

## Príloha 2

(národná správa pre IFIP TC3 o aktivitách na Slovensku v období 2012/2013)

### Country report - Slovakia (2012/2013)

#### General description of ICT in education

Our schools implement both “ICT in all subjects” and “ICT as separate subject” strategies in parallel. The subject focusing on ICT is called Informatics and has more complex educational goals than we usually expect in ICT. It doesn't restrict itself to developing “computer literacy” but proper Informatics perspective - although strictly respecting age of the children, i.e. the developmental appropriateness.

Informatics is an obligatory subject at primary level (K2 to K4), lower secondary (K5 to K9) and upper secondary (K10 and K11) levels. Many schools extend the minimum time space (defined by the state) of the Informatics subject from K1 to K12 and K13 (last 2 years of our upper secondary education).

Our National curriculum has the form of the **State Educational Framework** which in the case of Informatics subject specifies 5 broad areas to be covered and also standards that students should achieve. The State framework program is further elaborated in each school's **School Educational Program**. Those five topics of the State Educational Framework are (a) Information around us; (b) Communication by ICT; (c) Principles of ICT; (d) Algorithmic thinking and programming; and (e) ICT and society. However, many teachers choose only some of these areas and do not cover all five of them (especially they often tend to minimize or avoid programming because of the lack of their competency in that field). In such case their Informatics lessons are focused on user applications mostly: text, graphic and spreadsheet editors etc.

In spite of that, we consider programming and algorithmic or computational thinking of the key importance to modern Informatics education -in case that the developmental appropriateness is carefully respected. Therefore, in the Department of Informatics Education at Comenius University (and elsewhere) we spent enormous effort on developing proper tools and resources to support the development of in-service teachers' programming skills.

Note that programming is explicitly addressed in our National curriculum from K2 onwards. For the youngest age groups we have developed and are using several pre-programming software environments (starting by Thomas the Clown software for very young children, followed by 3 or 4 slightly more complex and powerful tools which are being spread across schools free of any conditions). In lower secondary we are also using Scratch, Lego WeDo language and robotic sets, Comenius Logo, Baltik, Imagine Logo and others.

Official state institutions (including Ministry of Education and its affiliated institutions) recently pay increased attention to the issue of integrating ICT into education. New policy document on the conception of the process of integration of ICT into education till the year 2020 – DIGIPEDIA 2020, has been published. It defines the needs of our schools in this area. The intension is to increase the amount of the digital content available for schools. There are several projects being conducted in this area, including The Planet of Knowledge, and Digital Content for primary and secondary schools. In the years 2012 and 2013 three large national projects (financed by the European Social Fund) have been either completed or are still running:

1. **Professional development of the Informatics teachers**
2. **Transition of the learning process in primary and secondary schools**
3. **Transition of the pre-primary education (including the digital literacy development of teachers)**

There are several other smaller projects in the area of integration of ICT into education, see <http://www.mpc-edu.sk/projekty/zoznam-realizovanych-projektov>. Another inspiring project is called eaktovka – devoted to coreating digital learning resources and textbooks.

Schools themselves get involved into various national or international projects and initiatives, which are supported either by their own resources or local community resources or are entirely covered by the international initiatives and institutions. Some NGOs, private companies or even schools themselves organize various contests, which build on digital technologies. There is also a growing number of activities initiated by public organizations concerning the digital safety of children etc., see [www.zodpovedne.sk](http://www.zodpovedne.sk), [www.pomoc.sk](http://www.pomoc.sk) or [www.stopline.sk](http://www.stopline.sk). There are several popular competitions and contests. Some of them are sponsored by the Ministry, like Informatics Olympiad, others are organized by NGOs. The most outstanding one is iBobor or iBeaver, see [www.ibobor.sk](http://www.ibobor.sk) in which more than 36.000 children were involved in 2011 from 649 schools (see below). In general we may sum up this introduction by saying that recently the involvement of the state in this area is rather modest.

### **Professional development of computing professionals**

In 2011 we noticed slight decrease of the students who enrolled at the Computer Science study programmes probably in all Slovak Universities. The decrease is (based on anecdotic evidence only) higher than the corresponding demographic drop. Concerning the decrease of the number of future teachers of Informatics (for primary and secondary stages), however, is disastrous - due to continuous fall of teachers' socio-economic status and overall respect to teacher's profession.

