

WEB INTERACTIVE TOOL TO IMPROVE FINANCIAL LITERACY

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ABSTRACT. The paper deals with the financial education in the Czech Republic. It introduces an interactive tool to improve financial literacy which is in the form of a web page combining study texts with materials developed in the CAS program Maple and links to external information sources. The document *Systém budování finanční gramotnosti na základních a středních školách* (The system of establishment of financial literacy at primary and secondary schools) was approved by the government in December 2007. This document includes particular standards determining target status of financial education for primary and secondary education. For most people it is not easy to have a good grasp of the basic terms in the field of finance and of their interrelations. The authors of the article created the interactive aid that would be helpful to students to improve their grasp of the issue of money, prices and financial product (for example consumer credit, current account etc.).

INTRODUCTION

Financial products such as current account, building saving, private pension scheme, instalment selling, consumer or mortgage credit, form a natural part of our lives. This means that each citizen should have a fund of knowledge and skills necessary for his/her orientation on the issue of money and prices including administration of financial assets and liabilities with regard to changing life situations. This fund of knowledge and skills can be designated as financial literacy, [5], [10].

The issue of financial literacy is also discussed within the international Organization for Economic Co-operation and Development, [9]. In 2003, OECD initiated an intergovernmental project 'Financial Education Project' focused on the introduction of an integrated system of financial education, the objective of which will be to increase the level of financial literacy. The results of the whole project were summarized in the publication *Improving Financial Literacy*, [8].

In the Czech Republic, attention is paid to the activities in the field of financial education by the Ministry of Finance of the Czech Republic, namely in the document *Strategie finančního vzdělávání* (Strategy of financial education), [5]. The objective of this strategy is to create an integrated system of financial education that will contribute to an increase in the level of financial literacy in the Czech Republic. The Ministry of Finance lays out the priorities and targets groups for the projects of financial education. The document *Strategie finančního vzdělávání* (Strategy of financial education) is followed by the document *Systém budování finanční gramotnosti na základních a středních školách* (The system of establishment

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of financial literacy at primary and secondary schools) that was approved by the government in December 2007. This document includes particular standards determining target status of financial education for primary and secondary education. In compliance with this document, the deans of university faculties preparing teachers for primary and secondary schools were invited to include the standards of financial literacy in the content of the relevant university programmes of education. The Pedagogical Faculty of the University of South Bohemia in České Budějovice reacted to this invitation in such a way that it included the subject 'An Introduction to Finance' in the fields of study concerning the teaching of mathematics.

The content of the subject 'An Introduction to Finance' is in compliance with financial standards designed for primary and secondary education in the Czech Republic. The main topics that are taught in the subject are the payment of interest, current account and its management, handling of surplus money (saving, building saving, saving account, valuables - bills of exchange, shares, bonds), solving of a money shortage (bank loans - consumer credit, mortgage loan, credit cards, leasing). The subject 'An Introduction to Finance' belongs to the sphere of financial mathematics and uses its methods, notions and theoretical base. Financial mathematics deals simply expressed with the utilization of mathematics in the financial area. Some parts of this discipline manage with secondary school mathematics (for instance the notion of function - linear, indirect proportion, exponential and logarithmic function and the notions of consequences and series), whilst other parts demand knowledge of some principles of college mathematics (for example Taylor expansion, correlation coefficient, least squares method and so on).

For a number of years, the Pedagogical Faculty of the University of South Bohemia has been teaching a course 'Financial Mathematics', the content of which is partly identical to the course 'An Introduction to Finance'. This subject was in particular designed for students of a specialised bachelor's field of the study of Financial Mathematics but it was widely attended also by students of mathematics teaching. Long-term experience (approx. 10 years) in teaching of financial mathematics at the Pedagogical faculty showed that most concepts of financial mathematics are difficult for students to understand and that sample solutions to selected tasks and modelling of discussed relations are helpful to a deeper understanding of respective concepts and relations between them. For these purposes, the authors successfully applied the program of type CAS (Computer algebra program), specifically the program Maple.

1. WEB INTERACTIVE TOOL

For the above purposes the authors of the paper decided to create an integrated set of teaching materials focused on the creation of students' capabilities to settle model problems in terms of the handling of finance. An essential teaching material is an interactive tool in form of a web page accessible at the Internet (Fig. 1; <http://www.pf.jcu.cz/stru/katedry/m/uf/>). It provides a user with an explanation of the theory, links to external sources and handling of selected tasks in finance and banking with the utilisation of Maple. Next we will see that this software provides a user with an invaluable combination of symbolical, numerical and graphical possibilities for modelling of financial relations. In addition, versions 11 and higher provide option to interconnect with the program Microsoft Excel. The problems are thoroughly solved in a way that explains all aspects of a problem and uncovers



FIGURE 1. 'An Introduction to Finance' web page

possible risks which are mostly kept back from the eyes of an uninformed user. An open format of the web tool ensures the possibility of continuous updating according to the current condition of the market with financial products.

Design of the page is shown in Fig. 1. In the left part of the window we can see the content of the page. Its items comply with the basic topics of the curriculum of the course 'An Introduction to Finance'. After clicking onto some of them, e.g. 'Spotřebitelské úvěry' ('Consumer credits'), a special page devoted to the topic with detailed teaching text and selected real-life tasks is opened. For each task, the user can select from several Maple applications (*smart documents* (*Tutorial*), *maplets* and *maple code*, see Fig. 2) related to the task, the number of them depends on the topic of a task.

In the first place we take advantage of the features of interactive smart documents. They enable us to combine text, symbolic and numerical computation and graphs in one worksheet all focused on solving, explaining and modelling some particular phenomenon from financial mathematics. In addition to smart documents we use assets of such other Maple features as maplets and classical worksheets. And, moreover, each topic is followed with links to relevant external links, mostly equipped with financial calculators.

1.1. Smart document. Handling of the tasks on web page (<http://www.pf.jcu.cz/stru/katedry/m/uf/>) is executed in program Maple 11. The environment of the so-called smart document was selected as the main tool for the presentation of a