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Technology education and presentation of knowledge using educational posters within the EU project conception

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Abstract

The paper deals with the part project activities for popularisation of science and technology focused on popularisation and technology education. The accent put on information technology and internet sources blocked the impact of printed media. There is described the strategy of medial effects and transferring of knowledge through educational posters focused on the project Windows of Science Wide Open. CZ 1.07/2.3.00/45.0004. Educational posters present scientific subjects in integrating knowledge of various subjects of science and technologies. This form of medial impact had positive reactions among pupils and teachers of primary and secondary schools and we recommend their other use within projects.

Key words: technology education, media in education, project in education.

Introduction

Decrease of the interest of technical and natural science subjects is a very current issue. Technicians and technologists are very strategic capital for a national economy development. The first stage for the interest increase in technical subjects and science is a popularisation of technology and sciences. The popularization has an impact on pupils 'motivation and on higher interest on natural and technical subjects – at school as well as during consideration of professional use. This activity is necessary to follow because it influences the company climate for the support of science in general. The human development is a long-time process and our Department of Technical and Vocational Education was placed into the task to realize the Key Project Activity within the project “Education for competitiveness – Cooperation of primary schools with the Faculty of Pedagogy and the Faculty of Natural Sciences in the field of technological education”.

The target of the project was to positive influence and change the trend of decreasing number of students of natural science and technical subjects by the activities that motivate leaders for the education of technologies. If we take the pupils 'knowledge into account (stated in researches PISA, TIMSS and Mc Kin-

sey), the popularisation is necessary for sustainability and development of economy. The general target of the project is to show and describe science to young people using simple and effective form – physics, chemistry, mathematics, biology as well as craft and science fields.

Nowadays, popularisation of the science has a specific position. Topics of science has to engage, inspire and lead participants to the deeper thinking. The problem is facilitation, idealization and limitedness of deeper knowledge.

Liessman [2006] writes: “Knowing becomes neither central nor marginal part of the entertainment industry...” “Knowing manifests itself as being able to astonish. It is amazing, what exists and how things work and are made. Most TV scientific channels are dedicated to technologies. The programmes are successful because they allow for the main motivation of knowledge – curiosity. From the beginning of modern times, curiosity, curiositas, belongs to the most important propelling forces of the knowledge process. At the same time it was always suspected that it is interested in any individual, extraordinary and not useful objects and it overlooks essential connections of the truth. Ludwig Wittgenstein [1989] called “a superficial curiosity to the newest scientific discoveries as one of the most condemnable desires of a modern human being. There is no popular scientific programme that could satisfy this most condemnable desire”. We realize the fact that in last years there were a lot of teaching centres in our regions having a main goal to popularize technology. These activities are very useful. This popularization is not every time effective for transferring knowledge. Information has to offer not only superficial amusing nature but also to offer and lead pupils to see presented events in connections. The teaching of events must lead to the situation where the presented event is expanded in the task, calculation or own realization.

Popularisers set out on the way of “medial influencing”, nevertheless there is necessary to set the suitable atmosphere of “secrets discovering” and adventures of knowledge with suitable methods in these popularization programmes.

Concrete Outputs and Targets of the key Project Activity

We built up the experimental workroom – laboratory supporting research oriented education, workroom for technology education and education of crafts and physical experiments with materials. Another workplace is for building up the measuring and robotic workplace for physics, chemistry, biology and technical subjects.

We ensured the Technological Day or Creative Day with educational programme in Laboratory I – for interested primary school pupils.

We ensured the Measuring among Us or The Day with Robot by educational programmes in Laboratory II – for pupils and teachers.

Realization of educational posters

Due to our consideration of being necessary to create values that could serve to basic schools for many years we decided to create the set of educational posters that should influence technology perception and technological subjects. From the practice at primary and secondary schools, we found the demand for materials that would decorate special classrooms i.e. workrooms or rooms for physics. The project provided us by financial means to pay a professional graphic artist.

We used this opportunity of graphical processing by a professional. The professional was Zdeněk Abendroth – Abe art. This realization could be done within the project Windows of Science Wide Open. CZ 1.07/2.3.00/45.0004.

It was necessary to set main technological topics. We decided that the educational clips must cover topics of technological innovations, modern technologies, physical principles, technology development and also a medial presentation of the project and social cultural aspects of modern technologies. For effective education, there is necessary to enable an integration of knowledge from various subjects within each topic. The demonstration of some posters is illustrated in the Fig. 1 and 2.

NAHLÉDNĚTE VĚDĚ DO OKEN!

okna
vědy
dokořán

TVŮRIVÉ DNY

ZÁŽITKOVÉ KURZY
PROGRAMOVÁNÍ
A MĚŘENÍ

TECHNOLOGICKÉ
DNY

Katedra technické
a pracovní výchovy
ve spolupráci
s Katedrou informačních
a komunikačních
technologií
Pedagogické fakulty
Ostravské univerzity
v rámci projektu
„Okna vědy dokořán“.