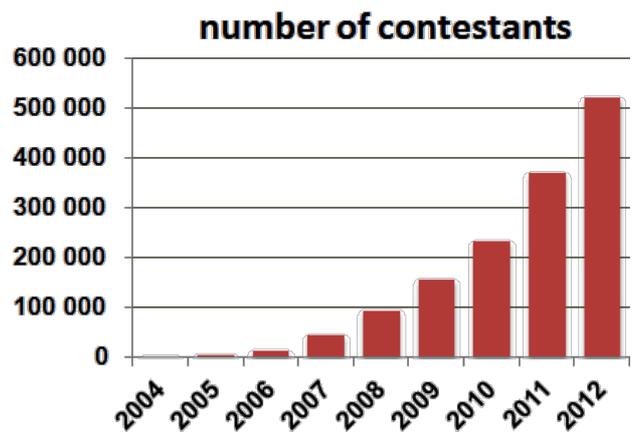
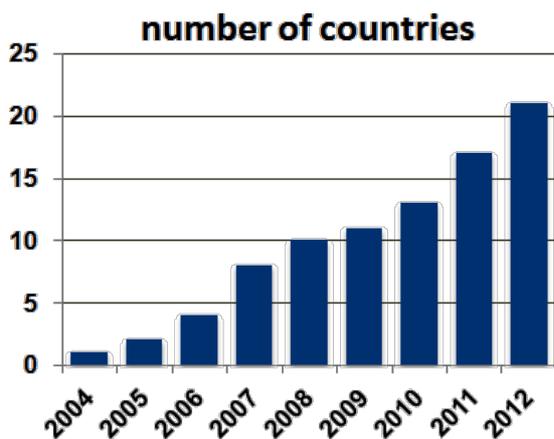
### **iBeaver – Informatics contest for every child**

As we already stressed above, in Slovakia we consider programming a key component of Informatics education and productive instrument for developing complex digital literacy. Saying so, we have in mind creative,

attractive, constructivist programming – not lessened by any misconceptions or bad practices, not reduced to **teaching a programming language**, not taught by a teacher who does not understand it. We try to build this programming or **computational thinking** competency as a powerful means for children to explore, model, control, communicate or express themselves. We are developing teaching/learning strategies, which should result in **programming for everybody – for boys and girls**, as a part of general education appropriate to contemporary creative society.

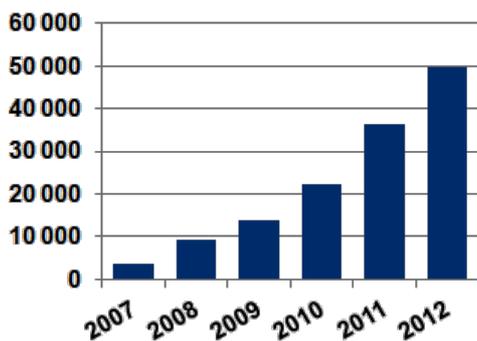
Trying to achieve our ambitious goals in developing modern Informatics education, we are engaging various strategies. One of them is organizing highly influential contest for all student age groups, namely **iBeaver contest**, where **i** stands for Informatics.

iBeaver is an international contest for students of lower and upper secondary stages established in 2004 in Lithuania by V. Dagiene, see (2010) for an overall picture. As illustrated by the diagrams below, growing participation of countries and students is phenomenal and reached 21 countries and over 500 000 students in 2012. It validates main goal of the contest, namely, **promote interest in ICT and Informatics... to all children.**

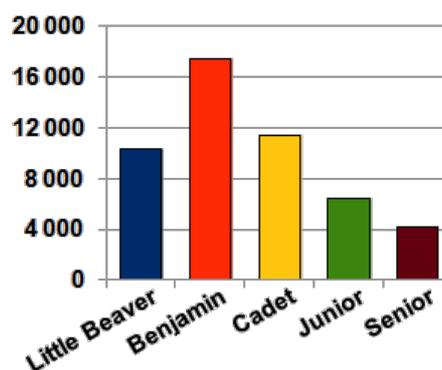


Here is the total overview of the Slovak participation in all years and specially in 2012:

