Conference

FUTURE-READY GEOGRAPHY

ANNUAL EUROGEO CONFERENCE 2023

27 - 29 April 2023

Pedagogical University of Krakow, Poland.

Introduction 4
Basic Data and Venue 6
Scientific and Organising Committees 7
Conference Schedule 9
Keynote Presentations 10
Paper presentations in parallel sessions 12
Session Future-ready geography education 13
Session Society and environment 13
Session Social geography 14
Session Problems and issues in geography education (1) 14
Session Physical geography 15
Springer session 15
Session Applied geography 16
Session Geographical education and geopolitics: future-ready 16
Session Challenges in geography education 17
Session Urban geography 17
Session Problems and issues in geography education (2) 18
Session New technologies in education 18
EUROGEO Session 19
Sessions by first author 20
Paper abstracts 22
Session: Future-ready geography education 22
Session: Society and environment 26
Session: Social geography 28
Session: Problems and issues in geography education (1) 31
Session: Physical geography 34
Springer session 37
GEODEM Session 39
Session: Applied geography 39
Session: Geographical education and geopolitics: future-ready 42
Session: Challenges in geography education 46
Session: Urban geography 49
Session: Problems and issues in geography education (2) 52
Session: New technologies in education 54
EUROGEO Session 57
Posters 61
Workshops 70
Workshop 1. 70
Workshop 2. 70

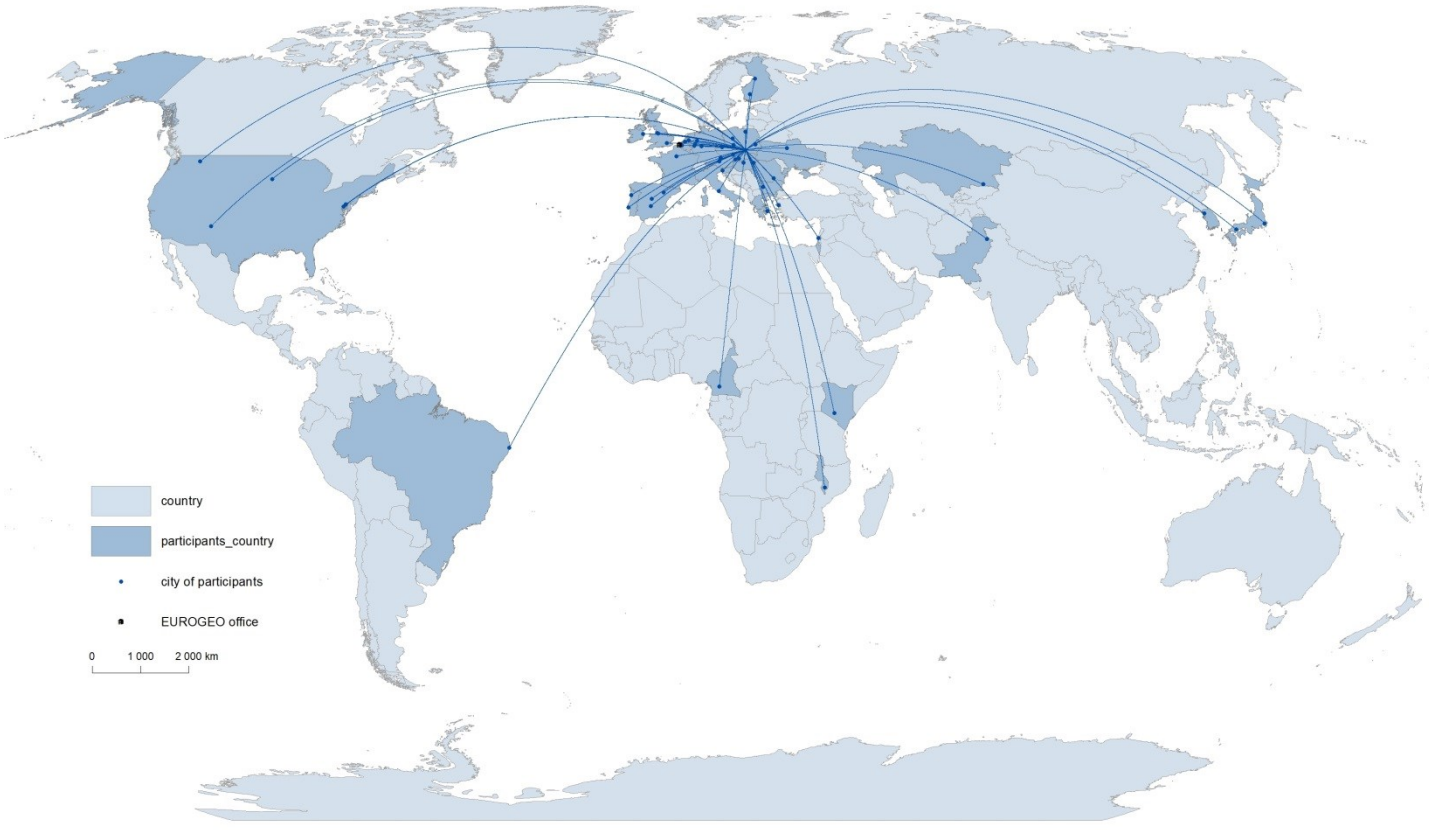
Introduction

The 2023 EUROGEO Annual Meeting and Conference is organized in April 2023 in Kraków, Poland, to present outcomes of geographical or interdisciplinary research related to the theme: “Future-ready geography”.

This Conference comprised more than one hundred contributions: 2 keynote plenary sessions, 67 paper presentations, 19 posters, 2 workshops, 3 special sessions and one field trip.

Conference attendees represent countries from almost all continents**.**

Participants of the conference "FUTURE-READY GEOGRAPHY" Krakow 2023



Today's world is in a state of permanent and radical change which is affecting society, science and the economy in equal measure. The concurrent processes of globalisation, digitisation, and integration shape and constantly modify the development factors and generate multidirectional social changes. Growing global issues related to climate change, food security, depletion of conventional energy sources, conflicts and wars, refugee crisis and pandemic open up new issues for geographic investigations as well as reinforce the need to examine old research topics covering a variety of subdisciplines.

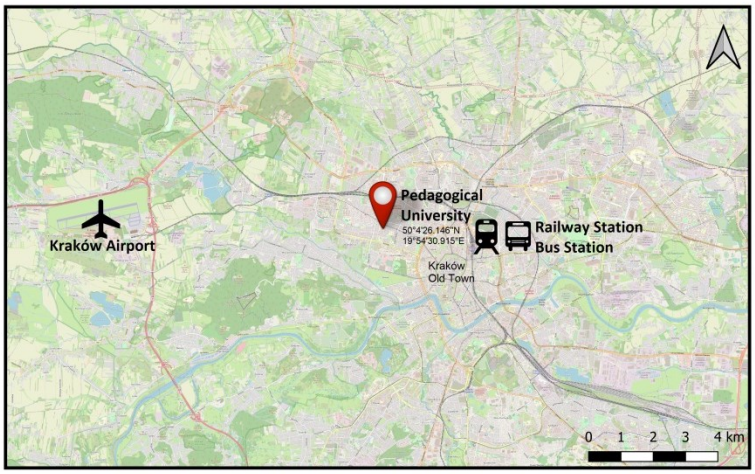
That is why the term “future-ready” becomes nowadays more frequently used in discourses on geographic research. In particular, geographic education at schools should be subject to discussion and reflection as this is where our learners are primed to understand the world around them. For this reason, **the main goal of this conference** is to foster a future-oriented exchange and discussion among scientists representing all subdisciplines of geography as well as geography teachers and heads of faculties on how geography as science and school subject can get ready for the “future.”

Conference Strands:

- What theoretical concepts and paradigms will dominate geographic research and education in the future?
- What are the crucial problems and challenges for geography as a discipline and school subject in the nearest future?
- What is and will be the role of geography in preparing the society for the future? Which issues will become key in geography as future-oriented science?
- In what way geography as science and school subject should respond to environmental, socio-economic, and political issues of global, regional and local impact in order to effectively utilise its potential of applied science?
- Which methods, techniques and tools of data collection and analysis efficiently support geographers in future-oriented research and forecasting environmental and social changes?
- How to reinforce the position of geography as science and school subject nowadays and in the future?

The Conference will be held in the Main Building of the Pedagogical University of Krakow. Poland; ul. Podchorążych 2; 30-084 Kraków, Poland.

GPS Coordinates:
50.07392951297278, 19.908587522961888
50° 4' 26.146''N 19° 54' 30.915



Main building (entrance from Podchorążych Street):
https://goo.gl/maps/gajPp6WEH6C6CNdp9

Venue (entrance from Chmiela Street):
https://goo.gl/maps/H7GWTMxZe2CiWx2y9

Scientific and Organising Committees

Co-chairs of the Scientific Committee:

Rafael de Miguel González, President of EUROGEO and Professor at University of Zaragoza, Spain

Danuta Piróg, Professor of Pedagogical University of Kraków, Institute of Law, Economics and Administration, Department of Geography Education and Logistics, Poland

Members of the Scientific Committee:

Maciej Jędrusik, Professor, Faculty of Geography and Regional Studies, University of Warsaw, Poland

Wioletta Kilar, Phd, Pedagogical University of Kraków, Poland

Franciszek Mróz, Phd, Pedagogical University of Kraków Poland

Urszula Myga-Piątek, Professor of University of Silesia in Katowice, Faculty of Natural Sciences, University of Silesia, Sosnowiec, Poland

Danuta Piróg, Professor of Pedagogical University of Kraków, Institute of Law, Economics and Administration, Department of Geography Education and Logistics, Poland

Zbigniew Podgórski, Professor of Kazimierz Wielki University in Bydgoszcz, Faculty of Natural Sciences, Kazimierz Wielki University in Bydgoszcz, Poland

Andrzej Suliborski, Professor, Department of Regional and Human Geography, University of Lodz, Poland

Agnieszka Świętek, PhD, Pedagogical University of Kraków, Poland

Mariusz Szubert, Professor of Pedagogical University of Kraków, Poland

Joanna Zawiejska, Professor of Pedagogical University of Kraków, Poland

Rafael de Miguel González, President of EUROGEO and Professor at University of Zaragoza, Spain

Caroline Leininger-Frézal, Université Paris Cité, France

Aiketerini Klonari, University of the Aegean, Greece

María Luisa de Lázaro Torres, Universidad Nacional de Educación a Distancia (UNED), Spain

Tjiana Ilic, University of Nova Gorica, Slovenia

Karl Donert, National Teaching Fellow, UK

Kostis Koutsopoulos, National Technical University of Athens, Greece

Gerry O'Reilly, Dublin City University, Ireland

Daniela Schmeinck, Universität zu Köln, Germany

Luc Zwartjes, Ghent University, Belgium

Members of the Organising Committee:

Danuta Piróg, Professor of Pedagogical University of Kraków, Poland

Kinga Bargieł, MA, Pedagogical University of Kraków, Poland

Mariusz Cembruch-Nowakowski, PhD, Pedagogical University of Kraków, Poland

Piotr Cybul, MA, Institute of Geography, Pedagogical University of Kraków, Poland

Agnieszka Gil, MA, Pedagogical University of Kraków, Poland

Wioletta Kilar, Phd, Pedagogical University of Kraków, Poland

Paweł Kroh, PhD, Pedagogical University of Kraków, Poland

Agnieszka Świętek, PhD, Pedagogical University of Kraków, Poland

Kamila Ziółkowska-Weiss, PhD, Pedagogical University of Kraków Poland

Rafael de Miguel González, President

Karl Donert, Vice President and Past President

Harry Rogge, Vice President

Michaela Lindner-Fally, Vice President

Gert Rupert, Vice President

Tjiana Ilic, Vice President

Gerry O'Reilly, Vice President

Daniela Schmeinck, Vice President

Kostis Koutsopoulos, Vice President

Caroline Leininger-Frézal, VicePresident

Aikaterina Klonari, VicePresident

Luc Zwartjes, VicePresident / Treasurer

María Luisa de Lázaro Torres, Secretary General

Conference Schedule

Time table	Thursday 27th April
9:00-9:30	**Registration**
9:30-10:00	**Welcome ceremony**
10:00-11:00	**First keynote**: "Poland's eastern border in the European and global network of people flows" by prof. dr. hab. ***Tomasz Komornicki***, Polish Academy of Science; Maria Curie-Skłodowska University, Lublin, Poland Presenter: Danuta Piróg
11:00-11:30	Coffee break
11:30-13:00	**Parallel session 1 and workshops**
13:00-14:00	Lunch
14:00-15:30	**Parallel session 2**
15:30-16:30	**Special session, Springer books presentation: Handbook of Geography Education and EUROGEO Series**
16:30-17:00	Coffee break / **poster exhibition**
17:00-18.30	**EUROGEO Annual General Meeting and elections**

Time table	Friday 28th April
9:00-10:00	**Second keynote: "**Research on the conceptions of geography teaching as an effective platform for the professional development of geography teachers", by doc. ***Petr Knecht***, Masaryk University, Brno, Czech Republic Presenter: Agnieszka Świętek
10:00-11:00	**GEODEM session: Teaching in and about Europe**
11:00-11:30	Coffee break
11:30-13:00	**Parallel session 3**
13:00-14:00	Lunch
14:00-15:30	**Parallel session 4**
15:30-17:00	**EUROGEO projects presentation**
17.00-17.15	**Closing ceremony**
19.00-22.00	**EUROGEO Conference dinner: Jewish restaurant Ariel, Szeroka 18 street**

Time table	Saturday 29th May
7:30-20.00	**Field trip:** ***The Tatras and Pieniny: two diverse mountain landscapes, a single historical and cultural region*** **Departure: Pedagogical University, Pochorążych 2 (main building)**

(Auditorium, AULA A1)

Poland’s eastern border in the European and global network of people flows

prof. dr. hab. Tomasz Komornicki, Polish Academy of Science; Maria Curie-Skłodowska University, Lublin, Poland

(Presenter: Danuta Piróg, Pedagogical University of Kraków)

Poland's eastern border is a border of global importance. Therefore, it should be given considerable attention in socio-economic and political geography studies. Of particular importance are the dynamics of changes in the intensity and structure of flows. Cross-border traffic in its broadest sense is sensitive to geopolitical and macroeconomic factors. It is an indicator illustrating the state of Castells' European space of flows.

In the presentation I'm going to show the results of recent studies of interregional flows of people (migration, tourism, commuting) in Europe obtained within the ESPON IRiE project. Against this background, the situation on the Polish eastern border is assessed. Changes in border traffic were related to factors rapidly disrupting flows such as migration pressure from outside Europe (from 2015), the COVID-19 pandemic (2020), Russia's aggression against Ukraine (2022). Data from the Polish Border Guard was used, as well as the latest data on the distribution of refugees from Ukraine (including the results of modelling their onward migration).

The results presented show the scale and nature of the impact of unpredictable external factors ('black swans') on the volume and structure of people’s flows. The impact on border traffic and tourism is shown to be far greater than on travel to work or study. It has been shown that flows across Poland's eastern borders have their territorial consequences also far from the boundary (within the European Union). At the same time, the consequences of flows have a clear territorial dimension. In the case of refugees from Ukraine, the spatial distribution of their registration confirms the theory of migration networks (duplication of previous directions of economic migration) and furthermore reinforces the processes of population concentration in the largest metropolises.

Research on the conceptions of geography teaching as an effective platform for the professional development of geography teachers

doc. Petr Knecht, Masaryk University, Brno, Czech Republic

(Presenter: Agnieszka Świętek)

In the first part of my talk, I will address why geography curriculum is losing its stable position in many countries. The community of geographers is responding to the discipline's declining status and trying to educate actors and stakeholders of education regarding geography's benefits and relevance in society. The debate on its relevance shows that geography offers teachers and students different and challenging paradigms, concepts, ideas, and modes of knowledge. Therefore, it is essential for geography teachers to make the most of the plurality of geographical knowledge and create opportunities for students to reflect on different theoretical perspectives in geography classes.

In the second part of the talk, I will present research findings on the conceptions of geography teaching among pre-service and in-service geography teachers. The results provide implications for shaping the professional knowledge of (future) geography teachers through a comprehensive 'starter pack' that provides a balanced representation of different conceptions of geography teaching, backed by various geographical concepts and paradigms.

Finally, I will present the online application Geo4tea (Geography for Teachers), which translates research findings of geography teaching conceptions into practical knowledge. The application allows teachers to identify the prevailing conceptions and continuously provide them with updated alternatives. Thus, the app helps teachers understand how different geographies may be delivered more effectively to their students. Moreover, the app can also reinforce the image of geography as a science and school subject and therefore contribute to popularising geography that can be impactful in planning for the future.

