit), Línus Pauling (twiddle-toy wolfing), Albert Einstein, Thomas A. Edison, Blaise Pascal, Robert Koch and etc., had been

influenced by toys and games in their early childhood and they developed these initial impulses later on during their science lifework.

Unfortunately standard scientific toys are usually used in a short term. They are interesting until the player finds out the natural relation or effect which toy uses and until he becomes familiar with the toy handling. Scientific toys should be found at schools, playrooms and they should become a part of flat's and office's interiors. Short notes in visitor's book of exhibition prove the fact that toy in general and especially scientific toy contribute to the family coherence and harmonisation of relationships.





### Examples of scientific toy

#### INTERNATIONAL COMPETITION SCIENTIFIC TOY

Activities of Civic Association Scientific Toy members are permanently connected with original mission of the competition; to compete for original or unknown scientific toy in the Slovak Republic.

Twelve year-duration of the international competition “Scientific Toy” have brought 139 proposals (81 from abroad) by 87 authors (23 of them were less then 18 years old).

Conditions of competition are available in enclosure (annex 1).

#### INDUSTRIAL PROPERTY PROTECTION OF PRODUCTS

Members of Civic Association Scientific Toy created 28 original products that have been registered or protected as an industrial property. They participated at international presentation of 54 Slovak patents, utility models and industrial designs. Members received 18 awards intended for patent owners and authors at 8 international exhibitions of patents and inventions in 5 diverse states. 15 of them are produced and sold in Slovakia (10 of them are toys and games).

International invention exhibitions (e.g. Eureka Bruxelles, Genius Budapest, IENA Norimberg) are good way for the young creators how to demonstrate own and also foreign prototypes or technical solutions. They can check the quality of the prototypes and gain experiences with public interest. They gained experiences through communication in English with visitors and sellers, as well as they obtained the knowledge what, where, and how could

be patented and produced. Meetings and interviews with other inventors have brought new experiences about creative solutions.

Members of CA ST visited 8 international invention exhibitions, won 15 prizes and medals. For the last three years we have participated with our own projects on “Touring Exhibition – Scientific Toy” and “Toy at School” at the Expo Science Europe ESE 2002 in Bratislava (won the certificate of merit from the President of Industrial Property Office of Slovak Republic), ESE 2004 in Dresden and Expo Science International ESI 2003 in Moscow. Projects mentioned above are an individual projects of secondary school students.

#### EXHIBITIONS AND TOURING EXHIBITIONS “SCIENTIFIC TOY”

According to the experiences from scientific toy shows, creative meetings, presentations at the national and international exhibitions, visits of the hands-on-centres around the world the CA ST has decided to organise interactive exhibitions of technical cognitive toys. In the centres of science you can usually find non-portable and special – purpose facilities, these help the visitors to demonstrate natural relations, effects, etc. Most of the main centres have their branches in another towns or have touring facilities, but most of the expensive and big interactive facilities stay in the main centres. The visitor can remember such facilities only from photos or videos, from own memories or leaflets. CA ST has already created the collection of technical toys, games, twisters and untraditional interior facilities. Besides the foreign centres of science these toys, games and twisters became the base for organising the first touring exhibition with the name “Scientific Toy – Surprise, Pleasure, Knowledge”. The exhibition was co-organised with the Faculty of Natural Sciences – Department of Physics, University of Matej Bel and Industrial Property Office of the Slovak Republic and biggest Museum (of Slovak National Uprising) in Banská Bystrica from the 1. December 1998 to the 7. March 1999. The exhibition had 12 022 fee-paying visitors.

From the 21. January to the 8. April 2000 CA ST organised second exhibition “Scientific Toy – Surprise, Pleasure, Advice”. The exhibits were replenished with 6 original facilities for physics experiments created within the frame of the diploma work by Martin Bulla<sup>7</sup>. Mgr. Jozef Škarba, teacher from Orava Region, exhibited his 30 physical toys created for the experimental physics<sup>8</sup>. Christmas 2000 in the House of Techniques ZSVTS in Žilina inspired to compound the collection of non interactive interior facilities and components with application of the light “Scientific Toy – Surprise in the Dark”. First reinstallation of the exhibition, which consisted only from toys and few twisters, was in April 1999 in the school

of the open-air museum Slovak Agricultural Museum in Nitra. On 25<sup>th</sup> of June 2002 the CA SC installed and opened there the first permanent exhibition “Scientific Toy”.

The chance to play with the toys had almost 100 000 particularly young visitors at 55 exhibitions in 42 Slovak towns (December 1998 - August 2004).

