



5th INTERNATIONAL BALTIC SYMPOSIUM ON SCIENCE AND TECHNOLOGY EDUCATION "SCIENCE AND TECHNOLOGY EDUCATION: NEW DEVELOPMENTS AND INNOVATIONS (BalticSTE2023)": SYMPOSIUM REVIEW

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The fifth BalticSTE2023 Symposium took place in Šiauliai on 12-15 June this year. Time passes inexorably, which is why this symposium can be called an anniversary symposium. It was also important that the symposium was held in the usual / regular format, i.e. face-to-face. It is worth remembering that this is a biennial scientific event of importance not only in the Baltic region but certainly internationally. Due to the Covid19 pandemic, the fourth symposium was held remotely. A review of this symposium has also been published (Lamanauskas, 2021). By the way, reviews of previous symposia have also been published (Lamanauskas, 2015; 2017; 2019). The symposium's fundamental aim is to promote science and technology education. Moreover, it is an excellent tool to disseminate research findings as well as to build collaboration and cooperation network. Another important aim is to show that Baltic region countries also actively participate in natural science and technology education research, especially in the STEAM context. In addition, Baltic countries, as well as other small regions of the world, need corresponding, close communication, and cooperation. During this symposium, all these essential ideas were developed and supported.

Scientific events (e.g. symposia) are clearly significant in many senses. As noted by Hauss (2020), usually, they bring together a complex network of academic and non-academic experts to discuss and disseminate new knowledge in a particular area of science. The COVID19 pandemic has understandably disrupted, to some extent, the organisation and running of normal scientific events such as conferences and symposia. We had to adapt to the new conditions and move towards academic events in a distance (online) format. On the other hand, much has been learnt, many challenges have been overcome, and the advantages and disadvantages of both models have become more fully apparent. However, whether virtual, blended, or other formats, whether venue-based or remote, it is clear that science events will remain an important aspect of academic life for the foreseeable future (Donlon, 2021).

The Fifth International Symposium was held on June 12-15 this year. The topic of the Symposium was "Science and technology education: New developments and innovations". More than 50 scientists from 18 countries participated in the symposium. The geographical spread of the symposium's participants is quite wide. Researchers from Brazil, Croatia, Czech Republic, Estonia, Finland, Italy, Latvia, Poland, Serbia, South Korea, Taiwan, etc.

The symposium was organised by the scientific methodological centre "Scientia Educologica", an associated member of Lithuanian Scientific Society. The main symposium partner was Šiauliai County Povilas Višinskis Public Library. Šiauliai Technology Training Centre was also an important partner of the symposium. The main sponsor of the symposium was Publishing House Scientia Socialis, Ltd.



This time the symposium lasted for four days. The first day of the symposium began traditionally with the opening of the symposium, including traditional musical greetings. The Musical Greeting "Festival of Beetles" by the ensemble of Šiauliai nursery-kindergarten "Three Dwarfs" was presented. The children were prepared by the art education teacher Ernesta Saveikienė.

Eight main (plenary) reports were planned in the symposium (Figure 3). Plenary report subjects comprised a very wide natural science and technology education problematic spectrum. It was discussed about Cognitive processes, Sustainable development, Engineering pedagogy, and Teachers education.

Plenary presentation authors, presentation topics are given in Table 1.