**Slovakia: total number of contestants**

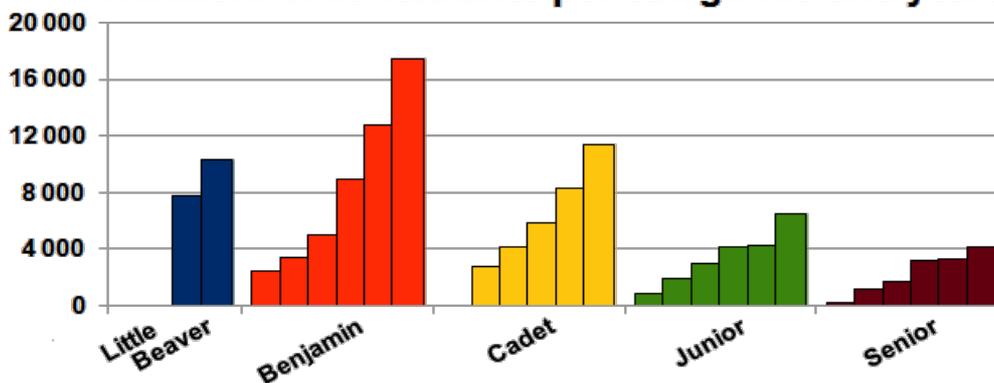


**Slovakia: contestants 2012**



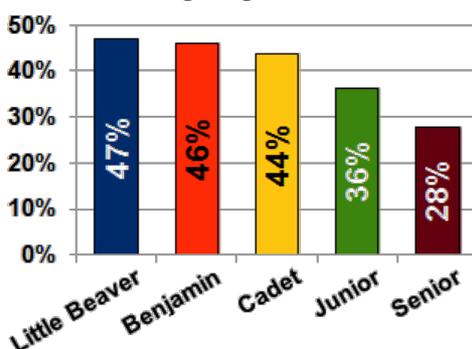
Following diagram shows the numbers of all Slovak participants per each category and in every year:

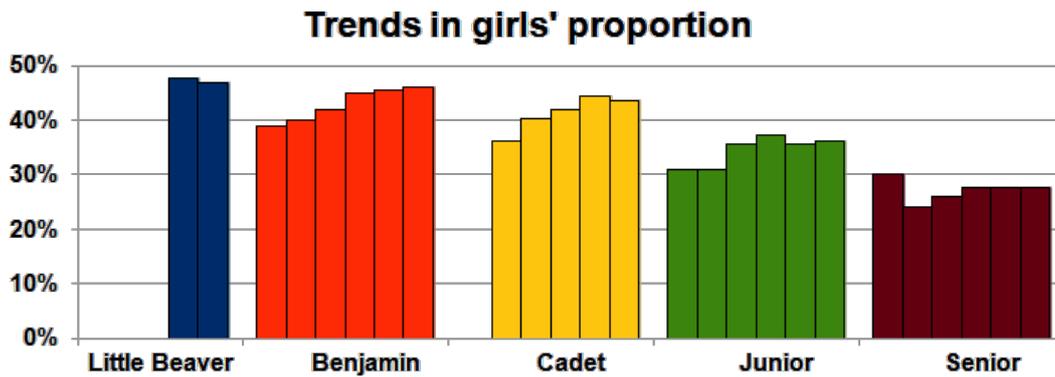
**Numbers of contestants per categories and years**



Next two diagrams show the proportion of girls in the contest in 2012. The last diagram shows the trends of the girls participation from the beginning of the contest (for Slovakia).

**Girls proportion 2012**





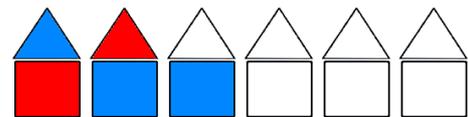
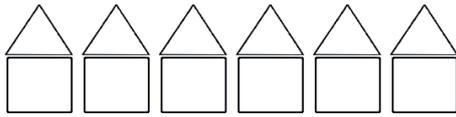
In Slovakia we joined iBeaver in 2007 and decided to run it as an on-line event. It attracts tens of thousands of children and beside all other benefits it provides us with excellent opportunity for educational research, see e.g. (Kalaš and Tomcsányiová, 2009). Since last year we extended the scope of the contest to challenge **primary children** between 8 and 10 as well. The argument for this innovative move has resulted from one of our previous research findings: *At the age of primary and lower secondary stages there are no significant differences between boys and girls in their interest in modern Informatics education, neither is there any significant difference in their achievements in the field - including programming. It is extremely important, though, to start at this age already and seek proper motivation and tasks to be attractive for girls as much as for boys.*

Another strong argument in favour of our new category of the iBeaver contest is the fact that since 2009 Slovakia belongs to those rare countries where **Elementary Informatics** is a compulsory and separate subject for every child from 7 year upwards. While ICT is being gradually integrated in all areas of learning, this new subject has its own distinctive learning goals - and its own problems with proper implementation, see (Blaho and Salanci, 2011).