Paper presentations in parallel sessions

27th April	Aula A1	Room 110N	Room 111N	Room 213N
Session 1 and workshops	**Future-ready geography education**	**Society and environment**	**Workshop**: Global change visible in cities: Story map experience	**Workshop**: Teacher training to teach reality *
11:30-13:00	Chair: **P. Knecht**	Chair: **H. Rogge**	**M. A. Rodríguez; M. L. de Lázaro**	**G. O'Reilly, T. Yaar-Waisel**
Session 2	**Social geography**	**Problems and issues in geography education (1)**	**Physical geography**	*Please bring to the workshop your mobile phone, QR-code scanner/reader app and headphones
14:00-15:30	Chair: **G. O'Reilly**	Chair: **M. L. de Lázaro Torres**	Chair: **J. Špulerová**	
Springer session	**Handbook of geography education and EUROGEO Books**			
15:30-16:30	Chair: **R. de Miguel**			

28th April	Aula A1	Room 110N	Room 111N
GEODEM session 10.00-11.00	**Teaching in and about Europe**		
Session 3	**Applied geography**	**Geographical education and geopolitics: future-ready**	**Challenges in geography education**
11.30-13.00	Chair: **J. Zawiejska**	Chair: **D. Schmeinck**	Chair: **A. Świętek**
Session 4	**Urban geography**	**Problems and issues in geography education (2)**	**New technologies in education**
14.00-15.30	Chair: **W. Kilar**	Chair: **K. Donert**	Chair: **T. Ilic**
EUROGEO Session	**EU funded projects presentation**		
15.30-17.00	Chair: **K. Donert**		

Session Future-ready geography education

Chair: ***Petr Knecht***

Authors	Paper title
Mary Fargher, *Rafael de Miguel González*	Educating teachers to use GIS in teaching about climate change: a comparison between practice in the UK and Spain
Michael Morawski, *Sebastian Wolff-Seidel*	Gaming & Geography (Education): overview of the research project's empirical methods and introduction of a model of reflexive analysis of digital space in video games
*Agnieszka Święte*k	The "geography of silence" in geography education and its potential consequences
Nina Scholten, *Natalie Bienert,* *Rainer Mehren*	Discussion of a framework on instructional quality in geography education
Josef Strobl	From virtual field Trips to blended experiences

Session Society and environment

Chair: ***Harry Rogge***

Authors	Paper title
Lavinia Pîndaru, *Laurentiu Rozylowicz,* *Steluta Manolache,* *Andreea Niţă,* *Gabriel Vânău,* *Viorica Iuliana Miu,* *Cristiana Pioarcă-Ciocănea,* *Iulian Niculae*	The analysis of the evolution of environmental action programs using the institutional grammar tool
Ivana Vyslúžilová	Sustainable development supported by high-growth technology in European Smart Cities
Zita Izakovičová, *Jana Špulerová*	Conflicts in the utilisation of Slovakia's agricultural land
Eugênia C. Pereira, *Andrezza Karla de Oliveira Silva,* *Kétcia Ferreira de Santana a Alexandre da Silva Xavier,* *Maria de Lourdes Lacerda Buril,* *Lucas Costa de Souza Cavalcanti*	Structure of vegetation of recovering patches of caatinga vegetation in Assunção Island, Cabrobó (Pe, Brazil)

Session Social geography

Chair: ***Gerry O'Reilly***

Authors	Paper title
Dominik Kevický	'We will protect our countryside without a green deal': the populist radical right and the environment in Czechia and Slovakia
Elizabeth Chacko, Marie Price	Synergies of solidarity: strategies for expanding migrant urban citizenship in U.S cities during the COVID-19 pandemic
Tomasz Padło, Agnieszka Gil, Paweł Struś	The perception of the border between Eastern and Western Europe and its changes over time in the opinion of respondents from seven European cities
George White, Bruce Millett, Kimberly Johnson Maier	Russia's war on Ukraine and European efforts to re-spatialize natural gas
Tal Yaar-Waisel	Is Israel a part of Europe? Why does Israel consider itself part of Europe?
Wojciech Janicki	Geography as myth-breaker of the future

Session Problems and issues in geography education (1)

Chair: ***Maria Luisa de Lázaro Torres***

Authors	Paper title
Jongwon Lee	Creating inquiry-based learning resources in response to the digitization of geography curriculum
Carlos Martínez-Hernández, Radosław Piskorski, Arie Stoffelen	Online teacher trainees' workshops on webGIS storymaps to learn geography and local and foreign urban heritage
Marine Simon, Alexandra Budke	Students' comparison competencies in geography: results from an assessment and an intervention study
Phillip Bengel	Extracurricular learning "next level": using mobile digital game-based learning to teach complex multi-perspective content in heterogeneous learning groups
Ourania Rizou, Aikaterini Klonari, Nikolaos Apostolellis	Geography undergraduate students' perceptions on online courses during COVID-19: sustainability and effectiveness

Session Physical geography

Chair: ***Jana Špulerová***

Authors	Paper title
Joanna Zawiejska, Joseph E. Flotemersch, Dorota Chmielowska-Michalak	A first look at the poorly understood blackwater streams of the Tatra Mountain foreland, southern Poland
Łukasz Pawlik, Daniel Okupny, Paweł Kroh, Piotr Cybul, Renata Stachowicz-Rybka, Agata Sady-Bugajska	Changing of the landslide relief in context of reconstruction of the holocene environment, Mt, Śnieżnica, Poland
Viorica Iuliana Miu, Athanasios Gavrilidis, Simona Grădinaru, Laurentiu Rozylowicz	Assessing invasive alien plant species in Romania: distribution and pathways of introduction
Jana Špulerová, Veronika Piscová, Noemi Matušicová	The contribution of science to the sustainable development of Biosphere Reserves in Slovakia

Springer session

Chair: ***Rafael de Miguel González***

Authors	Paper title
Sarah Witham Bednarz	Handbook for geography education: a preliminary look at the past, present, and future
Daniela Schmeinck, Gillian Kidman	Teaching Primary Geography. Setting the Foundation
Maria Luisa de Lázaro Torres, Rafael de Miguel González	Sustainable Development Goals in Europe A Geographical Approach
Gerry O'Reilly	Place Naming, Identities and Geography Critical Perspectives in a Globalizing and Standardizing World
Tijana Ilic, Gert Ruepert	Young geographers
Aikaterini Klonari, Maria Luisa de Lázaro Torres	Re-visioning geography in supporting SDG's in post Covid era

Session Applied geography

Chair: ***Joanna Zawiejska***

Author	Paper title
Abidemi Aina	Study and analysis of GSM call loss and it's propagational effect on ecological swathes landform pattern in tropical rainforest
Takem Ebangha Agbor Delphine, Nkwadi Alain	The Application of GIS and Remote Sensing Technologies in Mapping the Sanaga River Basin
Maureen Kapute Mzuza, Samu Geoffrey Simlemba	Factors affecting adoption rate of biomass energy saving technologies: a case of Bolero in Rumphi, Malawi
Saeedeh Fakhar, Mitra Saberi	Determination of the best geo-trail using of genetic algorithm (case study: Damavand)
Raphael Kweyu, Eberth Andreas	Conflict Mediation among Pastoralists in Karamoja Cluster of East Africa

Session Geographical education and geopolitics: future-ready

Chair: ***Daniela Schmeinck***

Authors	Paper title
Andreas Eberth, Lydia Heilen, Lara Brede, Christiane Meyer	Post-growth from the perspectives of young people in Germany
Gerry O'Reilly	Breaking news inside and outside the classroom: geography, geopolitics and survival education
Iryna Kostetska, Elvira Moldovan	Methods for assessing the potential of local strategies and programs in the field of energy and energy efficiency in communities of Ukraine
János Kapusi	Perspectives on the multilingual context of geography teaching in Hungarian secondary schools
Miguel-Ángel Puertas-Aguilar, Ana E. García Sipols, María Luisa de Lázaro-Torres	The web GIS to enhance learning about geopolitics

Session Challenges in geography education

Chair: ***Agnieszka Świętek***

Authors	Paper title
Ann Johnson	Resources to help build competency-based curriculum for geospatial programs
Christina Zisi, Aikaterini Klonari	Is kindergarten appropriate for early spatial interventions?
Dina Vasiljuk, Alexandra Budke	Student teachers' knowledge of multiperspectivity and its implementation in geography lesson plans: results from a study with German and Dutch student teachers
Susan Pike	Geography for the future? Curriculum change in Ireland
Stefania Montebelli	The "educating city": the power of learning in participatory design

Session Urban geography

Chair: ***Wioletta Kilar***

Authors	Paper title
Asad Aziz	Climatic gentrification and urban resilience for social justice: A geographical evaluation: from research to action
Iuria Betco	The influence of the city environment on hedonic wellbeing
Nikola Koktava	Ageing in cities - modelling the cities of the future
Ilieva Nedezhda, Kaloyan Tsvetkov	Exploring the spatial and social dimensions of the Roma ghettoized structures in Northwestern Bulgaria (Vidin District)
María Ángeles Rodríguez-Domenech	Multidirectional social and spatial changes in medium-sized cities in Spain. General approach in main cities in the region of Castilla-la Mancha
Simangele Dlamini	Future-ready cities: The role of geospatial information systems in smart city

Session Problems and issues in geography education (2)

Chair: ***Karl Donert***

Authors	Paper title
Anna Klimach, Agnieszka Dawidowicz, Marta Czaplicka, Marzenna Nowicka, Marta Gross	Geographic methods for studying children's spatial awareness
Mariana Soultanova	Investigation on the mindset of the high school graduates in the Smolyan region (Bugaria) for implementation up regional sustainable development policies
Danuta Piróg, Kinga Bargieł	Ageing of teaching staff in Poland: reasons, characteristics and consequences
Małgorzata Cichoń	Social participation in geographical education as a tool supporting the development of competences of the future

Session New technologies in education

Chair: ***Tijana Ilic***

Authors	Paper title
Daniela Schmeinck	What's next? Educational opportunities and needs for primary geography
Anastasia Georgiou, A. Galani, G. E. Bampasidis, T. Sivenas, G. Koutroumanos	Go robotics in school geography? New challenges
Caroline Leininger-Frézal, C.Naudet, Aurore Lecomte	Face to global change: a university challenge
Aikaterini Klonari, A.S Passadelli	The use of 3D printed landscape models in teaching geography

EUROGEO Session

Chair: ***Karl Donert***

Authors	Paper title
José Jesús Reyes Nunez, *Krisztina Irás,* *Ágnes Cselik,* *Mónika Varga,* *Dániel Kiss*	BIOMAPS project: summarising Hungary's contributions to the online map library of European writers and poets
María Luisa de Lázaro Torres, *Rafael de Miguel González*	Biographical map library of European authors on a story map
Luc Zwartjes, *Christos Polykretis,* *Dimitris Alexakis,* *Karl Donert*	GEOLAND: digital educational geoinformatic methodologies for monitoring landscape
Sophie Wilson	Gi-Pedagogy: an innovative model for integrating GIS into a 'future-ready geography curriculum'
Michaela Lindner-Fally	Smart village: developing rural tourism business through circular economy and social innovation
Rafael de Miguel González, *Karl Donert,* *Luc Zwartjes*	Teaching the future and learning climate change with ArcGIS Dashborads
Karl Donert *Gert Ruepert*	TOGETHER: a project introducing service-learning approaches in school

Sessions by first author

Last Name First Name	SESSION
Aina Abidemi	Applied geography
Aziz Asad	Urban geography
Bednarz Sarah	Springer Session
Bengel Phillip	Problems and issues in geography education (1)
Betco Iuria	Urban geography
Chacko Elizabeth	Social geography
Cichoń Malgorzata	Problems and issues in geography education (2)
Dawidowicz Agnieszka	Problems and issues in geography education (2)
de Lázaro-Torres María Luisa	EUROGEO Session
de Lázaro-Torres María-Luisa	Geographical education and geopolitics: future-ready
Delphine Takem Ebangha Agbor	Applied geography
Dlamini Simangele	Urban geography
Donert Karl	EUROGEO Session
Eberth Andreas	Geographical education and geopolitics: future-ready
Fakhari Saeedeh	Applied geography
Fargher Mary	Future-ready geography education
Georgiou Anastasia	New technologies in education
Gil Agnieszka	Social geography
González Rafael de Miguel	EUROGEO Session
Izakovičová Zita	Society and environment
Janicki Wojciech	Social geography
Johnson Ann	Challenges in geography education
Kapusi János	Geographical education and geopolitics: future-ready
Kevický Dominik	Social geography
Klonari Aikaterini	New technologies in education
Koktava Nikola	Urban geography
Kostetska Iryna	Geographical education and geopolitics: future-ready
Kroh Paweł	Physical geography
Kweyu Raphael	Applied geography
Lavinia Pîndaru	Society and environment
Lee Jongwon	Problems and issues in geography education (1)
Leininger Caroline et Cédric	New technologies in education
Lindner-Fally Michaela	EUROGEO Session
Martínez Hernández Carlos	Problems and issues in geography education (1)
Miu Viorica Iuliana	Physical geography
Montebelli Stefania	Challenges in geography education
Morawski Michael	Future-ready geography education
Mzuza Maureen Kapute	Applied geography
Nunez José Jesús Reyes	EUROGEO Session
O'Reilly Gerry	Geographical education and geopolitics: future-ready
Pereira Eugenia	Society and environment
Pike Susan	Challenges in geography education
Piróg Danuta	Problems and issues in geography education (2)
Piskorski Radosław	Problems and issues in geography education (1)
Rizou Ourania	Problems and issues in geography education (1)

Rodríguez-Domenech Maria Angeles	Urban geography
Ruepert Gert	Gaming & Geography Education
Schmeinck Daniela	New technologies in education
Scholten Nina	Future-ready geography education
Simon Marine	Problems and issues in geography education (1)
Soultanova Mariana	Problems and issues in geography education (2)
Špulerová Jana	Physical geography
Strobl Josef	Future-ready geography education
Świętek Agnieszka	Future-ready geography education
Tsvetkov Kaloyan	Urban geography
Vasiljuk Dina	Challenges in geography education
Vyslúžilová Ivana	Society and environment
White George	Social geography
Wilson Sophie	EUROGEO Session
Yaar-Waisel Tal	Social geography
Zawiejska Joanna	Physical geography
Zisi Christina	Challenges in geography education
Zwartjes Luc	EUROGEO Session

Paper abstracts

Session: Future-ready geography education

Discussion of a framework on instructional quality in geography education

Nina Scholten, Natalie Bienert, Rainer Mehren

The relationship between instructional quality and student learning in geography is of utmost importance for various reasons, such as improving or increasing student achievement or orientation for teacher education. Geography education research is just starting to explore the intricate relationship between these two complex phenomena. One seminal model of instructional quality that is productively used in German-speaking countries and has multiple strength is the three basic dimension model (TBD). This generic framework offers three dimensions that impact student achievement and motivation. Based on the TBD model, numerous subject-specific models have been produced in other subjects (Praetorius et al., 2018).

Based on the three basic dimension model and debates in geography education research, a current specific geography framework for instructional quality is introduced (Mehren and Mehren, 2022). The framework proposes key ideas (structure, challenge, support), six dimensions of which three are subject-specific (content-related structure, content-related quality, adaptive content-related support), and features that best support students' learning in the geography classroom. It is accompanied by an observation tool.

The framework was originally designed for teacher training or continuous professional development purposes. Using the framework, instruction can be observed for self-assessment or peer assessment. Apart from the framework's prime function, it also offers potential for use in preservice teacher education. For example it can be used in combination with videos of geography instruction to bridge the gap between theory and school practice. In geography education research, the framework can act as a stimulus for theoretical debates or empirical studies.

However, Mehren and Mehren's (2022) idea of instructional quality can also be critically discussed. Since instruction is such a complex phenomenon that can be perceived from different perspectives, it deserves to be controversially discussed (Scholten et al. under review). As in other subjects, competing models can be put forward. Especially in an international context, other factors might be decisive. Consequently, we are interested to debate about the model with the audience.

References:

Mehren, M., & Mehren, R. (2022). Fachbezogene Tiefenstrukturen - Woran erkenne ich die Qualität des Geographieunterrichts. Praxis Geographie, 52(7/8), 4-11.

Praetorius, A.-K., Klieme, E., Herbert, B., & Pinger, P. (2018). Generic dimensions of teaching quality: the German framework of Three Basic Dimensions. ZDM, 50, 407-426.

Scholten, N., Bienert, N., Mehren, M., & Mehren, R. (under review). Unterrichtsqualität im Fach Geographie - Herleitung und kritische Diskussion eines Modells. ZGD.

Educating teachers to use GIS in teaching about climate change: a comparison between practice in the UK and Spain

Mary Fargher, Rafael de Miguel González

It is now more widely accepted that climate change education is crucial to re-focusing teaching and learning in the light of the current global climate emergency (Reid, Dillon, Ardoin & Ferreira 2021). The UN Agenda 2030 Sustainable Development Goal (SDG) 13 implies the need for urgent action to combat climate change including a target to improve climate change education (Sustainable Development Solutions Network (SDSN) 2015; UNFCCC 2015). Despite this exigency, climate change education is not always prioritised in schools in ways that may achieve these targets. It can be argued that school geography is a vital medium through which high quality climate change education could be channelled. This paper presents the findings of a UCL Global Engagement Fund Project – Connecting on Climate Change Education which compared experiences of Masters students at UCL, London and Zaragoza, Spain in using GIS to teach about climate change. In this paper we critically explore the role of GIS in teaching about climate change and the opportunities and challenges experienced by teachers in pursuing this aim. We begin by setting this research in the context of where the contemporary status of GIS in geography education stands within the UK and Spain. We then present analyses of data collected through workshops, focus groups and interviews which identify the opportunities and challenges of using GIS to teach about climate change as experienced by participants.

Based on these findings and other work in the established literature on using GIS to teach about sustainability through hierarchical geospatial enquiry (Hwang, 2013), we argue that this approach has the potential to strengthen the connections that digitally-conscious geography teachers can make between using GIS and developing their students' epistemic access (Fargher and Healy, 2020). The paper concluded with recommendations for future teacher education on the use of GIS in climate change education in school geography.

Gaming & Geography (Education): Overview of the research project's empirical methods and introduction of a model of reflexive analysis of digital space in video games

Michael Morawski, Sebastian Wolff-Seidel

Video games are deeply rooted in youth culture, a youth culture that the subject of geography must address in order to meet the challenges of the future. A large proportion of students surveyed, for example in the Bitkom studies, believe that they learn skills with video games and that they can no longer imagine a life without video games. According to studies, more than 90% of all young people (in Germany) between the ages of 10 and 18 play games for up to two hours a day, depending on the cohort. Especially during the pandemic, these numbers have risen again.

Since philosophical cultural turns such as the spatial turn etc., geography has been dealing more intensively with the subjective perception and construction of space. Video games, and especially the vast digital spaces therein, are developed by teams of programmers, developers, and designers who make creative spatial construction decisions based on different worldviews, experiences, values, and skills. This results in a specific intended spatial experience for players to traverse. However, these players also approach the games with certain worldviews, prior experiences, values, etc., and the question arises to what extent spatial experiences can be intentionally passed through and what consequences the perception has for the (young) players we address with geography instruction. Thus, there is undoubtedly an (emotional) communication between both sides about digital space in video games. Furthermore, the question arises what role the creation of digital

spaces in the games plays for the experience, understanding and reception of real analog spaces as well as for the further competences of students like in the field of sustainability or decision reflections. This idea can also be applied in many ways to areas such as critical geography, e.g., how certain cultural settings, populations or cityscapes are conveyed through video games and how these representations shape the worldview of players and students. Thus, it cannot be dismissed that an engagement with video games should play a role in the context of addressing the reflection of spatial perceptions and constructions in geography education. Yet, they are still largely underrepresented in studies of geography education. In the talk, results from the research project "Gaming & Geography" will be presented, which attempts to create further legitimizing foundations for the integration of video games as a medium in the didactic discourse of geography via various empirical methods and transfer services. Based on the research in the project, a model for the reflexive analysis of digital space in video games will also be presented, which should facilitate a didactic integration of video games in geographic education.

