

Vol. 13, No. 3, 2014

ISSN 1648-3898



JOURNAL  
OF • BALTIC  
SCIENCE  
EDUCATION

# Journal of Baltic Science Education

ISSN 1648-3898



9 771648 389000

THE INTERNATIONAL JOURNAL OF THE SCIENTIFIC METHODOLOGICAL CENTRE "SCIENTIA EDUCOLOGICA"

Vol.13, No.3, 2014

ISSN 1648-3898

# Journal of Baltic Science Education



JOURNAL  
OF • BALTIC  
SCIENCE  
EDUCATION

The International Journal of the Scientific Methodical Center "Scientia Educologica"

## Editorial Board

### Editor-in-Chief

Prof., Dr. Vincentas Lamanauskas      Siauliai University, Lithuania

### Deputy Editor-in-Chief

Prof., Dr. Andris Broks      University of Latvia, Latvia

### Deputy Editor-in-Chief

Prof., Dr. Miia Rannikmäe      University of Tartu, Estonia

### Executive Secretary

Dr. Laima Railienė      Scientific Methodical Center "Scientia Educologica", Lithuania

### Editors:

Prof., Dr. Boris Aberšek      University of Maribor, Slovenia  
Prof., Dr. Agnaldo Arroio      University of Sao Paulo, Brazil  
Prof., Dr. Martin Bilek      University of Hradec Králové, Czech Republic  
Dr. Paolo Bussotti      Commission for the Publication of the National Edition of Federigo  
Enriques's Works, Italy  
Dr. Bulent Cavas      Dokuz Eylul University, Turkey  
Prof., Dr. Hana Čtrnáctová      Charles University, Czech Republic  
Dr. Peter Demkanin      Comenius University, Slovakia  
Dr. André du Plessis      Nelson Mandela Metropolitan University, South Africa  
Prof., Dr. Jānis Gedrovics      Riga Teacher Training and Educational Management  
Academy, Latvia  
Prof., Dr. Peter Heering      University of Flensburg, Germany  
Prof., Dr. Jack Holbrook      University of Tartu, Estonia  
Prof., Dr. Ryszard M. Janiuk      Maria Curie Skłodowska University, Poland  
Dr. Milan Kubiak      Masaryk University, Czech Republic  
Dr. Todor Lakhvich      Belarusian State Pedagogical University named after Maxim Tank,  
Republic of Belarus  
Prof., Dr. Jari Lavonen      University of Helsinki, Finland  
Dr. Rita Makarskaitė-Petkevičienė      Lithuanian University of Educational Sciences, Lithuania  
Prof., Dr. Aadu Ott      Göteborg University, Sweden  
Dr. Paul Pace      Malta University, Malta  
Prof., Dr. Valfrids Paškevičs      Daugavpils University, Latvia  
Prof., Dr. Jongwon Park      Chonnam National University, Korea  
Dr. Raffaele Pisano      European Society for the History of Science, Italy  
Dr. Pavol Prokop      Institute of Zoology, Bratislava, Slovakia  
Dr. Alona Rauckienė      Klaipėda University, Lithuania  
Prof., Dr. Heimo Saarikko      Helsinki University, Finland  
Dr. Uladzimir K. Slabin      University of Oregon, USA  
Prof., Dr. Valery P. Solomin      Herzen State Pedagogical University of Russia, Russia  
Prof., Dr. Borislav V. Toshev      Sofia University, Bulgaria  
Dr. Georgios Tsapralis      University of Ioannina, Greece  
Dr. Muhammet Usak      Gazi University, Turkey

A scientific journal JBSE issued by the SMC *Scientia Educologica* in cooperation with *Scientia Socialis*, Lithuania, emphasizes theoretical, experimental and methodical studies in the field of science education. JBSE is an international academic journal. In order to maintain the high standards appropriate to such a journal, all contributions received are submitted for anonymous review by two experts, additionally to review by the Editor. The decision of the Editor on the acceptance of articles is final and no correspondence can be entered into on reasons for rejection of a submitted contribution.

### Published since 2002

The journal is published bimonthly.  
IF-0.226 (2010), 0.425 (2011), 0.444 (2012)

### Address:

Scientific Methodical Center "Scientia Educologica"  
Donelaičio Street 29, LT-78115 Siauliai, Lithuania  
E-mail:      mail.jbse@gmail.com  
Phone:      +370 687 95668  
Home page:      <http://www.scientiasocialis.lt/jbse/>

**ISSN 1648-3898**

© Scientific Methodical Center „Scientia Educologica“, Lithuania,  
The Associated Member of Lithuanian Scientific Society,  
European Society for the History of Science (ESHS) and ICASE

*The articles appearing in this journal are indexed/abstracted in British Education Index (<http://www.leeds.ac.uk/bei/bei.htm>), Copernicus Index (<http://journals.indexcopernicus.com>), The Asian Education Index ([http://www.asian-education-index.com/sciences\\_index.php](http://www.asian-education-index.com/sciences_index.php)), EBSCO: Academic Search Premier (<http://search.ebscohost.com>), Social Scisearch (Thomson Reuters) (<http://science.thomsonreuters.com/index.html>), Journal Citation Reports / Social Sciences Edition (Thomson Reuters) ([http://thomsonreuters.com/products\\_services/scientific/Journal\\_Citation\\_Reports](http://thomsonreuters.com/products_services/scientific/Journal_Citation_Reports)), and SCOPUS (<http://www.scopus.com>)*