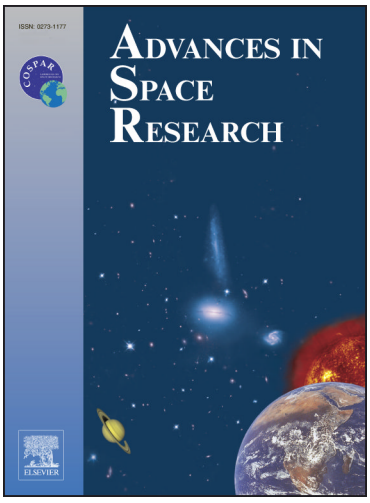

NEW EDUCATIONAL TOOLS TO ENCOURAGE HIGH-SCHOOL STUDENTS' ACTIVITY IN STEM

Vera Mayorova, Dmitriy Grishko, Victor Leonov

PII: S0273-1177(17)30547-1
DOI: http://dx.doi.org/10.1016/j.asr.2017.07.037
Reference: JASR 13347

To appear in: *Advances in Space Research*

Received Date: 13 March 2017
Revised Date: 24 July 2017
Accepted Date: 25 July 2017

Please cite this article as: Mayorova, V., Grishko, D., Leonov, V., NEW EDUCATIONAL TOOLS TO ENCOURAGE HIGH-SCHOOL STUDENTS' ACTIVITY IN STEM, *Advances in Space Research* (2017), doi: http://dx.doi.org/10.1016/j.asr.2017.07.037

NEW EDUCATIONAL TOOLS TO ENCOURAGE HIGH-SCHOOL STUDENTS' ACTIVITY IN STEM

Main Author
Prof. Vera Mayorova,
Bauman Moscow State Technical University, Russian Federation, victoria.mayorova@gmail.com

Co-Authors
Mr. Dmitriy Grishko, Bauman Moscow State Technical University, Russian Federation, dim.gr@mail.ru
Mr. Victor Leonov, Bauman Moscow State Technical University, Russian Federation, lv-05@mail.ru

Many students have to choose their future profession during their last years in the high school and therefore to choose a university where they will get proper education. That choice may define their professional life for many years ahead or probably for the rest of their lives.

Bauman Moscow State Technical University conducts various events to introduce future professions to high-school students. Such activity helps them to pick specialization in line with their interests and motivates them to study key scientific subjects.

The paper focuses on newly developed educational tools to encourage high school students' interest in STEM disciplines. These tools include laboratory courses developed in the fields of physics, information technologies and mathematics. The paper demonstrates examples of various laboratory courses developed by authors. More than 2000 high school students already participated in this experimental courses. These activities are aimed at increasing the quality of STEM disciplines learning which will result in higher quality of training of future engineers.

INTRODUCTION

Education in the sphere of scientific disciplines is a foundation in training of experts for high-tech industries. Because of that many countries – such as Australia, China, UK, Israel, South Korea, Singapore and USA – currently implement state-funded STEM programs - Science, Technology, Engineering, Mathematics [1,2,3]. In Russia, such STEM centers have been opened at several universities, centers of technical support of education, and techno-parks, in cooperation with businesses, e.g. with support from Intel. Such centers represent a network of research laboratories that support scientific, technological and engineering input into auxiliary educational programs of high-school students. This project is aimed to increase interest among high-school students towards engineering and technical majors and to motivate senior students to continue education in scientific and technological fields. STEM laboratories make modern equipment and innovative programs more accessible for children who are interested in research activity[1].

One of the directions in modernizing Russian secondary education system is setting various profiles – specializations in education – which has to meet the educational needs of students, reach the goals of person-specific education, and raise the level of achievement of scientific disciplines [2]. Introduction of specialized education in modern high-school makes it possible to select individual education trajectory, while profiled education allows a student to familiarize themselves with chosen profession.

One of the problems in modern school during the modernization period is lack of strong inter-disciplinary connections. Often a student who is quite successful in one discipline cannot utilize received knowledge neither in real life, nor in other disciplines. The main reason is in secondary education attention is paid to acquisition of knowledge whilst the later stage of development in our society is to prepare a graduate to use such knowledge in real-life situations. Because of this it is very important to make a transition of competency education into high schools. The introduction of profiled education into high school requires a change in social requirements, developing new approaches, new content, new forms and methods and also new educational methods of teaching high-school disciplines of scientific nature [4,5].

I. ANALYSIS OF THE PROBLEM AND POSSIBLE SOLUTION

Bauman Moscow State Technical University conducts various events to introduce future professions to high-school students. Here are some examples of such events:

[1] http://stemcentre.ru/

[2] http://government.ru/media/files/mlorxfXbbCk.pdf