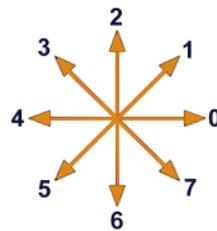
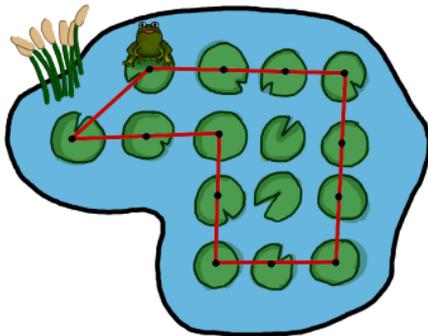
To structure the contest properly we have categorized the tasks for children into four *components of elementary Informatics education*: (a) **digital literacy** - basic concepts, computer literacy, security and legal issues, (b) **programming** - understanding, analyzing, interpreting and building descriptions of processes and behaviours, (c) **problem solving** - logical reasoning, strategies for problem solving, and (d) **data handling** - representations, patterns, data structures, data processing... Each task of the contest fits into one or two of these components. Following are two exemplary tasks for primary children.

Running the contest on-line gives us unprecedented opportunity to create **interactive tasks** (children can manipulate on-screen objects to construct the solutions) and also multiple choice **tasks with interactive helper** (children can manipulate on-screen objects to help them understand the problem and discover its solution, then tick their choice).

**Example 1 (for primary children):** *Use the Fill tool to colour small houses in red and blue, both their triangle and square parts. Each house must have both parts painted. You can try it out by clicking the parts of the houses. How many different houses you may get - 3, 5, 2 or 4?*



**Example 2 (for primary children):** *Jane the Frog likes to jump from one water lily to another. First she turns towards the next lily – in one of eight possible directions (see small yellow compass), and there she jumps! She started where you see her now and she is here back again. Which of these four scripts of directions records her red ramble?*



- Ⓐ 5, 0, 0, 6, 6, 6, 0, 0, 2, 2, 4, 4, 4
- Ⓑ 0, 0, 0, 6, 6, 6, 4, 4, 2, 2, 4, 4, 1
- Ⓒ 4, 4, 1, 0, 0, 0, 6, 6, 4, 4, 2, 2, 1
- Ⓓ 0, 6, 6, 4, 4, 4, 2, 4, 1, 1, 1

### Educational research

The Department of Informatics Education at Comenius University, Bratislava, is currently the only academic institution accredited to provide a research doctoral program in Informatics education and TEL. We are conducting several doctoral research projects in the field of Informatics education at primary and secondary levels and in integrating digital technologies into any level of formal education (pre-primary, primary and secondary). We are also involved in some international research projects, see for example (Kalas, 2010).

### Brief biographical sketch of national representative

Ivan Kalas is a professor of Informatics Education. For more than 20 years he concentrates on developing Informatics curricula for preschool, primary and secondary stages, developing textbooks and other teaching/learning materials for Informatics and ICT in education. Ivan is also interested in strategies for developing digital literacy of future and in-service teachers and enhancing learning processes through digital technologies.

Ivan is the head of the Department of Informatics Education at Comenius University (Bratislava, Slovak Republic) where he leads educational research and doctoral school in the field of Technology Enhanced Learning. His team has been involved in several national and international research projects with partners from Europe and beyond. Ivan is co-author of several educational software environments for children, including SuperLogo, Thomas the Clown, Visual Fractions, Revelation Natural Arts and Imagine Logo, and several books on children programming. These software environments have dozens of localizations throughout the world.

and are being used in thousands of schools. He has also been active in several national policy initiatives and programmes, among them Slovak national Infovek project. In 2009 he was appointed guarantor of the Slovak national informatics teachers' development project.

Since 2008, Ivan is a member of the International Advisory Board of the Microsoft Partners in Learning programme. Since 2009 he is a member of the Governing Board of the UNESCO Institute for Information Technologies in Education (IITE). In 2010 Ivan conducted an analytical study for IITE UNESCO titled Recognizing the potential of ICT in early childhood education. Currently he leads an IITE UNESCO research project on integrating ICT in primary education.

### Sources of information

[www.minedu.sk](http://www.minedu.sk)

[www.minedu.sk/index.php?lang=sk&rootId=1316](http://www.minedu.sk/index.php?lang=sk&rootId=1316)

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Blaho, A. and Salanci, L. (2011). Informatics in Primary School. Principles and Experience. In (Kalaš, I. and Mittermeir, R.T., 2011), pp. 129-142.

Kalaš, I. (2010). *Recognizing the Potential of ICT in Early Childhood Education*. UNESCO Institute for Information Technologies in Education, Moscow. Available at [iite.unesco.org/publications/3214673/](http://iite.unesco.org/publications/3214673/) (accessed 09 April 2012).

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