First CA ST foreign exhibition “Scientific Toy Wandering? Europe” was in Békéscsaba (Hungary) in April 2004. Touring exhibition “Scientific Toy Wandering ?Europe” is prepared for rent in Poland and Germany in 2005 (the offer - annex 2).



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Katalóg výstavy VEDECKÁ HRAČKA – prekvapenie, potešenie, poznanie. Vedecká hračka, Bratislava, 1999. ISBN 80-968131-1-2.

<sup>2</sup> Teplanová, K.: Katalóg výstavy Schola ludus - Vedecká hračka 1995. Slovenský pedagogický ústav, Bratislava, 1995. ISBN 80-85756-16-1.

<sup>3</sup> Žbirková, V. a kol.: Hra a jej sociálne súvislosti. Filozofická fakulta Univerzita Konštantína Filozofa, Nitra, 1999.

<sup>4</sup> Balážová, E.: Regiokultúrna hračka - prostriedok k multikulturalite a tolerancii. In: Hra - prostriedok formovania osobnosti. Univerzita Mateja Bela, Pedagogická fakulta, 1999.

<sup>5</sup> Balážová, E.: Hračky v škole. Vedecká hračka, Banská Bystrica, 2004. ISBN 80-968131????

<sup>6</sup> GENIUM - Tvorivo o tvorivosti. CD ROM. Gratex International 1995.

<sup>7</sup> Raganová, J., Bulla, M.: Rozvíjanie fyzikálneho vzdelávania prostredníctvom interaktívnych výstav. In: Acta Universitatis Matthiae Beli FPV III/99. Univerzita Mateja Bela, Banská Bystrica, 1999. ISBN 80-8055-296-7.

<sup>8</sup> Vedecká hračka - Katalóg putovnej výstavy. Vedecká hračka, Bratislava, 2000. ISBN 80-968131-1-0.



*OFFER FOR LEASE (SALE) OF INTERACTIVE EXHIBITION*

**Exhibition?    SCIENTIFIC TOY**

- Who?**        The Scientific Toy — the Slovak unprofessional, non-profit civil association dealing with creative technical activities which are aimed at designing, development, industrial property protection, production and presentation of technical toys and games.
- What is it?** Scientific Toy explains, demonstrates or otherwise utilises natural principles or phenomena. It is dedicated to cognitive games. The Scientific Toy is a travelling exhibition containing authentic toys from 20 states. Each toy is furnished with a plain and compendious descriptions in the English (German) languages. On request of a lessee the exhibition can be complemented with various physical experiments.
- How much?** Lease: 50 pcs of toys including descriptions — EURO 25 per day; 100 showpieces (toys, physical experiments, projection of surprises into dark) — EURO 55 per day.  
Sale: 50 pcs of toys including descriptions — EURO 1,200.
- To who?**     Anyone young in spirit from 4 years of age; mainly for primary schools students and families with children. Suitable for museums, schools, educational and cultural facilities for children and juveniles.
- Showplace?** At least 80 m<sup>2</sup> – max. 300 m<sup>2</sup>.
- Conditions?** The lessee provides for exhibition facilities (at least 10 stools, display case, 2 panels, electric power supply 220 V/50 Hz, optionally a darken area), presentation under lessor's guidelines, and supervision and maintenance.  
The lessor provides beforehand an instructive videoprogram and catalogue; further delivers and installs the showpieces with instructions and instructs the animators.
- Duration?** Installation by the lessor in co-operation with the lessee ca. 5 hrs; presentation ca 30 mins; playing at least 1 hr.
- Toys?**        Various: joyful (walking alarm clock); tricky (eyes on glasses, ever thirsty duck); unexpected (luminous roundabout) and magical (thievish moneybox); retrospective (kaleidoscopes) and inspirational (salty flower); classical (yo-yo, periscope) and modern (levitrons, holograms); indoor (optical fibres lamp, kinetons) and outdoor (balanced birds, wands); big (stork) and small (spherical cube); practical (magic magnetic pen, bottle on a larkheel) and souvenirs (Celtic element, whipping top); patented (UFO teasers, Stavros) and copyrighted (cylindrical pictures); Slovak (BAGOGO kit) and foreign (vocal tube, ball chaser), etc.
- Benefit?**     Playing with untraditional toys, games and simple physical experiments (in contrast to traditional school experiments). Attractive not only for children, but also their parents. Understanding of the secrets of the physics in an easy way; game enjoyment; experiencing untraditional toys and games.
- Contacts?** VEDECKÁ HRAČKA, Švermova 26, 974 04 Banská Bystrica, Slovak Republic; tel. +0421-903-549243; e-mail: [vedhra@pobox.sk](mailto:vedhra@pobox.sk).