Table 1
Information about Plenary Presentations

Speaker	Topic
Prof. dr. Ching-Ching Cheng <i>National Chiayi University, Taiwan</i>	IMPLEMENTING A NATIONAL DATABASE ON YOUNG CHILDREN'S LEARNING: A LONGITUDINAL STUDY TO EVALUATE THE QUALITY OF PRESCHOOLS
Prof. dr. Andris Broks <i>University of Latvia, Latvia</i>	HUMAN, LIFE, UNIVERSE: HUMAN'S LIFE WITHIN THE UNIVERSE
Prof. dr. Gabriel Gorghiu <i>Valahia University Targoviste, Romania</i>	PROMOTING SCIENCE ACTIONS IN NOWADAYS EDUCATION: AN IMPORTANT ISSUE RELATED TO OPEN SCHOOLING
Mg. phys. Ilva Cinite <i>University of Latvia, Latvia</i>	STUDENT-CENTERED EDUCATION IMPLEMENTATION IN UNDERGRADUATE PHYSICS COURSES OF NATURAL SCIENCES AT THE UNIVERSITY OF LATVIA: SUCCESSES AND CHALLENGES
Prof. dr. Jari Lavonen <i>University of Helsinki, Finland</i>	LEARNING SCIENCE THROUGH PROJECT-BASED LEARNING: US-FINNISH PARTNERSHIPS FOR INTERNATIONAL RESEARCH AND EDUCATION (PIRE)
Dr. Paolo Bussotti <i>University of Udine, Italy</i>	INTRODUCING THE CONCEPT OF ENERGY: EDUCATIONAL AND CONCEPTUAL CONSIDERATIONS
Assoc. prof. dr. Tiia Rüttnann <i>Tallinn University of Technology, Estonia</i>	ENGINEERING PEDAGOGY AND TEACHERS' COMPETENCIES FOR EFFECTIVE TEACHING STE
Assoc. prof. dr. Predrag Pale <i>University of Zagreb, Croatia</i>	WHICH TEACHERS NEED TO BE REPLACED BY AI

On the first day of the symposium, there was an opening ceremony and three plenary presentations (Figure 1 and Figure 2). In addition, poster presentations were made throughout the symposium. Also, on the first day of the symposium, the work was organised in two sessions with a total of 10 presentations (Table 2 and Table 3).

Table 2

Information about Session 1 Presentations

Speakers Name and Surname Entity/Academy represented	Topic of presentation
Angela James <i>Kwazulu-Natal University, South Africa</i>	Learning, sharing and growing: Science in community engagement
Małgorzata Nodzyńska-Moroń, Vladimír Sirotek <i>University of West Bohemia in Pilsen, Czech Republic</i>	The durability of formal knowledge and its restructuring during lifelong learning
Hyoung-Yong Park, Hae-Ae Seo <i>Gyeongin National University of Education, South Korea; Pusan National University, South Korea</i>	The public's understanding of "Evolution" as seen through online spaces
Boris Aberšek, Metka Kordigel Aberšek <i>University of Maribor, Slovenia</i>	Transformation of education from dehumanization back to rehumanization
Vincentas Lamanauškas, Rita Makarskaitė-Petkevičienė <i>Vilnius University, Lithuania</i>	Environmental education in primary school: Meaning, themes and vision

Figure 1

Symposium Participants



Figure 2

Plenary Speech by Predrag Pale





Figure 3
Symposium Poster

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5th INTERNATIONAL BALTIC SYMPOSIUM
ON SCIENCE AND TECHNOLOGY EDUCATION

<https://balticste.com>

SCIENCE AND TECHNOLOGY EDUCATION: NEW DEVELOPMENTS AND INNOVATIONS

12-15 June 2023, Siauliai, Lithuania

KEYNOTE SPEAKERS

 "IMPLEMENTING A NATIONAL DATABASE ON YOUNG CHILDREN'S LEARNING: A LONGITUDINAL STUDY TO EVALUATE THE QUALITY OF PRESCHOOLS" Prof. dr. Ching-Ching Cheng National Chiayi University, Taiwan	 "HUMAN, LIFE, UNIVERSE: HUMAN'S LIFE WITHIN THE UNIVERSE" Prof. dr. Andris Broks University of Latvia, Latvia	 "PROMOTING SCIENCE ACTIONS IN NOWADAYS EDUCATION: AN IMPORTANT ISSUE RELATED TO OPEN SCHOOLING" Prof. dr. Gabriel Gorghiu Valahia University Targoviste, Romania	 "STUDENT-CENTERED EDUCATION IMPLEMENTATION IN UNDERGRADUATE PHYSICS COURSES OF NATURAL SCIENCES AT THE UNIVERSITY OF LATVIA: SUCCESSES AND CHALLENGES" Mg. phys. Ilva Cinite University of Latvia, Latvia
 "LEARNING SCIENCE THROUGH PROJECT-BASED LEARNING: US-FINNISH PARTNERSHIPS FOR INTERNATIONAL RESEARCH AND EDUCATION (PIRE)" Prof. dr. Jari Lavonen University of Helsinki, Finland	 Topic "INTRODUCING THE CONCEPT OF ENERGY: EDUCATIONAL AND CONCEPTUAL CONSIDERATIONS" Assoc. prof. dr. Paolo Bussotti University of Udine, Italy	 "ENGINEERING PEDAGOGY AND TEACHERS' COMPETENCIES FOR EFFECTIVE TEACHING STE" Assoc. prof. dr. Tiia Rütümann Tallinn University of Technology, Estonia	 "WHICH TEACHERS NEED TO BE REPLACED BY AI" Assoc. prof. dr. Predrag Pale University of Zagreb, Croatia