From virtual field trips to blended experiences

Josef Strobl

Virtual Field Trips (VFT) are a well established format having received less attention recently, until the emergence of the Covid crisis. Initially, VFT were aiming at a desktop experience of remote sites, later enhanced with VR and other immersive interfaces. Smartphones with pervasive connectivity more recently made it into tourism-related contexts, but were little used in academic educational settings.
The author proposes and demonstrates an integrated approach where a VFT is used pre- and post-excursion, and also supporting a live field experience including logging and sharing of experiences. This does not aim at entirely replacing the real world exposure with 'canned' digital media, but rather at enhancing and complementing the learning process by more tightly connecting the real world with a variety of virtual representations.
Current smartphone functionality facilitates a qualitative quantum leap beyond earlier passive consumption of VFT media. Due to location and motion sensors, camera, microphone and pervasive connectivity a flexible and above all highly interactive participation process can be designed. Students are encouraged to actively observe and share, to follow individual learning paths, always connected to the spatial context and environment of any given location - at their current physical location and/or through tele-presence.
One example for active and in some cases problem-based learning facilitated by the integration of (geo)media technologies is the participation in Citizen Science initiatives. Connecting these seamlessly into a well designed VFT substantially enriches learning, avoiding the pitfalls of simply 'digitizing' long established practices and replacing these with learning models fully leveraging the capabilities of online technologies.
This kind of blended VFT is less intended as an alternative to traditional excursions, but rather aims at enrichment of learning outcomes, and in particular at a more individualized experience. Participants act at their own pace, are not constrained by a live group schedule, can take care of accessibility needs and follow individual interests or account for different prior knowledge. Overall, allowing for asychronous learning emerges as the main benefit of blended VFT without necessarily giving up the undisputed advantages of personal field experience.

The “geography of silence” in geography education and its potential consequences

Agnieszka Świętek

The concept of "the geography of silence" developed by American geographers in the mid-twentieth century assumes the deliberate omission or marginalization of certain areas of geographical knowledge on maps and other forms of geographic information presentation, in particular those published by state or state authorities. This concept is now being extended by the observation of "terrae incognitae" in various aspects of geographic research, including: research topics, research areas, methods of data presentation, or the low applicability of some geographic research (Crampton 2001; Livingstone 2010). Geographic education is an important research area within the concept of the "geography of silence", which is only just gaining its rightful place in geographical research. The great potential of using the concept of "geography of silence" to study the lack or incorrect representation of cultural content on maps and materials used at various educational stages has been noted by Yang 2013; Bagoly-Simó 2013; Zee, and Ryu 2013. The reliable knowledge and skills related to cultural and religious diversity which students acquire during geography lessons are the basis for building an attitude of openness towards the cultural diversity of our increasingly globalized (or diverse) society. In my speech, I will present the results of my research on the "geography of silence" concept, specifically as it relates to the presentation of Islamic and Roma culture in geographical education in Poland. Analysis of the core curriculum for geography and the ways of presenting minorities in geography textbooks showed that they are present in geography education, but to a very limited extent. Cultural themes are marginalized, and Roma and Islamic cultures are often simplified and stereotyped. The results of the author's nationwide research on the openness of young people, conducted on a group of 1,300 18-year-olds in 2021, indicate that this gap in the education of Polish young people preserves, and maybe even causes, young people's low openness other peoples and cultures. This is evidenced by the fact that the young people surveyed by the author on their relation to Roma and Muslims exhibited the highest level of social distance as measured by the Bogardus scale.

Session: Society and environment

Conflicts in the utilisation of Slovakia's agricultural land

Zita Izakovičová, Jana Špulerová

The existence of the human population is crucially land-dependent. The land is a source of food and raw materials, without which man could not exist. At the same time, it is the space for all productive and non-productive activities, without which the development of human society could not take place. This multifunctionality of the land is associated with various pressures on the use of its parcels. The clash of interests and conflicts between different land users are linked to various socio-economic as well as environmental problems: changes in landscape, the increasing anthropisation of the territory and the disturbance of the territorial system of ecological stability, the threat of the environmental quality and overexploitation of natural resources. The aim of this paper is to present a methodology for assessing conflicts arising from the clash of interests and current problems of Slovak agricultural landscape related to land use. The main drivers of changes in land use will also be evaluated and presented.

Structure of vegetation of recovering patches of caatinga vegetation in Assunção Island, Cabrobó (Pe, Brazil)

Eugênia C. Pereira, Andrezza Karla de Oliveira Silva, Kétcia Ferreira de Santana, Alexandre da Silva Xavier, Maria de Lourdes Lacerda Buril, Lucas Costa de Souza Cavalcanti

Assunção island, due to its multivariate uses, form landscape patches with native or exogenous vegetation, agriculture, etc. This configuration leads the Caatinga biome to restrict itself to small enclaves. Three different patches were evaluated according to the attributes of their wood plants. A Survey of species, biometrics, biomass evaluation, classification of structure, phytosociology, and statistical analyses were carried out. There were registered 1.738 individuals with different exigence and strategies for occupation, which induces a specific taxon's dominance. Human action strongly influences species diversity, with emphasis on preserved vegetation. The patches are formed by exotic and native species, mainly pioneer individuals, in process of primary and secondary succession, surrounded by agricultural areas. Natural or anthropic land degradation causes alterations that modify the geographical structure and interactions with landscape elements. In this context, nature tries to self-regulating and recover the disturbed balance, through its regeneration as well as the other correlated factors. Thus, knowledge of the regeneration capacity of native vegetation is mandatory for sustainable management.

Sustainable development supported by high-growth technology in European smart cities

Ivana Vyslúžilová

This paper provides an overview of how high-growth technology trends transform the urban environment to achieve higher sustainability. The paper first outlines urban areas that include a high demand for innovative technology and dynamic adaptive planning policy. The use of low-impact materials with technological innovations represent an alternative support for sustainable residential design.

Over the past few years, we have detected a geographical divide in Europe in the use of technology to develop a conceptual sustainable approach. European smart cities respond to the challenge of urban sustainability, specifically to develop the digital infrastructure of tomorrow. Emerging trends in science and technology with increasing volume of big data and open data, generate the need to do a deeper analysis of solution options to turn masses of raw data into metadata for further analytical purposes. It then describes the application of sustainability tools that impact urban infrastructure development that should be in line with the notion of sustainable design.

On the one hand, there is a broad spectrum of progressive sustainable inventions identified by scientists, government ministries and the activist movements to benefit, among others, of lower energy consumption, but on the other hand, there is a need to adapt wider society to fast changes in several technological areas to ensure data. To conclude, European smart cities are multiplying benefits for citizens of developing data-driven programs and supporting sustainable urban principles.

The analysis of the evolution of environmental action programs using the institutional grammar tool

Lavinia Pîndaru, Laurentiu Rozylowicz, Steluta Manolache, Andreea Niţă, Gabriel Vânău, Viorica Iuliana Miu, Cristiana Pioarcă-Ciocănea, Iulian Niculae

Environmental policies in the European Union (EU) began to stand out with the formation of this political union. Over time, these environmental policies have constantly evolved, with numerous community normative documents being implemented. Among the most important documents developed and adopted are the Environmental Action Programmes (EAPs). Thus, since 1972 (the year in which the first EAP was adopted) and until now, a total of 8 EAPs have been adopted. In order to be able to determine the evolution of these programs from the point of view of the priority objectives and the areas addressed, the Institutional Grammar Tool was used. Using this tool, it was possible to establish what are the main types of statements present (strategies, norms, rules) in the last two EAPs (7th EAP and 8th EAP), the main types of actions (permitted, mandatory and prohibited) that the actors will follow for the fulfillment of priority objectives, as well as domains of interest. Following the analyzes carried out on the two documents, it was identified that the directions are much clearer in the case of the 8th EAP, compared to the 7th EAP, which is much more complex from a linguistic point of view. In conclusion, using IGT, we will be able to present the evolution over time of the last two EAPs both in terms of priorities and domains.

Session: Social geography

Geography as myth-breaker of the future

Wojciech Janicki

Over the course of history, geography has changed significantly. From the traditionalist description of the Earth, it has gone a long way to explaining the spatial variability of phenomena, and then to studying the interdependence between various elements of the environment and humans and their activities. The next stage in the evolution of geography and its social role in the foreseeable future should be to break stereotypes and myths. The number of false beliefs recognized without evidence and the number of stereotypes reproduced in society, including by the educational system, is large enough to let their demythologization itself raise the profile of geography as a discipline in the general public perception.

Is Israel a part of Europe? Why does Israel consider itself part of Europe?

Tal Yaar-Waisel

Everyone knows that Israel is located in the Middle East, so why does Israel take part in many European organizations? Why do many Israelis see themselves as part of Europe? As can be assumed, the answer is complex, and surely includes various political, historical, cultural, and economic aspects. It is obvious, that this is not a question of geographic location, although Israel shares the Mediterranean Sea with European countries, other countries bordering this sea do not see themselves as part of Europe. It is rather a question of the sense of belonging affected by a variety of factors. From a physical-geographical point of view, the borders with Middle Eastern countries were hermetically closed. The only way out of the country was toward Europe. There has been a change in this since the signing of the peace agreements with Egypt in 1979 and with the Kingdom of Jordan in 1994, but even after the borders were opened it is infrequent to see active movements of people to the neighboring countries and certainly vice-versa. Israel has significant ties in the fields of economy, politics, science, and culture with European countries. But it has only a few existing relations with the countries of the region, though there has been a change process in recent years (2020), even the movement of planes to the east, forced the Israelis to fly through Europe, so as not to fly over Arab countries until 2022. It can be assumed, is not Israel's choice to be part of Europe, but it is a situation imposed on it. Sometimes it is due of been not accepted in various forums in the Middle East or Asia as sports competitions, or economic export-import relations. Sometimes, Israelis show flexibility in thinking and creativity to "enjoy both worlds". It can be said Israel today is more "Levantine" than "European", and the European perception in the past was unrealistic. Israel can easily serve as the "bridge" between the continents- Europe, Africa, and Asia, as a Mediterranean country, with strong European connections and local Middle Eastern characters. A "gateway" of Ideas, economy, technology, energy, environment, science, agriculture, culture, and much more, as it used to be in ancient times.

References:

https://www.cia.gov/the-world-factbook/countries/israel/
https://worldwidetravel.tips/israel/israel-is-in-which-continent/
Shindler, C. Israel - The Zionist experiment, in Furtado, P. (Ed.) Histories of nations - How their identities were forged, Thames & Hudson, 2012: 294 – 303.

Russia's war on Ukraine and European efforts to re-spatialize natural gas

George White, Bruce Millett, Kimberly Johnson Maier

Russia's recent phase of its war on Ukraine, which began in February 2022, has changed economic relationships with Russia as countries have either placed economic sanctions on Russia or have not gone along with sanctions. One of the economic sectors most affected is the energy sector as Russia is one of the largest energy producers and exporters. Within the energy sector, Russia is also one of the world's largest producers and exporters of natural gas, which in turn provides Russia with significant national income and hence provides Russia with considerable financial means to prosecute its war in Ukraine.

As major purchasers of Russian natural gas, European countries have worked to cut off a major revenue source for Russia but have had to find alternative sources for the natural gas that they have been purchasing from Russia without damaging their own economies. These efforts can be characterized as a "Re-spatialization" of natural gas. In 2022, Europe was largely successful, but challenges remain ahead. This paper examines the efforts of European countries to re-spatialize natural gas supplies in order to highlight and clarify the successes, identify the consequences, and outline the new spatial order of natural gas.

Synergies of solidarity: strategies for expanding migrant urban citizenship in U.S cities during the COVID-19 pandemic

Elizabeth Chacko, Marie Price

In this paper we use the lens of citizenship evolution as proposed by T.H. Marshall to analyze amplified practices of migrant belonging, social inclusion, and refuge in U.S. cities during the COVID-19 pandemic. Our study uses data gathered from interviews conducted in 2021 with local government officials as well as leaders of local immigrant-serving NGOs in 16 U.S. cities.

We analyze how local governments as well as civil society organizations increasingly viewed and treated migrants within their jurisdictions as urban citizens deserving of economic support and social rights, regardless of their legal status. The urgency of the pandemic drove local officials to devise new policies and construct innovative partnerships to reach vulnerable residents including undocumented migrants, asylum seekers, non-English speakers, and the uninsured.

The study emphasizes the importance of strengthening institutional coalitions, especially with migrant organizations in cities. We argue that such inclusionary strategies, driven by a public health emergency, allowed for the amplification of migrants' social rights and shifted attitudes toward migrant belonging and migrant citizenship in U.S. cities.

References:

Stahl, Kenneth. 2020. Local Citizenship in a Global Age. New York, NY: Cambridge University Press.
Yiftachel, Oren and Nir Cohen. 2021. Defensive Urban Citizenship: A View from Southeastern Tel Aviv. Chapter 7 in Theorising Urban Development From the Global South. Publisher: Palgrave MacMillan.

The perception of the border between Eastern and Western Europe and its changes over time in the opinion of respondents from seven European cities

Tomasz Padło, Agnieszka Gil, Paweł Struś

The presentation shows the diversity of perceptions about the course of the border between Eastern and Western Europe from the perspective of 7 European cities, based on research involving over 1,500 respondents, conducted in 2005–2007 and 2016–2018. Maps showing the general perception of the course were generated for each city. It has been proven that despite the processes of European integration, the perception of the border between the East and the West refers to the „Iron Curtain" and has not changed significantly in recent years.

We will protect our countryside without a green deal': the populist radical right and the environment in Czechia and Slovakia

Dominik Kevický

The electoral success of the populist radical Right (PRR) is currently increasing across Europe. These political parties are also increasingly commenting on environmental issues. On the one hand, the PRR parties highlight the beauty of nature and strive to preserve the landscape's traditional natural and rural character. On the other hand, they deny global climate changes and criticise solutions to reverse these, such as the Green Deal. The study's objective is to explain this dichotomy in the attitude towards environmentalism using the concepts of nationalism, globalism and populism.

The empirical analysis is based on an analysis of official political texts and statements by selected PRR parties in Czechia and Slovakia. The results show that PRR parties in both countries use nature's aesthetic, symbolic and material aspects to create an image of a traditional, rural country that the nation can be proud of and which is crucial to protect. In contrast, the PRR sees global environmental change and the efforts to mitigate it as 'external enemies' attempting to change the traditional landscape. Therefore, PRR parties use these themes to attack globalisation and transnational organisations' economic and cultural aspects. Finally, the PRR uses the environmental issue for populist strategic considerations, demonstrating authenticity and creating part of a chain of equivalence.

References:

Buzogány A & Mohamad-Klotzbach C (2021) Environmental populism. In Oswald M (ed.) The Palgrave handbook of populism, 321-340. Palgrave Macmillan, Cham.

Forchtner B & Kølvraa C (2015) The nature of nationalism: Populist radical right parties on countryside and climate. Nature and Culture 10(2): 199–224.

Lockwood M (2018) Right-wing populism and the climate change agenda: exploring the linkages, Environmental Politics 27(4): 712-732. https://doi.org/10.1080/09644016.2018.1458411

Session: Problems and issues in geography education (1)

Creating inquiry-based learning resources in response to the digitization of geography curriculum

Jongwon Lee

In 2022, the Korean Geography curriculum underwent a major revision alongside the national curriculum, which placed emphasis on the cultivation of digital literacy. As a result, the optional high school subject 'Korean Geography - An Inquiry Approach' was restructured with a renewed focus on digitization. The new curriculum aims to equip students with digital literacy skills by using digital tools and improving their digital capabilities through subject learning.

To support this, standard-based inquiry activities were developed to engage students in a range of tasks involving digital spatial information manipulation, analysis, coding, and visualization using artificial intelligence such as ChatGPT. These inquiry activities were designed in line with the geography curriculum achievement standards. Students use data from geospatial web services, public data, big data, and fieldwork using GIS to perform geographical inquiry activities. The curriculum aims to develop students' skills to navigate and analyze the vast amounts of data available today and extract valuable insights from it. To facilitate the inquiry activities, a website provides step-by-step guidance and necessary data for both teachers and students. The website includes information on how to navigate digital tools, perform spatial data analysis, and extract insights using artificial intelligence tools.

Extracurricular learning "next level": Using mobile digital game-based learning to teach complex multi-perspective content in heterogeneous learning groups

Phillip Bengel

The central challenges for now and the future, such as the transformation of our environment and digitization, share a common characteristic: they are almost always characterized by a high degree of complexity. This makes it mostly impossible to deal with them with solution approaches based on single disjointed perspectives. In order to enable the younger generations to view these problems from as many relevant perspectives as possible, to understand them, and ultimately to deal with them constructively, innovative educational measures must be created (UNESCO, 2020). Moreover, the success of these measures must be shared equally among all learners, without being limited by their individual biographical or attitudinal characteristics. So, the question arises how appropriate educational approaches would have to be designed, what are the conditions for success associated with them, starting from the conception, but above all from the learners themselves? From 2019 to 2022, a multi-perspective game-based learning concept for mobile digital education was developed at the Department of Geography at Philipps University Marburg, Germany (Prensky, 2003). The "SENSO-Trail" (Science Education and Natural System Observation), was implemented in the university's own research and teaching forest and finally examined with a quantitative study in a pre-post and follow-up design. In comparison with a control group, the acquisition of subject-specific knowledge of n = 94 students, as well as the influence of potential person-related parameters were analyzed longitudinally (Bengel and Peter 2023).

The results provide a basis for designing contemporary approaches for extracurricular settings, not only in a geographical context, and thus form the starting point for further research in this, relatively young field of education with mobile technologies.

Bengel, Phillip T.; Peter, Carina (2023): Technology in Nature—mDGBL as a Successful Approach to Promote Complex Contents? In: Sustainability 15 (1), S. 633. DOI: 10.3390/su15010633.
Prensky, Marc (2003): Digital game-based learning. 1 Band. New York: McGraw-Hill (1).
UNESCO (2020): Education for Sustainable Development. A Roadmap. Unter Mitarbeit von Aurélia Mazoyer und Olivier Marie. Paris, France: United Nations Educational, Scientific and Cultural Organization. Online verfügbar unter https://unesdoc.unesco.org/ark:/48223/pf0000374802/PDF/374802eng.pdf.multi, zuletzt geprüft am 13.11.2020.

Online teacher trainees' workshops on webGIS storymaps to learn Geography and local and foreign urban heritage

Carlos Martínez-Hernández, Radosław Piskorski, Arie Stoffelen

In a context of online and blended-learning education, generalized after the COVID-19 pandemic, the teaching of Geography has found great support in Geographic Information Technologies (GIT) (Yan et al., 2022). They were already either one of the research tools most used by geographers or one of the research objects most sought. Therefore, since a few years, educative curricula have been frequently updated by the inclusion of GIT (Henry & Semple, 2012). However, future teachers, non-geographers overall, are not used to manage them (Collins & Mitchell, 2019), while there is an urgent need to solve this gap.

In this paper we aim to present online teacher trainees' workshops on webGIS storymaps to learn Geography and local and foreign urban heritage. The workshops are designed for Madrid and Krakow, as both host a UNESCO World Heritage Site. Students must create digital didactic routes to teach urban heritage from the local city and the foreign one. The stops must be related to different types of heritage (natural, religious, historical, cultural) and their interest must be justified. This task implies the development of digital competences, geographical reasoning and critical-thinking on familiar and unfamiliar urban heritage. The designed is explained and the willing knowledge is founded from the point of view of Didactics of Geography. In the Anthropocene era, GIT are getting importance, so accurate teaching projects like these workshops are more and more needed, above all among primary and secondary teachers, who are in charge of future digital and global citizens. In conclusion, this paper could become a good-practice model for teacher trainees who present a lack of geographical and digital knowledge but will have to teach about it.