Odpovíme na otázky:

Proč je slunce zlaté?
Co je to vodkový článek?
Jak fungují motory?
Co je to vlastně program?
Proč je matematika důležitá?
Co všechno si mohou
pomáhat materiály?
Jak je to s tvarovou pamětí
kovů?
Proč letadla létají o motory
či bez nich?
Chemické pokusy
a technologické experimenty
pro vás a vaše děti...

PRO ŽÁKY ZÁKLADNÍCH I STŘEDNÍCH ŠKOL

Fig. 1. Educational poster advertising the project

POHONY LODÍ

Princip spirály

Princip spirály je založen na tom, že při otáčení šroubu dochází k posunutí vody směrem dozadu. Díky tomu se loď pohybuje vpřed.

Pohon lodním šroubem

Loď pohybuje lodní šroub, který je poháněn motorem. Šroub vytváří vlnu vody, která tlačí loď vpřed.

Sila větru

Větrné pohony využívají sílu větru k pohybu lodí. Nejznámějším příkladem je velrybí loď.

Století páry

Století páry bylo první velkým průmyslovým pohonem lodí. Využívalo páry k pohonu šroubu.

Od vesla až po lodní šroub

První pohony lodí byly vesla. Později byly nahrazeny kormidly a šrouby. Dnes se používají různé typy motorů a šroubů.

Fig. 2. Ship propulsions

TVAROVÁ PAMĚŤ V TECHNICE

Medicina

Využití tvarové paměti v medicíně zahrnuje například stentování cév a zubní korunky.

Domácnost

V domácnosti se tvarová paměť využívá například v kabelových svazcích a v kabelových sítkách.

Preprava

V dopravě se tvarová paměť využívá například v kabelových svazcích a v kabelových sítkách.

Těžba

V těžbě se tvarová paměť využívá například v kabelových svazcích a v kabelových sítkách.

Jak si může udržet „paměť“ tvar?

Tvarová paměť je schopna udržet svůj tvar díky speciálnímu složení a struktuře.

Využití tvarové paměti v praxi

Tvarová paměť má široké uplatnění v různých oblastech techniky a vědy.

Fig. 3. Shape memory alloys

DENDROCHRONOLOGIE

Letokruhy

Letokruhy jsou roční úhony dřeva, které vznikají díky změně rychlosti růstu dřeva.

Práce s přírůstovým nožem

Přírůstkový nůž je nástroj, který se používá k odstraňování letokruhů z dřeva.

Příbuzné vědy

Příbuzné vědy zahrnují dendrochronologii, dendroekologii a dendrohistorii.

Fig. 4. Dendrochronology

ŘEMESLO A UMĚNÍ

UŽ JSTE NĚKDY VIDĚLI DOKONALÉ ŘEMESLO ČI UMĚNÍ NAŠICH PŘEDKŮ?

ŽADNĚKÉ KURZY PROGRAMOVÁNÍ A MERENÍ, TECHNICKÉ DŘEVY, TVŮRNÉ DŘEVY

CO VYTVÁŘÍŠ NA TABLETU? JAKOU TO MÁ HOŠDĚLIT?

Umění je technika, se kterou dokážeš dělat věci, které ostatní nemohou. Umění je také umění!

Fig. 5. Social cultural impact of IT

Materials SMA are a progressive topic where we can present the wide range of knowledge – from crystalline structures to individual technological applications, see Fig. 3.

The principal informative topic suitable for education is a dendrochronology. With this topic, there is possible to present a positive impact of astronomy and a Sun observing on the other scientific subjects. We completed the education by the demonstration of work with a bucket auger and by a year growth measuring at the sample. This topic enables to open the problem of subjects using dendrochronology – see Fig. 4. For the education and popularization being complete, we realized the poster pointing out the social cultural connections – among craft, art work and passive accepting of information from tablets – see Fig. 5. The author of the visual artefact is the author of this paper. Photographs and graphical processing was done by Zdeněk Abendroth.

Conclusion

On the base of our experience, we recommend to supplement projects popularising science and technologies by educational posters. This media enables long-time effect on pupils and it influences the school environment and it serves to the aesthetical aspect of schools too. We find to be necessary to create conditions for graphical propagation within projects. The support of education with posters is the way how to effectively influence a pupils' and a public perception of technological subjects.

Literature

- Liessmann K. (2006), *Teorie nevzdělanosti. Omyly společnosti vědění.*
- Mullis I.V.S., Martin M.O., Foy P., Arora A. (2012), Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College, http://timssandpirls.bc.edu/timss2011/downloads/T11_IR_Mathematics_FullBook.pdf (1.09.2015).
- PISA 2012 Results: Creative Problem Solving (Volume V): Students' Skills in Tackling Real-Life Problems, <http://dx.doi.org/10.1787/9789264208070-en>, © 2014, Paris.
- Spitzer M. (2014), *Digitální demence: jak připravujeme sami sebe a naše děti o rozum, Brno.*
- Wittgenstein L. (1989), *Vortrag über Ethik* [w:] J. Schulte (red.), *Wittgenstein. Vortrag über Ethik und andere kleine Schriften*, Frankfurt am Main.