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Symposium Organizers:

Symposium Partners:

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Despite insignificant technical issues, all scheduled presentations were made on time. An in-depth discussion took place, various questions were raised.

Table 3
Information about Session 2 Presentations

Speakers Name and Surname Entity/Academy represented	Topic of presentation
Rita Birzina, Dagnija Cedere, Sandra Kalnina <i>University of Latvia, Latvia</i>	Learning skills acquired at school for STEM studies at the university
Martin Bilek <i>Charles University, Czech Republic</i>	The out-of-school science education in the international perspective: The project DOSLECTEP
Kalle Saastamoinen, Antti Rissanen, Arto Mutanen <i>National Defence University, Finland</i>	Intelligent learning in studying and planning courses – new opportunities and challenges for officers
Giovanni Scataglia Botelho Paz, Solange Wagner Locatelli <i>Federal University of ABC, Brazil</i>	The natural sciences curriculum of the city of São Paulo: Conceptions of teachers who teach natural sciences in the early years of elementary school

The second day of the symposium was traditionally dedicated to interactive learning activities. The symposium participants travelled to Žemaitija (Samogitia) (Figure 4). Samogitia is one of Lithuania's most interesting ethnographic regions. In addition, Samogitia is one of the five cultural regions of Lithuania and formerly one of the two core administrative divisions of the Grand Duchy of Lithuania alongside Lithuania proper.

Figure 4
Trip Information

5th International Baltic Symposium on Science and Technology Education (BalticSTE2023)
OUTDOOR WORKSHOP/EXCURSION
SCIENCE & TECHNOLOGY EDUCATION

Tuesday
13th June 2023

Meeting point: City Public Library, Aušros av. 62, Šiauliai

Departure time: 7.30 a.m.

Estimated time of return: 18.30 / 19.00

„Trying to avoid the fragmentariness of nature study, the educational process must classify the knowledge of sciences and their content, to look for, find and show the correlation between separate facts and phenomena of natural science inside every single educational subject when discussing individual topics, connecting them with the content of all subjects of science and integrating all related knowledge into the system.”
(Prof. Juozas Vaitkevičius, 1996)



The first destination was Plunge. The participants visited the Samogitian Art Museum (Samogitian Art Museum) operating in Mykolas Oginskis Palace since 1994 (Figure 5 and Figure 6). Later, a visit to the Plunge's Technology and Business School was made to learn about the educational process. Plunge's Technology and Business School was established in 1987. Since the beginning of the school's establishment, more than 6000 students finished this school.

Figure 5

Presentation of the M. Oginskis Palace in Plungė



Figure 6

After the Visit to the Žemaičiai Art Museum



After the two visits, the symposium participants had lunch at a traditional Lithuanian taverną, a 20-year-old family restaurant near the Vėžaičiai-Plungė road (Figure 7). The tavern has a cosy "home" atmosphere. The owner has created the rustic style and every detail of the interior "from the soul" herself. "The energy of the wood, which dominates the details, soothes a customer who is tired after work or just stopping by for lunch.

In the afternoon, the symposium participants continued their excursion. The Plunge's School of Art was visited (Figure 8). This excellent school is named after Mykolas Oginskis, a Duke, diplomat, and political figure of the Republic of the Two Nations (Polish–Lithuanian Commonwealth). Participants toured the school and listened to music performed by students.