Geography undergraduate students' perceptions on online courses during COVID-19: sustainability and effectiveness

Ourania Rizou, Aikaterini Klonari, Nikolaos Apostolellis

One of the numerous reverberations of the coronavirus (COVID-19) pandemic was the hasty blooming of distant learning on a global scale. This rushed development sprung a multitude of problematic issues, such as existing IT infrastructure capacity (connectivity, bandwidth, etc.), tutoring software availability & suitability (cost, language, features, etc.), educational material availability (digital repositories), teachers' level of preparedness, awareness and skill in this new and fundamentally different instructional method. On top of these, perhaps even more alarming was students' reaction. Thus, arose the need for viable and sustainable

teaching online methods. The principles of User Experience (UX) evaluation methodology have been proposed as a complementary tool for designing better online courses.

The goal of this study was to record and assess the students' reaction to the new educational status quo, in order to design better e-courses and pave the way towards the 4th of the 17 Sustainable Development Goals (SDG), namely "Quality Education" [source]. Our method was based on measuring their satisfaction and acceptance over a series of online courses as well as these courses' academic effectiveness (on them), across the three axis laid out above. The sample of the research were 60 undergraduate students of the Geography Department, University of the Aegean, Greece, who participated in online learning courses in Geography, during their Spring-Fall 2020 semester and their Spring 2021 semester. Data collection was carried out through a questionnaire, created and distributed via Google Forms.

Data analysis was performed quantitatively, using appropriate statistical tests, on their reported views on (a) the preparation stage, (b) the pre-class activities, (c) the in-class activities and (d) the post-class activities. Results ranged from anticipated to enlightening. They confirm that (i) on the matter of proper preparation for online courses students stated that they could use better guidance on the new teaching method, whereas the instructions they were given on the online applications (web platforms mainly) were more than adequate, (ii) a significant percentage of them encountered technical issues during their e-courses, (iii) on the matter of pre-, in- and post-class activities, the fact that the educators spent a great deal of time trying to assist them – individually and per group– was encouraging.

Students' comparison competencies in geography: results from an assessment and an intervention study

Marine Simon, Alexandra Budke

Comparison is an important geographic method and a common task in geography education. Mastering comparison is a complex competency and written comparisons are challenging tasks both for students and assessors. As yet, however, there is no set test for evaluating comparison competency nor tool for enhancing it. Moreover, little is known about students' and prospective teachers' comparison performances. Therefore, in this paper presentation, we present an assessment tool aiming to evaluate comparison competency and assess comparison text structures. The tool was tested, first, on a sample of 17 future geography teachers from a German university in an assessment study and secondly on 83 secondary French and German students in an intervention study. Results showed that students possessed low levels of comparison competency, although they performed better in content-related aspects. In the assessment study, university students utilized only a few of the available comparative text structures. In the intervention study, we tested the teaching of the comparison method as a tool to enhance comparative competencies. Students from the experimental group improved their competency significantly. The improvement in their post-test scores was positively correlated with the use of the comparison method during the intervention. This shows that teachers should include explicit instructions on the comparison method to help students develop their scientific literacy and should also include scaffolding tools to help master comparison text structures.

References:

Simon, M., & Budke, A. (2023). Students' comparison competencies in geography: Results from an explorative assessment study. Journal of Geography in Higher Education, 0(0), 1–21. https://doi.org/10.1080/03098265.2023.2174960

Simon, M. & Budke, A. (submitted). An intervention study: teaching the comparison method to enhance secondary students' comparison competency. International Research in Geographical and Environmental Education.

Session: Physical geography

A first look at the poorly understood blackwater streams of the Tatra Mountain foreland, southern Poland

Joanna Zawiejska, Joseph E. Flotemersch, Dorota Chmielowska-Michalak

Blackwater rivers and streams are a unique aquatic resource that occur in specific environments of the Polish landscape and elsewhere in the world. Blackwater streams have a characteristic, dark colour (from amber to deep brown) resulting from the presence of tannins from decaying organic matter and often display low pH levels. From a scientific standpoint, these systems are generally poorly understood. As a result, resource managers often compare observed conditions of blackwater system to conditions observed in non-blackwaters systems which can result in highly erroneous stream management decisions. Further, little is known about how natural factors and anthropogenic activities impact existing conditions in blackwater streams. In the Tatra Mountains foreland, blackwater streams drain extensive fen areas located in the Orawa-Nowy Targ Basin. Unfavourable climatic conditions and relatively poor soils had limited agricultural use and development in the basin, however, past attempts to drain the peat wetlands and enhance agriculture are still clearly visible in the landscape of today, including alterations of stream channel form.

Present human activities include logging, small scale farming, and more importantly, inputs into the stream system from local sewage and farming operations. However, the area remains largely undeveloped and overall anthropogenic impacts are limited. In contrast, over the last decade, many of the streams in this relatively secluded area have been colonized by beaver (Castor fiber) resulting in a profound hydrological and geomorphic change and rapid restoration of some of the altered streams. The unique combination of physical conditions that limited human interest in the area and allowed relatively natural functioning of the stream system provides a good opportunity to study the characteristics of the blackwater streams and shed light on their ecological value and status. That could possibly warrant protection or, at a minimum, provide scientific data for adequate and informed management of these streams that considers social demands and perceptions. This paper focuses on the results of the preliminary research carried out on the blackwater streams of the Tatra Mountains foreland.

Assessing invasive alien plant species in Romania: distribution and pathways of introduction

Iulia Miu V., Athanasios Gavrilidis, Simona Grădinaru, Laurentiu Rozylowicz Laurentiu

Biological invasions are one of the main drivers of modern human-induced species losses. Research on the distribution of alien species and their introduction pathways is essential for understanding and tackling the invasion process (Seebens et al. 2021). With this study, we aim to contribute to filling this gap and to provide a visualization of national patterns of species invasions, origin and pathways. Patterns of recorded species distribution and pathways of introduction were mapped and visualized using data from an exhaustive database following a major review of the published literature.

The present study provides a systematic analysis of invasive and potentially invasive plant species in Romania (Anastasiu and Negrean 2009, Sirbu and Oprea 2011). The number of occurrences has increased steadily after 1950s, with new species being continuously introduced. Species originate mainly in North and

Central America have been introduced almost equally through intentional and unintentional pathways. Mapping of the species occurrences has revealed several hotspots of recorded alien plant species which concentrate on urban areas. This research is accompanied by a comprehensive open-access spatial database with the collected data. We consider this study a necessary and reliable tool for drafting management and action plans, as well as a good starting point for various analyses as it is further developed and regularly updated.

Changing of the landslide relief in context of reconstruction of the holocene environment, Mt, Śnieżnica, Poland

Łukasz Pawlik, Daniel Okupny, Paweł Kroh, Piotr Cybul, Renata Stachowicz-Rybka, Agata Sady-Bugajska

The constantly evolving environmental conditions have played a key role in landscape changes at all spatiotemporal scales. In geomorphology as well as in ecology, disturbance events have played a special role, frequently acting as turning points in landscape and ecosystem evolution. The landslide on Mt. Śnieżnica (Beskid Wyspowy Mts, south Poland) is a very interesting example of a complex landslide with signs of reshaping its relief a few times. Based on geomorphological mapping and data from organic deposits (tree trunks and landslide fens dated by radiocarbon and geochemical methods) we have done an interpretation of landslide relief development. The Mt. Śnieżnica landslide probably formed ca. 14,000 cal BP in the first phase of the Allerød Interstadial. For almost 9000 years, there were no appropriate terrain conditions for the long-term accumulation of organo-mineral materials. At ca. 4400 cal BP, peat accumulation commenced, which proves to reshape relief in the top part of the landslide and building of ramparts. After another ca. 2000 years, the fen core sediments were dominated by limnetic mud, which could be a sign of both: change of ramparts height or paleoclimate humidity. Root dating in the valley's bottom has allowed us to evaluate of formation of a stream network in this part of the catchment between 660-260 years BP. As the last factor, human impact as stone exploitation could be seen in landslide relief.

The application of a wide spectrum of radiocarbon, geochemical and biogenous proxies allowed us to recognize three phases of landslide movements and one phase of intensified soil erosion. In addition, we found records of other morphogenetic changes, such as recent stream network formation on Mt. Śnieżnica landslide body or line erosion and debris flows on the main scarp.

The contribution of science to the sustainable development of Biosphere Reserves in Slovakia

Jana Špulerová, Veronika Piscová, Noemi Matušicová

Biosphere reserves (BR) are designated sites for testing interdisciplinary approaches to understanding and managing changes and interactions between social and ecological systems, including conflict prevention and management of biodiversity. The strategic objectives of the MAB Strategy for 2015-2025 are oriented to (1) conserving biodiversity, restoring and enhancing ecosystem services, and fostering the sustainable use of natural resources; (2) contributing to sustainable development; (3) facilitating biodiversity and sustainability science, education; and (4) supporting mitigation and adaptation to climate change and other aspects of global environmental change. Our study aimed at summarising the current state of knowledge and scintific result of BRs in Slovakia and assessment of contribution of science to the development of Biosphere reserve in Slvoakia. We based our methodological approach on literature review published in the scientific database Web of Science through keyword searches.

Our review of 30 years of research in the Slovak BR helped us to highlight outputs, outcomes, impacts and contribution to their management and sustainable development, and to draw conclusions regarding future challenges and developments for the research strategy of Slovak BR. Slovakia needs to strengthen the possibilities of research, practical education and training that support BR management and sustainable development in BR.Biosphere reserves (BR) are designated sites for testing interdisciplinary approaches to understanding and managing changes and interactions between social and ecological systems, including conflict prevention and management of biodiversity. The strategic objectives of the MAB Strategy for 2015-2025 are oriented to (1) conserving biodiversity, restoring and enhancing ecosystem services, and fostering the sustainable use of natural resources; (2) contributing to sustainable development; (3) facilitating biodiversity and sustainability science, education; and (4) supporting mitigation and adaptation to climate change and other aspects of global environmental change.

Our study aimed at summarising the current state of knowledge and scintific result of BRs in Slovakia and assessment of contribution of science to the development of Biosphere reserve in Slvoakia. We based our methodological approach on literature review published in the scientific database Web of Science through keyword searches. Our review of 30 years of research in the Slovak BR helped us to highlight outputs, outcomes, impacts and contribution to their management and sustainable development, and to draw conclusions regarding future challenges and developments for the research strategy of Slovak BR. Slovakia needs to strengthen the possibilities of research, practical education and training that support BR management and sustainable development in BR.

Springer session

Handbook for geography education: a preliminary look at the past, present, and future

Sarah Witham Bednarz

An international group of geography educators is preparing a Handbook of Geography Education to be published by Springer as part of a larger series of academic handbooks they are developing.

The book will be a broad overview of research and best practices in geography education at primary and secondary levels. The goal is to summarize the current state of knowledge in this sub-discipline of geography and to produce a useful tool for both novice and experienced geography educators and others. The book is framed around five questions: the purposes of geography education—why is it taught; perspectives on geography education—what is taught; the practices of geography education—how is it organized and taught; preparing geography educators—how best to prepare geography teachers; and what is the future for geography education, from a regional perspective. The presentation will summarize the table of contents, primary contributions from authors, and a preview of the final section of the book on future perspectives in geography, aligning with the theme of the conference.

Teaching Primary Geography. Setting the Foundation

Daniela Schmeinck, Gillian Kidman

This book provides an international perspective on teaching and learning geography in the primary classroom. It describes the essence of primary school geography and identifies the 'big ideas', thereby offering a synthesis of the international geography curricula and classroom profiles against these big ideas. Each chapter discusses current and new research on a set topic, yet a common thread running between chapters is the assessment relevant to that particular topic. By providing a portrait of the central concepts, the essential skills and necessary inquiry processes of a primary geography education, the book will be of interest to education researchers, classroom teachers and the pre-service teacher, curriculum writers and policy writers.

Sustainable Development Goals in Europe. A Geographical Approach

Maria Luisa de Lázaro Torres, Rafael de Miguel González

The aim of this book is to provide a synthesis of the newest research in Geography concerning the Sustainable Development Goals (SDG's). Although the world is strongly interconnected, most of the chapters in this volume focus on Europe or the work of European researchers. Each chapter of this book focusses on one of the 17 SDG's providing in-depth knowledge from a geographical perspective, fostering comprehensive research on these global targets to end poverty, fight inequality and injustice, and tackle climate change.

The Sustainable Development Goals are part of the 2030 Agenda for Sustainable Development. To achieve them, it will be necessary for all stakeholders, including citizens (civil society, doctors, teachers), governments, private sector to collaborate.

Place Naming, Identities and Geography. Critical Perspectives in a Globalizing and Standardizing World

Gerry O'Reilly

This book presents research on geographical naming on land and sea from a wide range of standpoints on: theory and concepts, case studies and education. Space and place naming or toponymy has a long tradition in the sciences and a renewed critical interest in geography and allied disciplines including the humanities. Place: location and cartographical aspects, etymology, and geo-histories so salient in past studies, are now being enhanced from a range of radical perspectives, especially in a globalizing, standardizing world with Googlization and the consequent 'normalization' of place names, perceptions and images worldwide including those for marketing purposes. Nonetheless, there are conflicting and contesting voices. The interdisciplinary research is enhanced with authors from regional, national and international toponymy-related institutions and organizations including the UNGEGN, IGU, ICA and so forth.

Young geographers

Tijana Ilic, Gert Ruepert

EUROGEO is committed to capacity building of young researchers, supporting geographers in their initial jobs and early steps of academic career, so publication possibilities will be elaborated on both inside and outside of the "Key Challenges in Geography" series. "Young Geographers'' aims to encourage Young Geography Researchers to share their research who are working on various geographical themes and implementing cutting edge research methodologies or geospatial technologies. The book touches on the most important issues to young geographers and emphasize different geographical questions to a better understanding of the world, geographical knowledge and skills needed in order to address global issues: physical, environmental, regional, spatial, social, educational,...and other geography- related areas.

Re-visioning geography in supporting SDG's in post Covid era

Aikaterini Klonari, Maria Luisa de Lázaro Torres

Why is a deeply-rooted discipline of geography in need of re-visioning? Given rising awareness that global challenges such as the SDGs can be solved through the application of geographic thinking and geospatial tools, and given the challenges that COVID brought to education and society, this book's focus on reconsidering the importance and role of geography is particularly appropriate. This book invites researchers, instructors, and others interested in examining new perspectives, resources, instructional strategies, and technologies to apply the insights gained from a wide variety of authors. The authors are rigorous researchers as well as innovative instructors. Their insights include timely topics such as agriculture, water, climate, literature, historical migration, and sustainability, and tools such as multimedia story maps and web based geotechnologies. Research on these topics and how the geographic perspective can aid in understanding societal and educational implications of COVID-19 firmly anchor geography as a relevant subject for our age. (Cover text written by Joseph J. Kerski, PhD GISP, Esri Inc and University of Denver, USA).

GEODEM Session

Teaching in and about Europe

Karl Donert

Geographic information plays an increasingly important role in enabling participative democracy, empowering citizens to contribute to decision making about European challenges and issues at European scale. Well trained young people with suitable geospatial skills are needed in diverse areas such as hazard management, environment and sustainability, local and regional development, land use planning, cultural heritage, retailing, tourism, security and utilities (energy, water etc.). As a result, geographers are much sought after in the European workplace.

This session seeks to define a benchmark statement about what should be taught about Europe in schools and universities.

Session: Applied geography

Determination of the best geo-trail using of genetic algorithm (case study: damavand)

Saeedeh Fakhar, Mitra Saberi

The present study aims to determine the most ideal geo-trail in the Damavand region by using Genetic Algorithms. Geo-morphosites are usually scattered, and their access routes are changing and eroding rapidly due to vehicular traction. Finding the most optimal path based on various parameters such as travel cost, duration, distance, and accessible services, as well as the number of geo- morphosites on the path, is the primary objective of the present study. In addition to direct observations and GPS navigation used to determine the location of geo-heritage sites; indirect methods such as monitored satellite images, aerial photographs, digital geological and topographic maps, road maps as well as surrounding rural areas, cultural, archeological and historical monument points, as well as the phone and flora areas of the region have been used. Once collected and inputted into the local database, the layers were stored and used in the geographic information system. The genetic algorithm method has been proven to be efficient all the while simple and easy to use in the analysis of large-scale networks. The algorithm combines five different parameters based on the user's viewpoint for the geo-morphosites on the path. In conclusion, in order to create innovation in the future of geo-tourism, the best geo-trail is recognized and displayed on the final map of the area.

Factors affecting adoption rate of biomass energy saving technologies: a case of Bolero In Rumphi, Malawi

Maureen Kapute Mzuza, Samu Geoffrey Simlemba

Majority of rural households in developing nations use traditional cooking devices with high-energy inefficiency and high biomass use. The main objective of the study is to investigate factors affecting the adoption of biomass saving technologies in Bolero Extension Planning Area in Rumphi. The study used mixed approach where both qualitative and quantitative data were used. Excel and SPSS were used to analyze the

data. Results shows that women are the ones mostly involved with the firewood saving technologies. In addition to that, the respondents still considers firewood as their primary source of energy for cooking. In terms of factors influencing adoption of firewood efficient cooking technologies, respondents reported mostly positive factors like energy saving, forest conservation and the cost of the firewood saving technologies. In conclusion, there are more benefits when using energy saving cooking technologies. There is need to conduct another study to explore the cost effectiveness of these firewood saving technologies.

Study and analysis of GSM call loss and it's propagational effect on ecological swathes landform pattern in tropical rainforest

Abidemi Aina

Landforms represent topographical features on the surface of the Earth. Landform Mapping is a concept of the land surface, whose definition and subdivision from Digital Elevation Models (DEMs) have been observed in different regions, due to its effects on the propagation of electromagnetic waves which is important in successful call termination by telecoms. A line of sight propagation is a characteristic of electromagnetic radiation which allows waves travel in a direct path from source to receiver. This implies that electromagnetic waves make cellular calls possible, provided there is no impediments that negates electromagnetic wave propagation to reach its destination (cellphones) with minimum or no signal loss..

