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ONLINE RESEARCH ACTIVITIES FOR TEACHING WITH THE HELP OF SPREADSHEETS

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Abstract

The contribution deals with the preparation of exercises for the teaching of maths via spreadsheets. Most of the existing school exercises use out-of-date or artificially created facts, making exercises unappealing to pupils. We present an approach which, with the help of specially created and accessible tools, enables the teacher to automate the acquisition of up-to-date data for immediate use in the classroom. This approach enables the use of both data freely available on the Internet and data gained from research carried out in lessons. The tool allows for the real-time modification of acquired data into a form that can be used to practise the use of formulas, functions or graph-making. We describe our experience of teaching with the help of this tool and lesson plans created for this purpose.

Introduction

- Spreadsheets are used to teach maths to the 15+ age range and to younger pupils aged 11 to 15.
- In spreadsheet **textbooks**, there are a number of exercises to practise this part of the curriculum. Many of them are based on **data**, which is **out-of-date** or made up by the author of the textbook.

Acquiring up-to-date data from the Internet

- The **Internet** provides a large amount of **topical** and **real-world data** which can be used in spreadsheet-aided maths teaching.
- This data often comes in an **unsuitable format**.
- If the teacher decided to base his lesson on up-to-date entries, he would have to edit this data by hand.
- We have created a **software tool** which **automates** the whole process:
 - The **teacher** simply **selects the type of data** he would like to obtain (Figure 1).
 - The **application** secures and pre-processes the data and **creates** a well-arranged **table** which it offers as a computer **file to be downloaded**.
 - The teacher obtains a table with data which pupils can immediately start using to practice their skills.

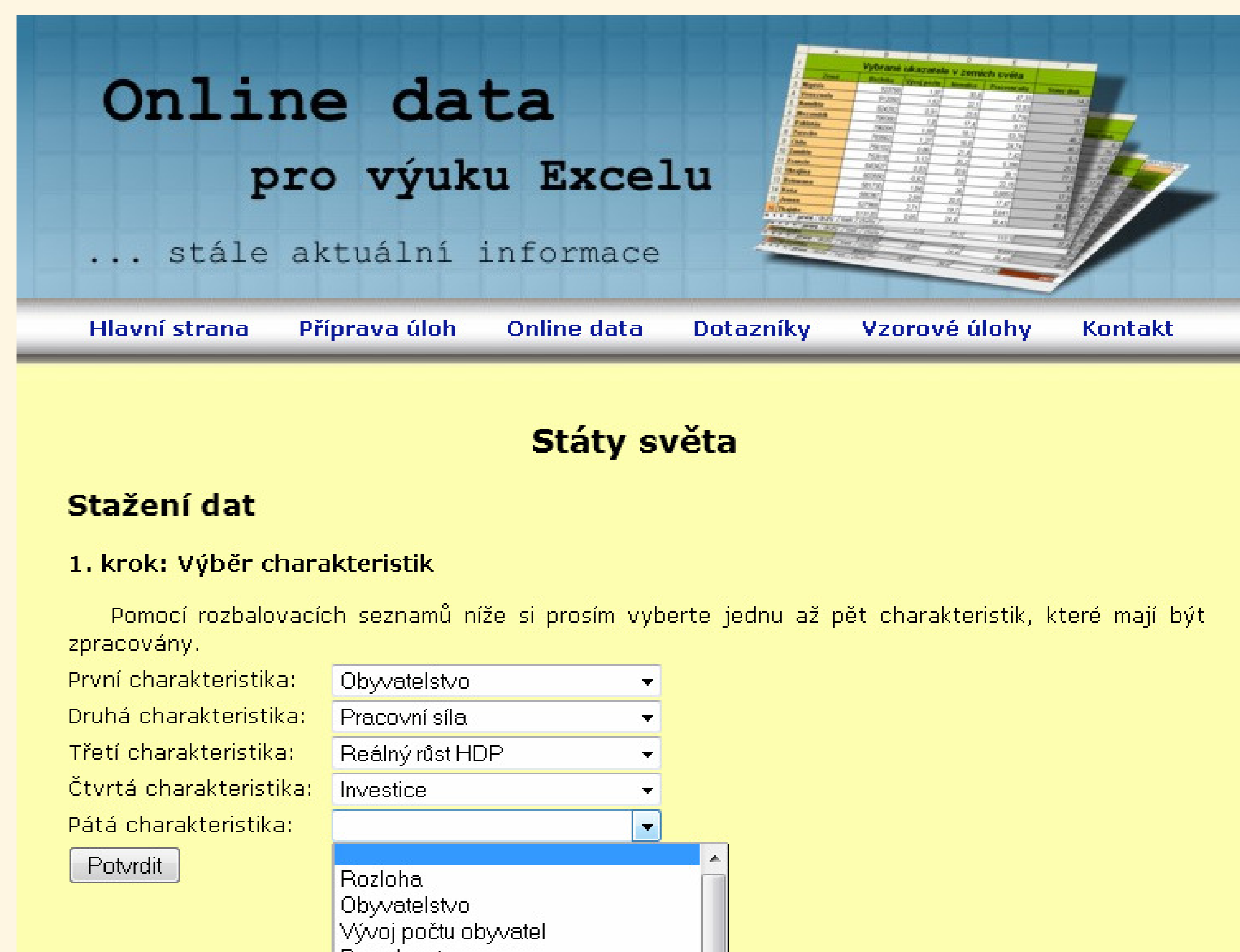


Figure 1: Selecting the type of data to obtain from the Internet in the online application

The online questionnaire system

- It is practical to use „**real-life**“ **data**, which the schoolchildren provide themselves as the base for interesting exercises.
- The problem is **how to collect** this data in such a way that it can be used to practise maths skills immediately.
- We have created a **web application**:
 - It enables the **teacher** to **create** an **online questionnaire** which all the **pupils** can **respond** to from their workstations **at once**.
 - The **system saves** the responses and **creates a table** from them (Figure 2), which the **teacher** and his pupils can easily **download**.
 - Pupils can start using data from this file in a spreadsheet.

Jméno	Pohlaví	Doba spánku [hodin/týden]
Eliška	žena	64
Čmeláák	žena	64
Luboš	muž	60
Honza	muž	58
Jahn	Muž	51
Jirka	muž	55

Figure 2: Table of responses in the online application created from parallel data collection from individual pupils.

Support for teachers

We have **created** a set of **lesson plans** with exercises which illustrate various mathematical procedures used in spreadsheets.

Verification in lessons

- We **tested** a total of six tasks from the lesson plans in **ICT lessons** at two grammar schools, **using** the created web **applications** as a source of data.
- We found that software for **acquiring data** from the **Internet** significantly cuts teacher preparation time, being able to **obtain** the necessary **data** within a **few minutes**.
- The system for creating **questionnaires** also worked very well. The whole process of **data collection** in the class took about **three** to five **minutes**, including an explanation of how to use the system.

Conclusion

We have decided to **publish** the created **web application** including lesson plans on the Internet site called Online task preparation. It is **available** to the general teaching public on the website <http://www.simandl.asp2.cz>.