Figure 7

After the Lunch in Karčema / Tavern



Figure 8

Visiting Plunge's Mykolas Oginskis Art School



The last object in this route was the Samogitian Village Museum in Telšiai town (Figure 9 and Figure 10). It is a subdivision of the Samogitian Museum "Alka", which was established in the 1960s in the southwestern part of the shore of Lake Mascis, on an area of 8.5 ha. The museum has 16 buildings, comprising three farmhouses and a public sector. They reflect the late 19th and early 20th century. The buildings, which date from the 19th century to the 19th century, represent the rural landscape of Samogitia.

Figure 9

Visiting Samogitian Village Museum



Figure 10

Introduction to the Samogitian Museum "Alka"



The third day of the symposium was as busy as ever in the academic sense. Four plenary presentations were made, reflecting a wide range of topics. These were reports made by P. Pale (Croatia), G. Gorghiu (Romania), P. Bussotti (Italy), and I. Cinite (Latvia). In addition, on the same day, work was carried out in three sections with a total of 15 presentations (Table 4).



Table 4
Presentations from Sessions 3, 4 and 5

Speakers Name and Surname Entity/Academy represented	Topic of presentation
<i>Third session</i>	
Maja Kerneža <i>University of Maribor, Slovenia</i>	Fundamental and basic cognitive skills required for teachers to effectively use Chatbots in education
Dejan Zemljak <i>University of Maribor, Slovenia</i>	Advanced tools for skill development: Learning preparations using ChatGPT
Jelena Kosmaca, Ilva Cinite, Girts Barinovs <i>University of Latvia, Latvia</i>	Exploring interactive H5P video as an alternative to traditional lecturing at the physics practicum
Jovita Ponomariovienė <i>Vytautas Magnus University, Lithuania</i>	Competency-based science education: the case of one Lithuanian school
Jan Francisti, Zoltán Balogh, Milan Turčáni <i>Constantine the Philosopher University in Nitra, Slovakia</i>	The use of internet of things technology in the pedagogical process
<i>Fourth session</i>	
Young-Joon Shin, Hyunju Park, Hae-Ae Seo <i>Gyeongin National University of Education, South Korea; The War Memorial of Korea, South Korea; Pusan National University, South Korea</i>	The influence of a project-based club program on middle school students' action competency in responding to climate change
Gabriel Gorghiu, Mihai Bizoi, Laura Monica Gorghiu, Claudia Lavinia Buruleanu <i>Valahia University of Targoviste, Romania</i>	Students' perceptions and attitudes regarding science following the implementation of the "Rewilding" science action
Sabina Wieruszewska-Duraj <i>University of Natural Sciences and Humanities, Poland</i>	The effectiveness of ecological education of children in the research concept of Celestyn Freinet
Radu Lucian Olteanu, Gabriel Gorghiu <i>Valahia University of Targoviste, Romania</i>	Increasing the students' interest in science by implementing a science action dedicated to plastics biodegradability
Solange Locatelli <i>Federal University of ABC, Brazil</i>	Drawings to learn chemistry: Limits and possibilities
<i>Fifth session</i>	
Saša A. Horvat , Tamara N. Rončević, Ivana Z. Bogdanović, Dušica D. Rodić <i>University of Novi Sad, Republic of Serbia</i>	Differences in graphic illustrations in the contents of natural sciences in regular textbooks and textbooks for students with special educational needs in the Republic of Serbia
Marcella Seika Shimada, Solange Wagner Locatelli <i>Federal University of ABC, Brazil</i>	Students' perception of an inquiry-based metavisual activity about concepts of chemical kinetics
Agneš R. Sedlar, Tamara N. Rončević, Saša A. Horvat <i>University of Novi Sad, Republic of Serbia</i>	The application of interactive learning tasks made by using digital hybrid illustrations in the topic "Hydrocarbons" in eighth-grade organic chemistry classes
Tamara N. Rončević, Saša A. Horvat, Dušica D. Rodić, Ivana Z. Bogdanović <i>University of Novi Sad, Republic of Serbia</i>	Secondary school students' perception of biochemistry concepts by using word association test
Carla Patricia Araujo Florentino, Marcella Seika Shimada, Solange Wagner Locatelli <i>Federal University of ABC, Brazil</i>	Prior knowledge about science from drawings by a group of deaf students

The third day of the Symposium concluded with the Symposium Dinner, which took place in Naisiai (Figure 11). Naisiai is one of the most visited villages, famous not only within Šiauliai district but all over Lithuania. The Balts` Arena is one of the most important, impressive, and largest objects in Naisiai (Figure 12). In other words, it's an open-air museum that's great fun to visit.