In this research we aim to study and analyze GSM call loss and it's propagational effect on ecological swathes landform pattern in tropical rainforest with the following hypotheses: i) There is a significant variation of landform patterns on ecological swathes in the study area, ii) There is strong correlation between the arbitrary signal strength difference of Mobile Phone Base stations and subscribers reception , and iii) There is a significant increase in the number of dead zones and call loss/reception due to landform pattern. Primarily, data gathering of reconnaissance, ground toothing and questionnaire administration methods are employed. Mobile datasets of individual call detail records (CDR) and aggregated call-volume data are collected. The preliminary results show that, a) The study area experienced call drops as a result of poor network coverage, b) The study areas composition of the basement complex rocks of igneous and sedimentary rocks deterred mode of GSM communication in the region, and c) The study affirmed that elevation in the study area affects call quality, clarity and signal strength.

The application of GIS and remote sensing technologies in mapping the Sanaga River Basin

Takem Ebangha Agbor Delphine, Nkwadi Alain

The Sanaga River is the largest river in Cameroon. It flows from its source on the Adamawa Plateau, down through the southern plateau which is a hilly landscape with volcanic domes to the very low depression where most of Cameroon's rivers join the Atlantic Ocean. Since the Sanaga is highly solicited for economic purposes detailed delineation of its drainage networks is important for natural resource management studies and Water management projects. The Shuttle Radar Topography Mission (SRTM) imagery covering the Sanaga area was used to extract drainage basins and define streams orders. The DEM threshold values of Flow Accumulation were used to delineate stream network, while the Strahler's and Horton's method of stream ordering was used to exact order of streams in the basins. It was found that Sanaga tributaries are of 9th order. Total 155011 streams are identified of which 77.939 are first order, 36.923 are second order, 20.127 are third order, 9.975 are fourth order, 4.606 are fifth order, 2.964 are sixth order, 1.321 are seventh order, 608 are eighth order and 548 are ninth order Stream. According to the results of this research, the Sanaga covers a drainage

basin of 142,412 km². The drainage basin was divided into 5 drainage divides following the pattern in which channels merge with smaller tributaries to join the larger trunk stream. According to this research analysis, the Sanaga River channels covers an area of 1.257 km² and has a lenght of 877,577 km. The SRTM, DEMs provides greater detail in the extraction of the stream ordering system and drainage networks which can be applied in the analysis of hydrologic processes.

Conflict Mediation among Pastoralists in Karamoja Cluster of East Africa

Raphael Kweyu, Eberth Andreas

There is a growing need to resolve environmental conflicts that are caused by population dynamics, climate change and perceived natural resource shortages. Environmental conflicts are an integral part of natural resource governance regimes. Therefore, sustainable models of resource management must consider and incorporate widely accepted principles of good governance, such as intragenerational equity and participation, to resolve resource conflicts. Being inspired by the work of Elinor Ostrom on Governing the Commons (1990), this paper explores the role of traditional customary practices in resolving resource conflicts among communities in the Karamoja cluster of East Africa. Karamoja, has witnessed intermittent fighting of communities surrounding cattle rustling and fighting for water and pasture. It is clearly demonstrated among the Karamoja that conflict has been escalated to community violence over the past decades. This has been attributed to climate changes resulting in degradation of pasture and water systems as well as the involvement of external parties in the conflict such as bussiness people, politicians and the international community. As a region marginalized in the development agenda by the respective states, the cluster of communities have depended on traditionally organized systems of resource management and intra/intercommunal conflict resolutions. Most of these systems have been ignored in science and knowledge and yet have the potential for informing policy and practice on managing the Karamoja syndrome as well as other ASALs of Africa and beyond.

This work attempts to position itself within the broader context of valuing variability (VV) in drylands. People and organizations working in African drylands have, over time, documented experiences that challenge the conventional stereotypical notion of despair and suffering in the ASALs. The VV concept proposes that dryland activities should be classified under productive systems and not coping systems as they have been carried out for many decades under self organized sustainable resource management régimes. This paper concludes that resource mediation as a traditional practice has the potential for re-emergence of the 'African' values in environmental management and governance. This discourse resonates with emerging trends of decolonization of knowledge, science and practices in the global South.

Session: Geographical education and geopolitics: future-ready

Breaking news inside and outside the classroom: geography, geopolitics and survival education

Gerry O'Reilly

The challenge for the teacher is to be flexible, adapt and prioritize which Breaking News to deal with in the classroom, and especially to use an appropriate pedagogy. Salient examples of recent and current emergencies include the Russian invasion of Ukraine (2022-), refugee flows into Europe, especially since 2016, and the Covid pandemic (2020-2022), as well as the ever-present evolving consequences of global warming. Students have had little choice but to strive to make sense of what is literally going on around them at home but also in parallel with the virtual world and social media. Therefore, what is being taught in the classroom has to be in harmony with this, otherwise what is happening in class may seem irrelevant to many. Teachers have been obliged to reconsider the nexus and alignment between geography, geopolitics, and humanitarian action, in times of emergency and conflict, and consequently vital geographical education. Hence, on the meta-level, teachers need to have the skills to find and evaluate quality data on (i) the physical and human geographical context of the emergency, conflict, and power constructs; (ii) the humanitarian action and development paradigms; and particularly (iii) the geopolitics and global governance patterns. On the micro-level, teachers have to juxtapose the Breaking News - Big Story, with the evolving realities on the ground whether at home or abroad. It would be unreasonable to expect teachers to be familiar with all the spatial narratives of emergency areas in Europe, or its neighbouring regions, or indeed elsewhere, therefore, through applied geographical frameworks and orientation to quality data sources teachers and students can research and produce analyses feeding into personal actions. Applying the above viewpoints, this paper explores the T&L experiences of Geography students in a university in Ireland.

Methods for assessing the potential of local strategies and programs in the field of energy and energy efficiency in communities of Ukraine

Iryna Kostetska, Elvira Moldovan

Ukraine has accepted the challenge with the whole Europe, and has started its own way of the Green Deal. Working-out of the package of national normative and legislative documents, as well as strategies and programs, aimed to regulation of the field of energy, energy efficiency, and energy safety was one of the first step on this way. According to these documents, regional strategies and programs were worked-out. These regional documents became the basis for approving both general and targeted local documents. Albeit, as practice demonstrates, regional acts are not always correlated with national regulative basis, and local strategies and programs are not always correlated with regional and national documents. This issue is especially topical for monoprofile areas, particularly, for energy generation communities as they are the first objects of the Just Transition as one of the tools of the Green Deal. However, the process of the implementation of strategies and programs demonstrates very often their inability, i.e., they are ineffective, unsuitable for implementation in practice. That is why the issue of the assessing regional / local strategies and programs on their ability and accordance to normative and legislative acts of the higher levels is urgent.

To resolve this issue, the Methods of assessing ability of local strategies and programs in the field of energy and energy efficiency was worked-out. There are suggested two groups of ability indicators. Ability

indicators are indexes that allow to estimate the ability of the local / regional strategy or program and its accordance to provisions of the national legislation. The Methods is a practical tool for the assessing ability of local strategies and program in the field of energy and energy efficiency. Due to use of the Methods, local communities and specific energy cities will be able to determine the level of accordance their local strategies / programs to the regional regulative acts and the national legislation. Such an assessment of ability is the first step to the practice of energy efficiency and energy sustainability. In the presentation, we will analyze strategies and programs of six local communities of six Regions (Oblast) of Ukraine with the help of the suggested Methods. Due to this approach, we will cover with analysis different regions of Ukraine. The findings will be represented in conclusions. In practice, the research could be interesting for companies, working in the field of the energy, Local Self-Governmental Authorities, utility companies, scientists, and wide audiences, interested in issues of the energy and energy efficiency.

Perspectives on the multilingual context of geography teaching in Hungarian secondary schools

János Kapusi

In Hungary, around 20,000 students are offered a chance to learn various subjects in foreign languages in bilingual, minority and international education in more than 120 secondary schools each year. Across these dual language programmes, Geography has been taught in 10 languages (Croatian, English, French, German, Italian, Romanian, Russian, Serbian, Slovakian and Spanish), including those of protected minorities. This linguistic diversity is a less-studied yet particularly valuable feature of Hungarian public education. Unfortunately, the status and prestige of Geography as a subject has been declining in general, therefore the relevance of foreign language Geography education is given even less attention, resulting in a lack of publications and teacher training materials. Nationwide, foreign language Geography teaching shows a decentralised spatial distribution, involving a variety of school types and teachers with an average experience of 13.5 years spent in teaching relevant to the study. Though these programmes differ in their demographic context, pedagogical aims, methodological background and subjects offered in foreign languages.

Geography has managed to maintain its position as a common choice to teach. In spite of the drop in its relative significance, Geography has been – regardless of language – the most popular optional subject since the 2005 introduction of the two-tier matura exam system, demonstrating the effectiveness of geographical skills development via language learning tools. In my presentation I am going to reveal key findings about the achievements and challenges of Geography teaching in foreign languages in Hungary, mainly from the teachers' point of view. In addition to 16 years of personal experience of teaching Geography in English, this research relies heavily on a wide variety of resources including detailed spatial and statistical data published by schools and educational authorities, publication review, job shadowing visits, several interviews and a recent survey among 72 teachers involved in foreign language Geography teaching. As no such subject-specific investigation has been concluded in Hungary for decades, research findings may provide new perspectives on the integration of content and language, contributing to the general research of Geography teaching, both within the Hungarian and European context.

Post-growth from the perspectives of young people in Germany

Andreas Eberth, Lydia Heilen, Lara Brede, Christiane Meyer

The presentation provides an insight into a current research project on the perspectives of young people from Hanover, Germany, on post-growth which were captured by means of focus groups. In the context of education for sustainable development (ESD), it will be discussed which findings can be derived for transformative learning in geography teaching. The term post-growth (Jackson, 2021) covers various approaches that break with the idea that current production systems and consumption patterns can grow globally in the long term. Post-growth stands for a movement that strives for human well-being and prosperity beyond economic growth as a goal. Related concepts and initiatives for post-growth societies describe steps for a societal transformation, not an ideal final state (Lange et al., 2021; Burkhart et al., 2020; Krueger et al., 2018).

This approach offers enormous potential in the context of education for sustainable development. However, corresponding research findings are still a desideratum (Getzin and Singer-Brodowski, 2016). The current research project "Change instead of Growth – The Sustainable Development Goals (SDGs) and Post-Growth Economies from the Perspectives of Young People in the Context of a Societal Transformation", which started in October 2019 at Leibniz University Hanover, addresses these debates in a sub-project by reflecting on young people's ideas about post growth. In its theoretical framing, the project refers to debates on young people's geographies (Firth and Biddulph, 2009). It is of interest to find out how young people position themselves with regard to the critique of the predominant growth paradigm and to alternatives in the area of post-growth (economies). Their perspectives are collected in order to take their voices into account in the implementation of ESD and the 2030 Agenda and to integrate them adequately into geography lessons. Methodology: Seven groups with 3-4 young people took part in three online meetings each group. 24 persons participated overall. The first meeting was conducted as a focus group (Bedford and Burgess, 2001).

Different aspects of post-growth economies were presented and discussed via various impulses like photos, videos and text extracts. Subsequently, the young people independently selected pioneers of change who were of particular interest to them. These are individuals who are involved in sustainable initiatives or companies (e.g. co-working space or repair café). In a second meeting, the group interviewed one of the selected pioneers of change with regard to their contribution to the co-creation of a post-growth society. In the third meeting – another digital focus group – the young people reflected on the interview and discussed whether and to what extent the topic could and should be taken up in school education. To this end, they developed their own possibilities for implementation in the classroom. The empirical data obtained will be evaluated and processed in a systematic manner by means of content-structuring qualitative text analysis (Kuckartz, 2014). Post-Growth in Geography Lessons: From this, recommendations are derived in order to take up alternative approaches beyond the neoclassical mainstream in the field of transformative learning in geography lessons (Mitchell, 2018). To highlight this, results from the second focus group will be presented. This focus group was conducted along the following guiding questions:

- What impressions do you take away from the interview with the pioneer of change?
- To what extent can this initiative contribute to a system change?
- Should such sustainability initiatives also be addressed in school lessons?
- How should the topic of post-growth be taught in schools?

The web GIS to enhance learning about geopolitics

Miguel-Ángel Puertas-Aguilar, I Ana E. García Sipols, María-Luisa de Lázaro-Torres

The recent use of cloud-based Geographical Information Systems (Web GIS) in secondary schools highlights the importance of researching its potential to engage students and improve their understanding of spatial concepts for better grades, but also enhanced competencies. This study has focused on comparing the results of a traditional written exam on two groups: one using Web GIS (the experimental group) and the other using a conventional presentation (the control group).

The sample comprised 92 geopolitics' students at K10 level (15-16 year olds). A 'research and action' method has been used in the actual teaching process, as this makes it possible to use direct observation to collect evidence and employ it immediately in lessons. However, quantitative data are also drawn on to confirm the potential of Web GIS as a learning tool. The results show that Web GIS technologies engage students and assist learning, making it advisable to increase teacher training in these tools, along with the appropriate competencies and pedagogy to use them.

Session: Challenges in geography education

Geography for the future? Curriculum change in Ireland

Susan Pike

This paper considers some of these issues in the context of research that is informing curriculum change in Ireland. Drawing on recent research for the National Curriculum for Curriculum and Assessment, the paper aims to provide some answers to key questions of power in education and curriculum: Who asks the questions relating to Geography in the curriculum? What research evidence is drawn on for Geographical approaches and content? And what decisions are being made?

NCCA (2023) Framework for the Primary Curriculum. Dublin: NCCA.
Pike, S., Ní Cassaithe, C., McGuirk, N., Usher, J., Mallon, B. and Whelan, P. (2023) Literature Review for Social and Environmental Education. Dublin: NCCA

Student teachers' knowledge of multiperspectivity and its implementation in geography lesson plans: results from a study with German and Dutch student teachers

Dina Vasiljuk, Alexandra Budke

Multiperspectivity is an important principle of didactics. Its objective is to avoid monocausal views and to make differentiated and informed decisions instead by considering various perspectives. Therefore, the principle is particularly relevant for geography lessons as a lot of controversial topics are discussed that show a significant complexity based on multiple irreconcilable views. That applies for topics like climate change, income inequality, economic growth or disparities. By using the principle in geography lessons, students can learn to deal with such wicked problems while inert knowledge can be avoided. Furthermore, teachers can promote powerful geographical knowledge, critical thinking as well as perspective-taking competence through integrating a multiperspective approach in lessons. However, implementing multiperspectivity can be a very challenging task. Previous research has shown that teachers often struggle with using multiperspectivity in lessons. Therefore, it is important to start dealing with the principle of multiperspectivity within teacher training, so student teachers learn how to incorporate it into geography teaching effectively. To develop an appropriate teaching and learning support for higher education, it is important to understand the difficulties that student teachers face when planning geography lessons that include multiperspectivity. Thus far, neither the student teachers' understanding of multiperspectivity nor the implementation of multiperspectivity in geography lessons has been analysed.

Therefore, the exploratory qualitative study aims to gain initial insights about student teachers' understanding of multiperspectivity and what support student teachers may need during their training to be able to consider multiperspectivity in lesson planning. The study was embedded within a project in which German and Dutch geography student teachers explored multiperspectivity for one semester. First, we will present the theoretical background. Secondly, we will explain the methodological approach of the exploratory qualitative study. In the third part, we will present the empirical results together with a set of criteria that we developed for analysing multiperspectivity in geography lessons. In addition, we state the potential of our criteria set to help student teachers better understand and consider multiperspectivity when planning lessons.

Resources to help build competency-based curriculum for geospatial programs

Ann Johnson

One of the first questions that educators ask when starting a geospatial program is what should be included in the curriculum. This question has very different answers today than in the past due to technological advances, its expanded use by much of the workforce and its adoption as an analysis tool by more disciples across a college. Students today must meet the needs of many different applications of geospatial technology. The GeoTech Center has collaborated with academic faculty, industry partners and the US Department of Labor to define the competencies that students should be exposed to for different applications. The outcome from the partnerships have helped create the Geospatial Technology Competency Model – a pyramid of competencies in multiple tiers from basic to specific geospatial knowledge. GeoTech has also created Self-Assessment and Program Content Tools based on the workforce defined competencies as well as Model Courses and other curriculum resources. This presentation will cover how these resources can be used to help develop, update, or align curriculum based on different student Learning Outcomes.

The “educating city”: the power of learning in participatory design

Stefania Montebelli

Inhabiting a territory means being included in its semiotic space, being culturally formed by it but also being part of its configuration and, thus, of its evolution. This presupposes and requires an educational process of social involvement of each person as active citizenship, aware of his own living space. To foster this awareness, the participation of different social groups in designing shared spaces can do a lot, so that learning would take place in the field by getting to know the inhabited territory and exploit the potential and functionality of common places. So, the city becomes an open-air laboratory educating its inhabitants to proactively share the territory in a regenerative planning that involves both the places of common life and the social aspect involving them.

The city as training environment and laboratory for learning active participation encourages the encounters and exchanges between different social forms that talk to each other and are involved in planning and regenerating the common urban spaces. The territory, therefore, as product of the society and privileged field of education, is generated and transformed over time. It is good to remember this above all in the era of the knowledge society, where the digital knowledge seems to be far from the inhabited territory, which appears increasingly disordered, frayed, characterised by marginality and degradation that do not only reflect physical parameters, but are present in social and material suburbs. In such scenario, rethinking the education of citizens also means rethinking the territory and its social configuration. This is in line with the EU perspective of learning cities as organized networks of synergistic stakeholders for continuous and ubiquitous learning, communities as nuclei of social learning, with the concept of an educating city which is at the same time a widespread place of all-ages lifelong learning, generated by democratic and deliberative participation, and an educational dimension for a knowledgeable society which acts as ferryman in this transition towards sustainability and inclusiveness. In this view, learning is the principle of the educating city, a territorializing strategy of a society that reifies, gives meaning, and makes functional its spaces.

Sources:

UNESCO, Unesco Global Network of Learning Cities. Strategy 2021-2023.

WARD C.Incidental education,Milan, Eleuthera, 2018.

OSBORNE M., KEANRS P. AND YANG J.,Learning cities: developing inclusive, prosperous and sustainable urban communities, in “International Review of Education”, vol.59, n. 4, 2013

Is kindergarten appropriate for early spatial interventions?

Christina Zisi, Aikaterini Klonari

Spatial ability is usually described as "neglected" by researchers, and this is even more the case in the Greek kindergarten. Despite the fact that spatial abilities are referred to in Greek Kindergarten Curriculum, they are not combined with the provision of appropriate teaching interventions, teaching material, or proper teacher training. In our previous research, we found that teaching so far has not resulted in an effective improvement of spatial abilities.