Figure 11
In Naisiai Village



Figure 12
Exploring the Balts` Arena



The fourth and final day of the symposium was dedicated to interactive activities. The keynote interactive presentation was given by Prof. Andris Broks (University of Latvia), with the assistance of colleagues from other countries. We had a really interesting and rich debate, as well as a discussion of the symposium. The last day of the symposium took place at Šiauliai Technology Training Centre (Figure 13). The Centre organised two workshops for the symposium participants: Floristic educational activities and Photography educational activities (Figure 14). The symposium participants had a unique opportunity to learn about the composition of bouquets, as well as photo art activities.

Figure 13
At Šiauliai Technology Training Centre



Figure 14
After the Workshops





During the whole symposium, various country researchers shared their insights on possible further collaboration. All the symposium papers were published as open access Symposium Proceedings (<https://www.ceeol.com/search/book-detail?id=1123290>). Also, it is freely available on Research Gate: https://www.researchgate.net/publication/371666351_Science_and_technology_education_New_developments_and_innovations_Proceedings_of_the_5th_International_Baltic_Symposium_on_Science_and_Technology_Education_BalticSTE2023 and ERIC (Institute of Education Sciences): [https://eric.ed.gov/?q=Baltic STE&id=ED629086](https://eric.ed.gov/?q=Baltic+STE&id=ED629086).

In summary, the work of the Symposium was meaningful and fruitful. Academic experiences were shared, and new contacts were made. Thus, the fifth symposium leaves only good impressions and valuable experience. The symposium can be at least partially accessed on the YouTube channel, where the main video material is posted (Table 5).

Table 5
Information on the Dissemination of the Symposium

Title	URL
Presentation by Boris Aberšek, Slovenia	https://www.youtube.com/watch?v=-PegPC4dIVw
Presentation by Jari Lavonen, Finland	https://www.youtube.com/watch?v=Uqtp88lXbMw
Outdoor activities / Excursion, 13 June 2023	https://www.youtube.com/watch?v=kwZ0htmEjjM
Presentation by Andris Broks, Latvia	https://www.youtube.com/watch?v=Tt-AoADs7G8
Presentation by Paolo Bussotti, Italy	https://www.youtube.com/watch?v=Cq8a_AHYlmU
Presentation by Ching-Ching Cheng, Taiwan	https://www.youtube.com/watch?v=rm2hhl_ejJQ
Presentation by Gabriel Gorghiu, Romania	https://www.youtube.com/watch?v=y3Tysb7tqrw
Presentation by Tiia Rüttnann	https://www.youtube.com/watch?v=jT3pwenDw9I
Presentation by Zoltan Balogh, Slovakia	https://www.youtube.com/watch?v=YGxxnrak2HE
Workshops I and II	https://www.youtube.com/watch?v=fYUdgMDTECU
Presentation by Predrag Pale, Croatia	https://www.youtube.com/watch?v=LSpfZxH9Lio
Presentations_Section 5	https://www.youtube.com/watch?v=qFKkH9HAxcM
Presentation by Ilva Cinite, Latvia	https://www.youtube.com/watch?v=LZF3KIIfMbY
Presentations_Section 1	https://www.youtube.com/watch?v=Ms-Y4Mt0Kr0
Symposium Overview	https://www.youtube.com/watch?v=J-mv5Tw7_1g

All in all, it was an intense symposium, useful in every sense. It not only presents the latest research results but also fosters scientific cooperation between researchers from different countries. It is clear that the contacts established during the symposium between researchers from Lithuania and other countries will not only be a definite incentive for the exchange of new ideas but will also create an opportunity for joint research projects.

It is expected that the sixth symposium will take place in Šiauliai in June 2024. Detailed information is given on the symposium website: <http://balticste.com>.

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