The purpose of this study is to create an appropriate teaching intervention that will develop kindergarten children's spatial abilities. An intervention was planned for this purpose and two large-scale giant maps with dimensions of 3x4 meters were created, a map of the city of Mytilene with a scale of 1: 1000, and a map of Lesvos with a scale of 1:20000. The sample was 140 kindergarten pupils, 56 from the experimental group and 84 from the control group. Children's knowledge and abilities were tested using a questionnaire before and after the intervention, with the help of kindergarten teachers who wrote the answers as children of this age do not know how to read and write. The findings show that early spatial intervention in kindergarten leads to a significant improvement in pupils' spatial abilities according to the goals set by the curriculum. The improvement of the experimental group was significant regardless of gender and grade (1st or 2nd year in kindergarten). There was a statistically significant difference in total score and in all questions after the teaching intervention and the comparison between the experimental and control group was spectacular.

Session: Urban geography

Ageing in cities - modelling the cities of the future

Nikola Koktava

This paper focuses on the challenges posed by the global ageing population in urbanized areas and improving the accessibility of fundamental services. Geoinformatics can assist urban planners in creating environments that are accessible to all residents, including those who are ageing or less mobile. As the number of older residents in cities increases, barriers such as staircases, high curbs or lack of rest areas that may limit their mobility become a more common problem. The 15-minute city concept has been set as a target for several world cities, such as Paris. It emphasises the accessibility of key services such as shops, health facilities and offices to all city residents within a 15-minute walk or bike ride. It includes two main factors: creating a suitable dense network of services as well as acceptable conditions for walking/riding. The case study covers selected Czech middle-sized cities such as Ostrava and Hradec Kralove.

The study exemplifies the main problems in these cities related to the senior's mobility and, conversely, provides examples of good practices. The walking conditions in Ostrava and Hradec Kralove are assessed and indicate variable walkability . The 15-minute city concept offers the possibility of future redevelopment of urban areas to be welcoming to an ageing population while creating a pleasant and functional environment for all residents .

Climatic gentrification and urban resilience for social justice: A geographical evaluation: from research to action

Asad Aziz

This study make an attempt to evaluate the impact of climate change, rise of sea level and sale purchase decision in low elevated areas on property values. It has been investigated that over 0.8 billion people are vulnerable and exposed to be at risk, in cities located in low elevated/coastal areas all over the world. This including London, Mumbai, Hong Kong, Miami, Karachi and other more cities located at the coastal areas. As a result of this crucial issue, this impact become gradually deceptive, it is a matter of fact that those who are most disadvantage will get most affected socially as well as economically. This impact generate a term "Climatic Gentrification" which getting more importance around the world among policy makers. According to which the property, located at high elevation, will have ability to accommodate this climatic impacts and have more values than other, located at low elevation. This term climatic gentrification also have some negative impacts, the people with low income status may be pushed out as they are unable to pay the rents of houses (rising rents) or property prices (high costs) who's seek to build property in these areas.

The study use property variables including the elevation of house, size of land, stories in building, number of bed rooms and age. Correlation among these property attributes can be measured by using the hedonic pricing model. Geographical information system and remote sensing techniques along with statistical model i.e. Multi Linear Regression give us an estimation framework to analyze these effects spatially. The study result, will provide field base results after carefully and critically investigation, to create awareness among property investors to made attempts to minimize this issue at possible level. Finally, the outcomes of the study will help to create an environment for social justice for all over the world for urban resilience.

Exploring the spatial and social dimensions of the Roma ghettoized structures in northwestern Bulgaria (Vidin District)

Ilieva Nedezhda, Kaloyan Tsvetkov

In the post-socialist period, new patterns of socio-spatial polarisation have emerged, increasingly based on income inequality and ethnicity. Social inequalities, as well as long-term ethnic interactions affect the structure of space. In recent years, the Roma population in Northwestern Bulgaria, has been subjected to significant ghettoization, with limited access to basic services, poor living conditions, and socio-economic marginalization. Roma neighborhoods are changing very intensively both horizontally (in space) and vertically (in height), and much of the dynamics in the internal structure of the neighborhood remains hidden to local authorities, making follow-up action significantly more difficult. Spatial segregation has been strongly influenced by the "Divided cities" theory (Van Kempen, 2007, Marcinczak 2007), and "Dual cities" (Mollenkopf and Castells, 1991), which essentially describe the polarization trends of urban societies and growing socio-spatial disparities.

This study aims to explore the spatial and social dimensions of the Roma ghettoized structures in Vidin district through a combination of orthophoto images and in-depth interviews. The study uses orthophoto images to trace the dynamics in Roma neighbourhoods' since the beginning of the 21st century. These images provide a visual representation of the changing landscape and allow us to identify areas that have undergone significant physical changes, such as the emergence of new structures or the expansion of existing ones. In addition, the study employs in-depth interviews to outline contemporary demographic trends, which are hampered by the lack of data not only locally but also nationally. The findings reveal that the Roma population is concentrated in areas, characterized by high levels of poverty, social exclusion, and limited access to basic services. The ghettoization process has been influenced by a range of factors. The study provides a comprehensive analysis of the spatial and social dimensions of this structures (boundaries and extent, internal structure, patterns of spatial organization), highlighting the urgent need for policy interventions that address the root causes of ghettoization.

The study has been conducted within a project titled "Spatial models of the Roma ghettoized urban structures in Bulgaria", funded by the National Scientific Research Fund of the Republic of Bulgaria, Grant №КП-06 ПН65/7 - 2022.

Future-ready cities: the role of geospatial information systems in smart city

Simangele Dlamini

Smart city development is seen as a way of facing the challenges brought about by the growing urban population the world over. Research indicates that cities have a role to play in combating urban challenges like crime, waste disposal, greenhouse gas emissions, and resource efficiency. These solutions should be such that they do not make city management less sustainable but should be solutions-driven, cost and resource-efficient, and smart. This study explores opportunities on how the City of Johannesburg, South Africa, can use Geographic Information Systems, Big Data and the Internet of Things (IoT) now and in the future in identifying opportune areas to initiate smart city initiatives such as smart safety, smart utilities, smart mobility, and smart infrastructure in an integrated manner.

The study will combine Big Data, using real-time data sources to identify hotspot areas that will benefit from ICT interventions. The GIS intervention will assist the city in avoiding a silo approach in its smart city development initiatives, an approach that has led to the failure of smart city development in other countries.

Multidirectional social and spatial changes in medium-sized cities in spain. General approach in main cities in the region of Castilla-la Mancha

Rodríguez- Domenech María Ángeles

The concurrent processes of globalisation, digitisation, and integration shape and constantly modify the development factors and generate multidirectional social changes. In these cities, social distance does not find its equivalent in physical distance, so that other forms of differentiation may come into play. Other forms of differentiation may come into play: physical barriers (urban and architectural (fenced or private buildings) and symbolic barriers or elements (devaluing narratives).

This project proposes a multi-scale, multidimensional and transversal analysis of socio-spatial differentiation, segregation and fragmentation in articulated urban areas. differentiation, segregation and socio-spatial fragmentation in urban areas articulated by inland medium-sized cities in by inland medium-sized cities in Spain in the period 2001-2021. The general of the research aims to study the transformations that have taken place in the social maps of these cities. the social maps of these cities. To this end, it interrelates the study of socio-spatial differentiation and segregation with the changes experienced in the form and structure of residential spaces, in a context of recompositing of the urban social mosaic. References:

Musterd, S.; Marcińczak, S.; van Ham, M.; Tammaru, T. (2015). "Socio-Economic Segregation in European Capital Cities:Increasing Separation between Poor and Rich", Bonn: Institute for the Study of Labor, Discussion Paper No. 9603

Musterd, S. (2020). Urban segregation: contexts, domains, dimensions and approaches. In: S. Musterd (Ed), Handbook of Urban Segregation. Elga.

The influence of the city environment on hedonic wellbeing

Iuria Betco

Mental health problems have been increasing worldwide, which may be associated with the growth of the urban population and the associated lifestyle. The recognition that the various aspects of the urban environment can affect the mental health of individuals is increasing since they are responsible for facilitating or inhibiting behaviors and lifestyles that impact feelings. In this context, it is crucial to understand the potential impact of the urban environment of the city of Lisbon. To do that, we resorted to hedonic wellbeing (i.e., sentiment analysis), using a lexicon from the NRC Sentiment and Emotion, based on data from the social network Twitter, enabling the identification of places where both positive and negative sentiment prevail. Next, an artificial intelligence (AI) model associated with an agnostic model was used to increase understanding of the factors in the urban environment that can explain sentiment. Four artificial intelligence models were tested, Random Forest (RF), Extreme Gradient Boosting (XGBoost), Neural Network (NN), K-Nearest Neighbour (KNN), and a linear model for comparison (Generalized Linear Model - GLM). The applied agnostic models, the Local Interpretable Model-Agnostic Explanations (LIME), and the SHapley Additive exPlanation (SHAP), played a vital role in this study. Answering the starting question, the explanatory variables most related to sentiment are distance to fitness facilities, distance to green spaces, the popularity of places (estimated through the Flickr social network), and distance to the cycling network.

Session: Problems and issues in geography education (2)

Geographic methods for studying children's spatial awareness

Anna Klimach, Agnieszka Dawidowicz, Marta Czaplicka, Marzenna Nowicka, Marta Gross

Spatial awareness (Ishikawa, 2021) is a new term covering many elements consisting of knowledge, skills and affectivity. Until now, each of these elements has been studied separately (Peters et al. 1995, Hartley & Harlow, 2012) with the main focus on the study of spatial orientation. However, it is important to fully study spatial awareness in order to comprehensively diagnose elementary school-aged children as Generation Z. Today's generation of children perceives the world through the prism of screens and tools of geographic information systems. The authors, on the basis of previous scientific research, propose a new tool to study children's spatial awareness. Through this research, it will be possible to change the curricula so that tools/tasks will be introduced to teach children about space.

References:
Ishikawa, T. 2021. Spatial thinking, cognitive mapping, and spatial awareness. Cogn Process 22 (Suppl 1), 89–96, https://doi.org/10.1007/s10339-021-01046-1
Peters, M., Laeng, B., Latham, K., Jackson, M., Zaiyouna, R., & Richardson, C. (1995). A redrawn Vandenberg and Kuse mental rotations test-different versions and factors that affect performance. Brain and cognition, 28(1), 39-58. https://doi.org/10.1006/brcg.1995.1032,
Hartley, T., & Harlow, R. (2012). An association between human hippocampal volume and topographical memory in healthy young adults. Frontiers in human neuroscience, 6, 338. DOI=10.3389/fnhum.2012.00338

Social participation in geographical education as a tool supporting the development of competences of the future

Małgorzata Cichoń

In the world of constant changes, new technological achievements and socio-economic and environmental crises, education faces multidimensional challenges. Various reports and research results describe the characteristics, factors, areas that will affect the future of education. All of them indicate problems of a global nature, very often related to the environment, e.g. waves of migration resulting from climate change. These are problems realized by teachers and students at different levels of geographical education. However, the future of geographical education is not only knowledge about specific problems, verified by tests, but also the ability to solve these problems and the adopted attitudes. This means that in the future, education, especially geographical education, should focus on developing pro-environmental competences. One of such tools may be social participation (Cichoń et al. 2021). The pilot studies conducted among students of geography will make it possible to determine whether the scope of specific competences increases with the increase in the level of social participation.

Ageing of teaching staff in Poland: reasons, characteristics and consequences

Danuta Piróg, Kinga Bargieł

Many countries struggle with the ageing of its teaching workforce. Teaching has been often referred to as a "silver" profession and this widespread, unfavourable trend will be difficult to stop. The ageing of teachers has affected Poland greatly over the last decade and statistics clearly indicate that the speed and scale of this process will further increase in the coming years. This is corroborated by the data: average age of a teacher is constantly on the rise. In addition, average age of geography teachers is even higher than the general average for the profession. The issue is critical also due to the fact that fewer young teachers enter the profession. One of many consequences of these processes are acute staff shortages and vacancies. In order to mitigate the issue, school principals often employ retired teachers. The share of working teachers past retirement age has been constantly rising. This trend is clearly visible and will most probably continue in the years to come. The cohorts of elderly teachers are numerous and the topic deserves an in-depth academic examination. Consequently, the objectives of the paper are:

- to discuss the literature review regarding the reasons, characteristics and consequences of teacher ageing worldwide;

- to present initial results of empirical studies conducted among Polish teachers (including geographers) who continue to work in schools after they acquire pension rights.

Our study was conducted using narrative biographical interviews. We focused on factors that have an impact on the decision of teachers with pension rights to continue working. We have identified key factors and motivations for staying in schools and we analyse and interpret them in relation to the teachers' entire professional trajectory.

Investigation on the mindset of the high school graduates in the Smolyan region (Bugaria) for implementation up regional sustainable development policies

Mariana Soultanova

An investigation on the mindset and behavioral patterns of the high school graduates in the Smolyan region, a mountainous region in Bulgaria is focuses on determining the awareness of sustainable development and the policies related to it. It is also examined if the last school year students from this region take actions, corresponding to sustainable development, without realizing how these are associated. The article is a projectivity of a survey with similar aims investigated among all age respondents sample of the mountainous region. An internet survey was used which consisted of 29 long form and multiple-choice questions. The same hypothesis were tested based on the responses of high school graduates: Is the sustainable development concept well understood by the population; Is the sustainable development concept only associated with the notion of the environment; does the population in fact acts in a sustainable manner, but they not place their actions in a sustainable development framework.

The article arrives at meaningful conclusions on the awareness of high school graduates about sustainable development. It gives the possibility to arrive at the most applicable conclusions on the educational curriculum policies and on mountain regional development.

Session: New technologies in education

Face to global change : a university challenge

Caroline Leininger-Frézal, C. Naudet, Aurore Lecomte

Preparing young people to cope with global change is one of the challenges facing universities. The aim is to mitigate these phenomena by informing people, building their resilience and their capacity to adapt to it (Mochizuki & Bryan, 2015). How is the topic addressed in the curriculum? How to develop a cross-curricular approach to global change education? These two questions are at the heart of V-Global project (Erasmus Plus Program 2021-1-FR01-KA220-HED-000023242).

To answer these questions, we interviewed 25 higher education teachers from different European countries (France, Germany, Greece, Spain, Portugal, UK). We analyzed the geography curriculum of four universities: Universität Hamburg, UNED, National Technical University of Athens; Université Paris Cité. These cross-analyses have made it possible to highlight the diversity of ways of integrating global change into the curriculum and teaching practices. These analyses also show that the place for ESD is uncertain. We will conclude this presentation on possible strategies for developing a global change curriculum at the university.

Go robotics in school geography? New challenges

Anastasia Georgiou, A. Galani, G. E. Bampasidis, T. Sivenas, G. Koutroumanos

The affordances of Robotics in Education mainly in STEM are mentioned by lot of scientists. According to the research literature, when the robots are used in the teaching process, the logical and critical thinking of students are developed (Yilmaz Ince & Koc, 2021), their performance is better and their interest is increased (Han et al., 2013; Mubin et al., 2013). But what about Robotics and Geography? This presentation tries to answer the above-mentioned question through the discussion of the following questions:
a) How Robotics contribute to advance School Geography and
b) How the use of Robotics in classrooms is a challenge for Geography teachers.

Papers from databases, such as Web of Science, Scopus and Google Scholar were picked. Moreover, projects, good practices or other educational applications which use robotic devices and focus especially on School Geography were selected. We limited our literature research to papers and practices published within the last 10 years and to cases that use robotics in a School Geography context.

The research reveals that there are few educational robot-based projects, in School Geography which support the core ideas of geography. Although geographical education is an important part of the curriculum, the contribution of robotics to geographically oriented interdisciplinary approaches do not appear to be very well developed, compared to the other STEM disciplines.

The findings of this research can be used to propose new approaches in School Geography based not only in the use of the robots, but as a discipline to support the geographic literacy, spatial thinking, spatial concepts/ representation/ reasoning /planning, decision-making as well as skills related to the 4Cs, life and green skills that can be used in solving real world problems. Moreover, they will help teachers, education stakeholders and educational material designers to import robotics in School Geography in order to use the geography technology in the classroom and understand better the five key concepts of Geography: place, location (absolute and relative), region, human-environment interaction, and movement.

The use of 3D printed landscape models in teaching geography

Aikaterini Klonari, Passadelli A. S.

Three-dimensional (3D) printing has become extremely popular in recent years. Starting with a project focused on developing students' spatial thinking, we explored the effectiveness of 3D-printed landscape models in teaching and learning through a number of classroom geography activities.

In this paper, we'll describe the implementation of 3D models in a teaching intervention in a geography course, at a secondary school in Mytilene on Lesvos Island, Greece. The students' activities in which these models were integrated were six (focusing on various relief landforms from different regions of the world, such as mountainous areas, lowlands with river areas, etc.), one of which was for the students to paint the models with suitable water colours. In this study participated 54 students (18 students of 7th grade and 36 students of 8th grade) aged 13-14 and two teaching hours were needed for the application of the instructional material. We found that 3D models were well received by secondary school students with different learning abilities (there were a few dyslexic students in these two grades). 3D landscape models were a valuable strategy to enhance physical geography education and develop spatial thinking abilities for all students who participated in this study.

The results showed that all students have better performance and all students believed that the geography course was more interesting when the teacher implements this kind of activities. 3D-printed landscape models changed how teaching and learning happened in geography studies classrooms and all students shifted their thinking about the value of teaching geography. The overwhelmingly positive feedback generated by this intervention suggests that 3D-printed landscape models are a worthwhile strategy for improving physical geography education and spatial thinking and could implement in geography course easily.

What's next? Educational opportunities and needs for primary geography

Daniela Schmeinck

Smartphones and tablets, wearables such as smartwatches, fitness bracelets and digital glasses, networked cars, kitchen and household appliances, intelligent home automation and many more – our everyday life is increasingly shaped by digital and networked technologies and mobile devices. But it is not just the technologies that have changed rapidly in recent years. Even areas such as communication, working, leisure time activities, banking, dating, shopping, travel planning, information research, etc. and thus almost all areas of our lives have been heavily influenced by increasing digitization in the last few decades and have changed in accordance with the new possibilities. And all these changes came along with numerous consequences. Thus, already today our individual behaviour patterns, our shopping behaviour, interests, movement profiles, health data and furthermore individual data are logged, tracked, stored and analysed in the form of digital data (big data). In many cases, this data also contains geographical information like movement profiles and location data which is e.g. used for Location Based Services (LBS), navigation, customer orientation and marketing capabilities etc. The almost complete digital penetration and automation of our lifeworld thereby does not exclude the everyday life of primary school children.
The challenges of digitalisation and digitality, as they are outlined and set out in a wide range of papers and studies and elsewhere present primary geography and/or primary science and social sciences teaching with a twofold challenge. On the one hand, we need to reflect creatively on the formats and environments where digital technology can meaningfully be used to add value to primary geography and/or primary science and social sciences teaching and promote learning using media, taking both theory and practice into account. The increasing importance of digital media and artefacts for children and young people (Schmeinck 2013), on the

other hand, and more recent developments, mean that there is an urgent need to develop and trial educational approaches and materials that treat digitalisation as subject in itself, with a range of interconnecting perspectives, i.e. learning about the artefacts and phenomena of digitalisation and their complex connotations.

Therefore, the question arises: What knowledge, skills and attitudes do children and young people need to be able to deal with the uncertain and complex issues of today and tomorrow, to question our current actions and to learn from the mistakes of the past? And how can subjects like primary geography or primary science and social sciences make a decisive contribution to these knowledge, skills and attitudes?

This paper describes the potential but also the risks and challenges of digital technologies, digital media and increasing digitality for the further development and innovation of education and shows ways in which primary geography and/or primary science and social sciences can and should contribute to promoting children's digital literacy.

EUROGEO Session

BIOMAPS project: summarising Hungary's contributions to the online map library of European writers and poets

José Jesús Reyes Nunez, Krisztina Irás, Ágnes Cselik, Mónika Varga, Dániel Kiss

Hungary participated in the Erasmus+ KA201 project entitled "Biographical map library of European authors", which began in December 2020 and finish in June 2023. Apart of Hungary, the project counted with the participation of colleagues from Spanish and Portuguese universities and secondary schools, as well as EUROGEO was represented by his president.

Our main aim was the making of a map-based library that can be freely accessed on the web. Each country selected fifteen of the most important writers and poets for their presentation on the web. The selection filled two important conditions: writers and poets should be included in the national curricula of their respective countries, and they should have at least a high-quality translation to Spanish, which is the official language of the project.

In the current presentation, Hungarian colleagues describe in more detail the works developed within the project. The workflow can be divided into two essential phases: the first one is the data collection, which includes not only collecting biographical data, but also geographical (geo-referenced) data that connect an author to the specific places where he lived and worked. At the same time, we also collected multimedia data, which is used to complete the information represented in the maps as well as to illustrate the final product of this online library: the story maps about the life and works of each author. The second phase is the creation of the story maps, which begins with the making of diverse maps from the overview maps (e.g. world or continent maps) to the more detailed ones (e.g. city maps). It is followed by the selection of the more appropriated design and specific solutions that are used to present the collected data in a dynamic, attractive, and interactive graphic environment. All the story maps are made in ArcGIS Online, one of the most powerful web-based mapping solution in the current GIS market. The valuable work developed during these three years was recognized by the Spanish Association of Geography (AGE) by awarding the Educational Innovation Award in the category of Secondary Education-Baccalaureate in 2022. In parallel, the participating institutions also developed different activities within the project to popularize these new solutions between teachers and students. In Hungary, the Eötvös Loránd University successfully organized two GIS Days in two secondary schools in Budapest, as well as all the Hungarian colleagues participated in different national and international events to present the results of the project.

Biographical Map Library of European Authors on a Story Map

María Luisa de Lázaro Torres, Rafael de Miguel González

Biographical Map Library of European Authors (BIO-MAPS) is an Erasmus+ project focused on learning literature and raise awareness about social values as part of European cultural heritage. Places and journeys that have shaped the life and literary work of famous authors are possible to visualize using digital story mapping (DSM). Secondary school students collaborating in the project are already developing linguistic communication skills in Spanish while creating literary routes via digital cartography and on real fieldtrips. The biography of selected authors has been made using StoryMaps in each of the participating countries (Spain, Hungary and Portugal). It has been demonstrated that it is possible to explain authors biographies by using digital storytelling mapping in a collaborative way, through 'learning by doing' and learning from others work. The story map of the writers can be downloaded and printed to study as textbook content. Using a digital story

map as a way of sharing the biographical map libraries is an innovative, attractive, and an inspiring way to value literary heritage. More information about the project can be found at: www.biomaps.eu

- Authors of the digital biographies:

• IES San Roque: Isaac Buzo Sanchez (Coordinador); Manuel Tena Garcia; Angel Dominguez Molano; Rafael Caso Amador; M. Paz Alejandrina Martin Rodriguez; Esmeralda Tienza Sanchez; Carlos Vega Fernandez; Jose Antonio Pulido Cuadrado; Maria Isidora Fortuna Martin; Patricia Garcia Gonzalez; Esther Cachadina Gutierrez; Arantxa Fabuel Sanchez-Cortes; Ivan Garcia Suances; Luis Miguel Rodrigo Rivero; Maria Pilar Sevilla Maya; Maria de los Angeles Bayon Alfonso; Elisabet Amaya Chaves.
• Escola Secundária Quinta das Palmeiras: Joao Paulo Ramos Duarte Mineiro (Director); Cristiano Jorge dos Santos Carrapato; Veronica Margarida Rebelo Cruz, Albertina Maria Heriques Salgueiro Leitao.
• Kispesti Karolyi Mihaly Magyar-Spanyol Tannyelvu Gimnazium: Agnes Eszter Cselik (Directora); Daniel Kiss; Monika Varga • UNED: Maria Luisa de Lázaro Torres, Francisco Jose Morales Yago, Julio Fernandez Portela, Juan Jose Pons Izquierdo, Alejandro García Ferrero and Javier Álvarez-Otero.
• Instituto Politécnico de Oporto: Maria de Fatima Lambert Alexandrino Alves de Sa Monteiro; Marta Saracho Arnaiz.
• ELTE: Jose Jesus Reyes Nunes; Kisztina Iras.
• EUROGEO: Rafael de Miguel González; Antonella Clara; Miguel Ángel Puertas Aguilar.

GEOLAND: digital educational geoinformatic methodologies for monitoring landscape

Luc Zwartjes, Christos Polykretis, Dimitris Alexakis, Karl Donert

Landscape is both a physical reality and the representation that we make of it. It is the face of a land with all its natural and anthropological elements and, at the same time, the feelings and emotions that it arouses in us when we see it. Therefor the European Landscape Convention indicates that assessment of all these different dimensions that exist in landscapes should be considered by public authorities while adopting policies and measures at local, regional, national and international level for protecting, managing and planning landscapes throughout Europe.

With this situation in mind, GEOLAND – an Erasmus+ KA2 Higher Education project - focuses on NATURA 2000 sites, with as goal to establish a learning path for the HE students and professors in order to apply their geospatial analysis knowledge in Landscape monitoring and protection, using digital skills like public participation GIS, and low-cost geoinformatic. In particular the main aim of the project is to develop a web based GIS platform where numerous geospatial data may be uploaded, analyzed and students' opinion about landscape will be asked through questionnaires and crowdsourcing.

The project will thus provide the opportunity to students and professors, being interested in definition and implementation of landscape policies, to play an active part in setting sustainability indicators of desirable landscape quality objectives (LQOs). In addition, GEOLAND will attempt to train the future employees to identify and summarize the environmental and cultural stratification in the examined landscapes through a sophisticated GIS oriented Landscape Character Assessment (LCA) methodology. . In this direction, the project will develop a new methodological framework for monitoring Landscape tailored to the needs of the new digital era, safeguarding thus the inclusive nature of learning opportunities. Moreover, the project will provide training content matching the digital education needs.

Gi-Pedagogy: an innovative model for integrating GIS into a 'future-ready geography curriculum'

Sophie Wilson

The aim of this session is to share the findings from work done as part of an Erasmus+ funded project completed with European Partners drawn from schools and universities, together with EUROGEO, to develop a toolkit and framework to support teachers to use GIS more routinely to teach Geography.

This will be done by introducing you to the research informed online training course developed by the project for teachers which starts with a brief introduction to what geoinformation (GIS) is and why it should be used - followed by an outline of the innovative pedagogical model and theoretical basis for the Gi Pedagogy Concept Cube, Framework, and Steps.

The next section focuses on an example of how this can be used to sequence and integrate GIS into the curriculum, using scaffolding and the Gi-Pedagogy: Curriculum hub of resources developed by the project. Linked to technical competency levels, this has been designed to help teachers to work with GIS layers to support their existing curriculum, to help develop their confidence and geospatial skills. By using GIS routinely in the classroom, this will help students to develop their sense of place and locational knowledge of the world, so they become more future ready and globally aware citizens able to contribute positively to societal debate. The course concludes with an 'I - we – you' section on creating and sharing ideas.

References:

Donert, K, Zwartjes, L, Gonzalez, R, Lazaro, M, Wilson, S and Lidner-Fally, M. (2021) An Innovative Pedagogical Model for Teaching with GIS Research Gate Available at: https://www.gilearner.ugent.be/publications-gi-pedagogy/ (Accessed: 3 Jan 2023)

B., De Lázaro Torres, M.L., De Miguel González, R., Donert, K., Linder-Fally, M., Parkinson, A., Prodan, D., Wilson, S. & Zwartjes, L. (2022) Toolkit of Innovative Pedagogical Approaches for Teaching with GIS, including the GI Ped Framework + Model Available at: https://www.gilearner.ugent.be/wp-content/uploads/GI-Pedagogy-Toolkit.pdf (Accessed: 5 Jan 2023)

Puertas Aguilar, M.A., Conway, B., De Lázaro Torres, M.L., De Miguel González, R., Donert, K., Linder-Fally, M., Parkinson, A., Prodan, D., Wilson, S. & Zwartjes, L. (2022). A teaching model to raise awareness of sustainability using geoinformation. Available at: https://www.gilearner.ugent.be/publications-gi-pedagogy/ (Accessed: 3 Jan 2023)

SMART VILLAGE: developing rural tourism business through circular economy and social innovation

Michaela Lindner-Fally

The SMART VILLAGE project created a new educational curriculum for senior citizens in deprived rural areas around Europe. In order to upgrade digital skills and competences to seniors/50+ impacted by the COVID-19 pandemic crisis, the SMART VILLAGE project focuses on their special needs and seeks to stimulate economic and social engagement for personal and community's future development. Four handbooks were created to give some ideas about the principles and benefits of circular economy and social innovation for rural communities. They also show how to create one's own new business by using innovative local cultural tourism opportunities. The project is a great opportunity for seniors to earn their own living in the economic crisis generated by the pandemic period, to keep their mind challenged and stay active in the community. Finally both seniors and their communities will benefit from the innovative approach of SMART VILLAGE.

The SMART VILLAGE project provides free online teaching and learning approaches including a research study and a collection of good practice initiatives. A training kit and an online platform help acquiring entrepreneurial competences in rural tourism.

Teaching the future and learning climate change with ArcGIS Dashborads

Rafael de Miguel González, Luc Zwartjes, Karl Donert

Teach The Future (TTF) is an European Union funded project, coordinated by EUROGEO, and designed to promote a highly relevant educational approach to climate change education, by applying open science and open data principles to the framework of a digital citizenship educational paradigm. he project responds to the needs of Europe and the goals of Agenda 2030 concerning sustainability and climate action.

TTF's has produced an analysis of curriculum across partners and the potential for teaching the future, climate education and using open data. Later on, teaching tghe future has created an online climate data dashboard, as a teaching resource targeted at teachers. This gathers climate data and scientific information which can be used by schools to support learning and teaching climate in schools. TTF's ArcgGIS Dashboard provides opportunities in and beyond the classroom, developed from an analysis of the resources and opportunities available, but also allows to develope an online teacher training course and to implement a quantitative and qualitative reserach about the challenges of climate change education in secondary education.

TOGETHER: a project introducing service-learning approaches in school

Karl Donert, Gert Ruepert

The TOGETHER project aims to foster digital creativity of young generations by using the "service learning" methodology, which means to create a link between students' learning objectives and the actual needs of society, and by applying the approach to secondary schools.

The aim is to engage students in community-valuable activities of digital transformation for cultural heritage resources, in order to protect community's cultural assets. The project has developed a training path for secondary school teachers on how to provide significant creative digital skills through the application of service learning, aiming to engage students in real-life initiatives in collaboration with key local actors for the promotion of their cultural heritage.

Posters

Anthropic action on protected areas of recife metropolitan region (Pernambuco, Brazil): causes and consequences

Maria de Lourdes Lacerda Buril, Larissa Monteiro Rafael, Mônica Cristina Barroso Martins, Eduardo Rodrigues Viana de Lima, Ranyere Silva Nóbrega, Eugênia C. Pereira

The need for space for urbanization and agriculture is exponentially growing, despite their finite availability, which increases the eradication of natural vegetation areas. In Brazil, the Atlantic rainforest is highly affected, which is the case of the Recife Metropolitan Region. The mapped patches of original vegetation were evaluated identifying the main impacts, and compared to lichen occurrence in their interior. In addition to predatory human action - such as hunting, foraging, littering, and invasions - and pollution from roads and avenues around those forest fragments, invasive exotic species were identified, mainly in the smallest areas, as well as the difference in lichen composition, since those organisms could be used as bioindicators of human impacts. It was concluded that those actions cause the loss of habitats, with drastic alterations in luminosity and humidity, which affect the development of more sensitive lichen species to environmental stress. In addition, those areas have several endemic or rare plants, animals, and lichen species, which demands a severe protection.

Characteristics of education for sustainable development in junior high school geography in Japan: content analysis of the national curriculum standards

Sakaue Hiroaki

Needless to say, Education for Sustainable Development (ESD) becomes a more and more important theme in geography education. At present, ESD is positioned in primary and/or secondary geography curricula in many countries and regions. In Japan, ESD has been introduced into the national curriculum standards in 2008 (primary and junior high school) and 2009 (high school) (Nakayama et al., 2015), and developing citizens to build a sustainable society is emphasized in the revised curriculum in 2017 (primary and junior high school) and 2018 (high school). This poster focused on junior high school geography and clarified the characteristics of ESD through content analysis of the geography curriculum in 2008 and 2017. The analysis focused on the establishment of concepts for building a sustainable society and the abilities and attitudes emphasized by learning instructions from an ESD viewpoint (see, Kadoya & Goto, 2013). As the results of comparisons of descriptions in both 2008 and 2017, the geography curriculum in 2017 included more of the concepts for a sustainable society and ESD abilities and attitudes. This is because more global and local geographical issues as a center content of ESD have been introduced into learning units, especially “world geographies” and “Japan geographies” in the curriculum in 2017, and the principle of curriculum organization has changed from content-based to the competency-based curriculum.

References:

Kadoya, S., & Goto, M. (2013). The past, present and future of ESD in Japan: how to develop and disseminate ESD at school with the network of the local community. NIER Research Bulletin, 142, 47–58. http://id.nii.ac.jp/1296/00000006/

Nakayama, S., Wada, F., & Takata, J. (2015). Geography education as education for sustainable development (ESD) in Japan. In Y. Ida, M. Yuda, & T. Shimura (Eds.), Geography education in Japan (pp. 107–119). Springer. https://doi.org/10.1007/978-4-431-54953-6_10

Current situation and issues in primary geographical education in Japan

Yui Yoshimichi, Sakaue Hiroaki, Murata Sho

Primary geography education receives attention in many countries (see, Review of International Geographical Education Online, vol.5, issue 2, 2015). In contrast to the world trends, geography education (research) in Japan mainly focuses on the secondary education stage, and the discussion on primary geography is a few (e.g., Shimura, 2015). Of course, recently, some research, e.g., the Science Council of Japan (2011), pointed out that such a situation is a considerable problem.

Purpose and method: This presentation reports on the current situation and issues in primary geographical education in Japan under the following research questions: (1) How is the situation in primary geography in Japan, compared with some countries? (2) Based on the current situation, what considerable problems are there in geographical education in Japan? To answer the above questions, we analyzed the Course of Study, textbooks, and related educational policy documents in Japan, compared with some countries.

Results and discussion: Compared with other countries, the situation in primary geography in Japan is shown as follows: Although the primary social studies curriculum in Japan is organized based on expanding environmental approach, it does not deal with global issues in geographical learning. Global issues themselves are positioned in the curriculum, however, they belong to civics learning in 6 grades. In addition, primary geography in many countries teaches world geography. On the other hand, primary geography in Japan focuses on geographies in school districts/local areas (1-3 grades), cities (3 grades), prefectures (4 grades), and Japan (5 grades) and emphasizes developing investigation skills through such learning units.

References:

Science Council of Japan. (2011). Proposal: Creating a new high school geography and history-fostering space-time cognition in response to globalization. Science Council of Japan. http://www.scj.go.jp/ja/info/kohyo/pdf/kohyo-21-t130-2.pdf

Shimura, T. (2015). Primary geography education in Japan: Curriculum as social studies, practices and teachers' expertise. Review of International Geographical Education Online, 5(2), 151-165.

Gaming & geography (education) - an overview

Sebastian Wolff-Seidel

Video games can play a role in the context of addressing the reflection of spatial perceptions and constructions in geography education. This does not only apply to serious games, but in fact to a possibly even greater extent to games that are produced primarily for entertainment purposes, as these are much more widespread. Nevertheless, they are still largely underrepresented in studies on geography education. The poster presents the project "Gaming & Geography (Education)" and thus gives an overview of current discourses on the role of video games in geography/geography didactic research, current research projects as well as theoretical concepts and impulses for further research.

Gamma radiation as biosynthetic activator of cladonia verticillaris (Lichen) for producing phenolics which induce chemical modification of soils

Juliane Barbosa Sales da Silva Botelho, Andrezza Karla de Oliveira Silva, Eugênia C. Pereira

The coastal area of the Brazilian Northeast is covered by the Atlantic rainforest. Some parts are losing space for urban and agricultural activities, with an emphasis on sugar cane plantations. Some exclusive areas with tableland relief, with sandy soils and edaphic “cerrados” (savannah-like vegetation), are inserted in the forest patches, both surrounded by plantations, which exposes the endemic biota to disappearing. This study shows as Cladonia verticillaris which naturally occurs in those areas can chemically modify its substrate, and how an exogenous gamma radiation source can influence the production of their main compounds, considered soil bioremediator. A simulation of dry and rainy periods was also carried out. Phenolics and photosynthetic pigments were produced no matter the used treatments, with emphasis on irradiated and wet samples, and percolated to the soil used in the experiments. Production of metabolites occurred until the end of experiments, but damage in the thallus structure was detected. C. verticillaris can reduce Al and increase pH, which can be considered an increase in physicochemical properties and soil fertility.

Geomedia skills for 21st century learners -digital story mapping as a teaching method in the framework of critical digital literacy

Henna Anunti

The rapid technological development and increasing quantity and accessibility of information in today´s modern, digitalised world provides opportunities and challenges for the 21th century geography education aiming to educate citizens who have skills to understand the world around them and build a worldview based on reliable information. Digitalisation and technology supported geography education can respond to a great variety of learning needs and disseminate effective practices as geospatial technology and geographic data are freely available more than ever (See e.g. Anunti et al. 2018; Bearman et al. 2016). However, concurrently researchers and teachers are beginning to understand that we must also identify and counter some of disruptive effects of digitalisation in teaching and learning (OECD, 2021). Teachers need to be equipped with a diverse repertoire of methods and instructional materials recognised effective to teach geographical knowledge and skills (Shell & al. 2013) and, thus, there is a need to explore and evaluate new didactic approaches to geography education. Digital story mapping is an innovative method that enables a student-centred inquiry-based learning approach, combined with the use of information and communication technology.

In this poster presentation I summarize the main results of the digital story mapping teaching experiment implemented in upper secondary education and teacher training (n = 25 high school students, n = 14 pre-service teachers). In addition, I examine digital story mapping as a teaching practice from the framework of critical digital literacy (Gauseti et. al., 2021).

References:

Anunti, H., Vuopala, E., & Rusanen, J. (2018). Lukiolaisten kokemuksia geomedian käytöstä tutkivassa oppimisessa. [High school students’ experiences of using geomedia in problem-based learning]. Terra (130)1, 17–32.http://urn.fi/urn:nbn:fi-fe202003067585

Bearman, N., Jones, N., André, I., Cachinho, H. A., & DeMers, M. (2016). The future role of GIS education in creating critical spatial thinkers. Journal of geography in higher education, 40(3), 394-408. https://doi.org/10.1080/03098265.2016.1144729

Gouseti, A., Bruni, I., Ilomäki, L., Lakkala, M., Mundy, D., Raffaghelli, J., Ranieri, M., Roffi, A., Romero, M. and Romeu, T. (2021). Critical Digital Literacies framework for educators - DETECT project Report 1.

http://doi.org/10.5281/zenodo.5070329
OECD (2021). 21st-Century Readers: Developing Literacy Skills in a Digital World. PISA, OECD Publishing, Paris. https://doi.org/10.1787/a83d84cb-en

How can geographical information tools help in assessing age-friendly multi-family residential estates in urban spaces?

Agnieszka Dawidowicz, Małgorzata Dudzińska, Marta Czaplicka, Adam Senetra

Assessments of sustainable urban development and the quality of life in cities play an increasingly important role in the light of Sustainable Development Goals (SDG) [Desa, 2016], including goal 11 (Sustainable cities and human settlements), and ISO 37120 (Sustainable cities and communities — Indicators for city services and quality of life) (ISO, 2014/2018), to identify areas that require revitalization. These assessments should focus primarily on residential areas, i.e. housing estates, that account for the largest percentage of urban space [Bradecki and Twardoch, 2013]. Special emphasis should be placed on multi-family residential estates (MFREs) whose number continues to increase in limited urban space due to population growth. In Europe, in particular in Euro Area countries (19 countries), a slow but steady increase in the percentage of the urban population residing in apartment blocks (more than 55%) has been noted in recent years due to declining incomes [EUROSTAT, 2020]. Ważne jest również aby diagnozować osiedla pod kątem potrzeb seniorów, na co wskazuje raport WHO „ Global age-friendly cities" [WHO, 2007].

The main aim of this study was to develop a methodology for evaluating Spatial Functional Structures (SFS) in multi-family housing based on a complete list of SFS indicators for open spaces, and to determine the applicability of GIS tools and selected open data sources for automating this process. Spatial and functional structures were evaluated only in open spaces because the information for indoor areas is not publicly available. The intermediate goal was to determine differences in SFS solutions in two MFREs that had been built with various technologies and urban layouts in the last 70 years. The first estate was built in the socialist era and comprises apartment buildings made of precast concrete slabs, whereas the second estate was developed with the use of more advanced construction technologies in the last 30 years. A list of user-friendly SFS indicators was developed for open spaces in the analyzed MFREs with the use of selected data sources and GIS tools. According to research, residential needs should be identified locally [Grigsby and Rosenburg, 2017]; therefore, SFS indicators were developed based on a survey of local inhabitants' needs. The proposed method was tested in MFREs in the city of Olsztyn in north-eastern Poland. Olsztyn features several MFREs, and some of these estates were built in the socialist era.

The presented approach is dedicated to urban planning and property management experts, in particular in former Eastern bloc countries that abound in LPHE, especially EU Member States which have developed the National Spatial Data Infrastructure (NSDI) under the INSPIRE Directive [INSPIRE, 2007].

Internal displacement of the Ukrainian refugees and migrations towards Moldova, Romania and Bulgaria

Rossen Kostadinov Koroutchev

In this work we have studied the evolution of the migration and refugee crisis in Ukraine and several neighbouring countries due to the armed conflict started in February 24th 2022. We have compared the internal displacement migration at two stages, in March 2022 after beginning of the conflict and in May 2022. Several changes have been observed regarding the increase of the returning migrants at the later stage. We have also discussed the migration of the Ukrainians to Moldova, Romania and Bulgaria. The latest country welcomed the largest wave of refugees in its history trying to adapt its policies to the current challenges and to integrate the most part of the Ukrainians immigrants and refugees to its labour market. We have also compared the Ukrainian migration to these three host countries in terms of several characteristics related to their profile, home of origin and later displacement, gender and age, education level and so on.

Landscape-ecological plan as a tool for management of Biosphere reserves

Zita Izakovičová, Marta Dobrovodská, Jana Špulerová, Veronika Piscová, Jakub. Melicher, Juraj Hreško

One of UNESCO's most important intergovernmental scientific programmes is the Man and the Biosphere (MaB) programme, established in 1971 to build a scientific basis for improving the interaction between people and their environment. In practice, the MaB programme is implemented through a system of biosphere reserves, which are internationally recognised as model sites for the application of interdisciplinary approaches, given their three main functions: a) protection of biodiversity, ecosystems and landscapes, b) sustainable economic and socio-economic development of local populations, c) promotion of science, research and education, with an emphasis on building partnerships at local, regional and international levels. Optimal management of the biosphere reserve is necessary for it to fulfil its functions.

One of its tools can be a landscape plan aimed at landscape-ecological optimisation of land use through an interdisciplinary approach. Its essence is the confrontation of the requirements of society for the development of the territory with the conditions (characteristics) of the landscape system, which form the excluding, limiting, or even supporting regulations of social development, and the subsequent harmonization, i.e. the proposal for the landscape-ecologically optimal distribution of individual activities in the territory with the aim of eliminating the current and preventing the emergence of new landscape-ecological, environmental and socio-economic problems. The paper will present the theoretical and methodological basis for the creation of a landscape-ecological plan.

Map-work strategies - systematic review

Nikola Koktavá

This poster presents the results of a systematic review of six empirical research articles on identifying strategies for working with maps. Using a systematic review methodology, findings from the literature on map work strategies were recorded. The findings show that eye-tracking testing is used to investigate map working strategies and the methodologies are similar in dividing the map field into areas of interest (AOIs).

The analysis of the findings shows that researches that use different partitioning of the material under study cannot be compared with each other. Four researches have chosen the same methodology to investigate mapping strategies and the results from these studies can be compared. The value of the study is that it gathers the available information to identify the map work strategies and methods that were used. The study also provides information on map work strategies and their study.

Matching the educational content of socio-economic geography to the needs of the labour market

Wioletta Kilar

The aim of the presentation (poster) is to present the diversity of the content of socio-economic geography education in secondary schools in Poland contained in the national core curriculum and its adaptation to the needs of the modern worker.

In preparing the paper, the author used several methods: content analysis and desk research, literature search and analysis; participant observation during several meetings related to the research conducted. As is well known, education is one of the key factors contributing to socio-economic development and the development of a knowledge-based economy, as it provides an inflow of skilled labour into the labour market. Therefore, it is particularly important to select the content of education and ways of its implementation in such a way as to effectively achieve the assumed objectives and prepare a young person for the needs of the contemporary labour market. Nowadays, the competences a person starting a professional career should be characterised by include the following skills: complex problem solving, critical thinking, managing people, cooperation with others, reasoning and decision making, negotiation, but also creativity and flexibility. Therefore, while analysing the provisions of the core curriculum in socio-economic geography in Poland, the author assessed their adjustment to the needs of employers. Furthermore, due to the "employee market" currently operating in Poland, she indicated the possible consequences of education in this area on the contemporary labour market.

Physico-chemical characterization of soil from a salinized area and a remaining caatinga vegetation in Assunção Island, Cabrobó (Pernambuco, Brazil)

Andrezza Karla de Oliveira Silva, Elvis Joacir de França, Bruno Fonseca da Silva, Rodrigo Santana Macedo, Gustavo Gabriel Alves, Eugênia C. Pereira

Brazilian Northeast in its West part has a dryness polygon, with semi-arid characteristics, whose biome is named Caatinga. In its area, one may identify some desertification cores, whose land degradation is mainly characterized by environmental degradation, with emphasis on loss of soil fertility, decrease in its productivity, and salinization, due to inadequate human activities. In this study soil samples from a salinized (degraded by human action) and a protected area (with natural vegetation) were chemically and physically evaluated, in Assunção island, Northeast Brazil. Physicochemical and statistical analyses showed that Fluvisol presents high base saturation and content of salts, even in area with coverage of natural vegetation. These values are near to salinized areas, conditioned by topography, deforestation, use and management of soil. This could be interpreted by parent material of this area, rich in halogens.

Phytosociological analysis in an area of caatinga remnant vegetation and an anthropized area in the municipality of cabrobó (Pernambuco, Brazil)

Thaís Fernandes de Assunção, Vitória Cezário Borges Dos Santos, Linaldo Severino Dos Santos, Steffane Ketily de Souza Silva, Eugênia C. Pereira

In Brazil, the Seasonally Dry Tropical Forests are found in the Caatinga Phytogeographical Domain. Despite having a high level of endemism, there are few researches for inventory and dissemination in the academic community of its biota. In this study, twenty sample plots with 400 m² each were delimited, with ten plots in a preserved remnant of Caatinga and another in a degraded area. Thus, 1,122 living individuals were measured, being distributed over 25 species belonging to the conserved area and 20 in the degraded area. Pielou's Equability was 0.818 and 0.766, respectively. The Shannon-Weave Diversity Index was 2.748 nats.ind.-1 and 2.215 nats.ind.-1, respectively. In the conserved area, there was a predominance of Caesalpinia pyramidalis and Jatropha mollissima are frequent species in the Caatinga. In the degraded area, the species with the highest occurrence were Aspidosperma pyrifolium, Caesalpinia pyramidalis and Mimosa tenuiflora.

Relationship to place and its reflection. Connecting geography and philosophy to create a good future for places and regions.

Kateřina Vyhnánková

The field of geography, or regional geography, is increasingly being challenged by the demand for a holistic approach. Straddling the natural and social sciences, and focusing on problem-solving as well as research, it provides an excellent umbrella for the complex question of the future of places and regions. This is the field's asset, but above all its responsibility. Thus, geography must also include "research on immaterial elements, such as thinking and perception of values" (Halás et al. 2014). Collaboration with philosophy, or learning and apply the philosophical reflection, will play an important role. This can be exemplified by the concept of "community resilience", which is so far reduced to the ability of a community to face natural disasters or humanitarian threats together in terms of rescue, psychotherapeutic intervention and mutual aid (Norris et al. 2008, Kulig et al. 2013).

The concept of community resilience should offer much more to local actors. The request to move beyond the familiar horizons in municipal development strategies is also proposed (away from a construct of foreseeable future that is modelled as a consequence of past events). This places a claim on change agents who are capable of such conceptual leadership beyond short-term projects (Grillitsch and Sotarauta 2020) and articulates the distinction between what development "can be" and "shall be" (Pike et al. 2007) which raises the question of where this normative claim comes from. It is a sovereign question of philosophy of values, existence, dialogue and non-objectivity (Jaspers, Buber, Marcel, Hejdánek etc.). I dare to say that in practice, municipalities and communities have insufficient methodological support for a holistic concept of community resilience and local development, i.e. for developing the capacity to understand and respond effectively to the changes and challenges of the situation and the future. This is the basic framework of my inquiry. In-depth field research identifies the values of citizens and local actors and compares them with the methodological support for the change agenda they receive from regionalists. It discovers weak points that are methodologically neglected and suggests ways in which collaboration with philosophically moderated reflection and dialogue can help.

The Cadastre as a tool to study the urban mobility problems derived from population aging. A case study: Algarrobo (Málaga, Spain)

Concepción Camarero-Bullón, Ángel Ignacio Aguilar-Cuesta, Ana Luna San Eugenio

The Cadastre has become a multipurpose tool of great value for the knowledge of territories and their people. This fact has caused it to be used by any citizen with interests in a property, as by researchers for the investigation of socio-economic changes in a given space. Thanks to the use of Geographic Information Systems combined with the database of the General Directorate of Land Registry, the National Geographic Institute and the National Statistics Institute, we have analyzed the socio-economic changes in the town of Algarrobo with the aim of showing the challenges and future risks of this territory, characterized by an urban location in an area of very steep topography. This space has a high singularity, because there are three population centers, two inland and one coastal, along with scattered settlements in the countryside. Its economic, social and historical differences and the great differences in the topography of that space have caused changes in a short period of time, giving rise to great differences: depopulation-overpopulation, urban inequality, mobility problems, very related to the aging of certain spaces and strong rejuvenation of others. In conclusion, thanks to these data we can determine mobility problems in each area or population center and prevent situations of risk and marginality in the future, with a view to future decision-making.

The climates of Europe: according to the climate classification of Novais

Giuliano Tostes Novais, Helena Madureira, Ana Monteiro

The climate classification of Novais is a methodological system that uses data obtained through climate reanalysis and data modeling to adjust the limits of climate units according to the scale adopted. The objective of this work was to spatialize this climatic classification for all Europe. The zonal climate scale, of astronomical influence, is presented by the first hierarchies (Climatic Zones and Zonal Climates). The regional climate scale is characterized by Climate Domains, Subdomains and Types. Six climatic domains were found in Europe, characterized by the average temperature of the coldest month, which were: Mild Tropical, Subtropical, Temperate, Cold Temperate, Subglacial and Arid. These domains are divided into climatic subdomains according to the amount of dry months (precipitation lower than potential evapotranspiration), and may be

moist, semi-humid, semi-dry and dry. To place regionally the domains and subdomains in each continent of the Earth, the climatic type is used, from the relief and vegetation. In the end, 154 climate units were identified for the continent. Research in this scale-up dimension can improve the understanding of Europe's regional and subregional climates.

The Tatra Biosphere Reserve as an educational site

Veronika Piscová, Juraj Hreško, Slavomír Celer, Zita Izakovičová, Jana Špulerová, Marta Dobrovodská, Jakub Melicher, Peter Bezák, Peter Gajdoš

Every biosphere reserve is required to develop and implement criteria and contents for environmental education in its framework plan, taking account of the specific structures of the biosphere reserve. Terms such as ”education“ are much too narrow and too strongly associated with the formal education system and the context of ”school“. To emphasise that it is a matter of actively changing patterns of behaviour and the values, attitudes, future orientation, motivations, etc. Upon which they are based, the term ”learning“, i.e. ”learning for sustainability“, should be brought much more to the fore.

The term ”learning sustainability“ also makes it clear that new forms, learning locations and fields of action are required. As educational places, not only schools, kindergartens or specially established educational facilities are suitable, but also the territory of the biosphere reserve itself. With their concept of the various zones, biosphere reserves offer outstanding opportunities for creating learning locations and learning landscapes for learning sustainability and for the introduction of new learning methods for many groups of players every day. Learning for sustainability presupposes that in future the employees in the biosphere reserves will see their job as including making the biosphere reserve into a ”learning landscape“, developing new learning methods and designing learning processes. Geographical education in the territory of the biosphere reserve should also be the subject of discussion and reflection, because even here we are ready to understand the world around us.

Why Europe is a must!

Harry Rogge

With the help of two maps the European concept will be explained. Focus on two European institutions the European Union and the Council of Europe. Presenter of poster is an official delegate to the Council of Europe on behalf of EUROGEO for years. Getting to know and understand the European values is main target!

Workshop 1.

Global change visible in cities: Story map experience

Maria Angeles Rodríguez-Domenech, María Luisa de Lázaro Torres

Education for sustainable development encourages changes in knowledge, skills, values and attitudes to enable a more sustainable and equity or balance or fair or equal society for all. And virtual field trips allow guided exploration through a structured online learning experience. EUROGEO invite you to participate in a higher education workshop on V-Global project. It will be explained: how to build a story map; collect data with a participatory tool (123Survey ArcGIS) in a field and apply it to Krakow. And the data collected will allow us to collaboratively create a digital story map on global change and see the results.

Workshop 2.

Teacher training to teach reality

Gerry O'Reilly, Tal Yaar-Waisel

Teaching current geography encounters difficulties and barriers in various parts of the world. It is challenging for many teachers. The proposed workshop is designed to reduce the existing concerns of teachers and allow them to approach the teaching of this topic with interest and joy. It is intended to make students reflect, discuss, and understand our interconnected & interdependent world.

In this workshop, we will find out the possibilities hidden in the discussion of geopolitical issues and the abilities of geography teachers to use their professional skills for the realization of extensive teaching goals. Use of media and online means for interesting and up-to-date teaching. Independent learning of a variety of contemporary issues that raise dilemmas for the learners like military intervention, civil involvement, and even sports. Sample events that invite learning and research will be tern to actual and curious teaching at this workshop.

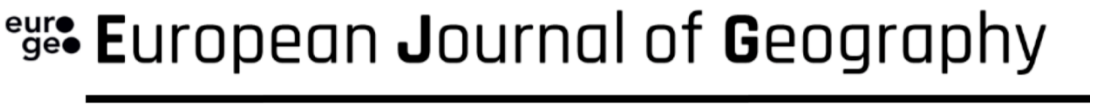
When a teacher makes the student understand the connection between geography and politics, he might find himself intimidated by the teaching of politics and forgets the importance of education political understanding, and civic engagement. In the 21st century geography still influences politics, and politics, of course, influences geography, nature, and the environment. This workshop will deal with how to make this field accessible to students since appropriate teacher training will allow teachers to teach the subject in its best way. Now, more than ever, students, parents, and administrators expect geography teachers to address current events and tie them into geography teaching. For example, the war in Ukraine led many teachers to engage in this in the classroom and to debate the issues of teaching and its goals. Even the World Cup in Qatar brought geopolitical issues to the geography classes.

We believe that teachers have the power to generate discussion and develop long-term attention on actual current issues, and the role of education systems is to address these issues through online means like the internet and mobile phone use in the classroom.

Conference Publication Options

Presenters at the EUROGEO Conference are invited to send their contributions according with relevant publication rules to the EUROGEO Journal or the EUROGEO and Book Series:

1. European Journal of Geography, http://www.eurogeographyjournal.eu/ (Instructions for authors: http://eurogeographyjournal.eu/index.php?func=page&page_id=45) (Indexed in Scopus, Scimago Journal & Country Rank).



2. Springer – EUROGEO book series: **Future-ready geography**. Call for chapters will be anounced soon.