



9th IEA
International
Research
Conference

Researching Education: **TRENDS & CHANGES**



PROGRAM

DUBAI,
UNITED ARAB EMIRATES

Workshops: **14-15 November 2021**

Conference: **16-18 November 2021**



Supported by:



OUR GUEST RESEARCHERS AND EDUCATIONAL EXPERTS

Honorable Ladies and Gentlemen,

It gives me great pleasure to welcome you to the ninth session of the *IEA International Research Conference*. We are proud to host it for the first time in the Middle East and the Arabian Gulf; we are also proud that the United Arab Emirates is a leader in hosting international conferences... Your presence and participation today in the work of the conference is valued, and we extend our thanks to the *International Organization for Educational Research IEA* for accepting the invitation of the United Arab Emirates to host the current session, and for its confidence in the exceptional capabilities and competencies of our beloved country.

The importance of the conference stems from the fact that it specializes in international educational studies, which is one of the most important evaluation tools for educational systems. Identifying the strengths and weaknesses in the field of education contributes to the development of the educational process and the drawing of modern methodologies and frameworks. In this sense, we have sought to promote a culture of research, in assessing educational attainment; and have encouraged those in the field of education to learn about best practice and to exchange ideas and information on important educational issues.

It is worth mentioning that the conference will contribute to a stimulating, and creative, dialogue between researchers and scientists. Promoting openness to new data analysis methodologies will also allow communication between researchers, teachers, and policymakers, in order to lay new foundations in educational research.

During the conference, a number of workshops will be held to introduce IEA data analysis mechanisms on how researchers use international assessment data—through multi-level modelling—as well as how educational organizations use international assessments (such as ICCS, ICILS, PIRLS, and/or TIMSS) and how policy decisions are made. The future of international assessment, at the national and regional level, will also be discussed.

The UAE has invested in human development in accordance with the sayings of the founding father, Sheikh Zayed bin Sultan, may his soul rest in peace, that the greatest investment of money is to invest it in building generations of educated people. As education is a top national priority, the real prosperity of our country is achieved through education and knowledge.

His policies and words were a beacon for us in our journey towards progress and prosperity in all fields, including the educational field, in order to contribute to building a knowledge-based economy.

We in the United Arab Emirates pay great attention to international assessments and believe in their importance in developing the educational system. We also value the role of the leading educational organizations that support us in achieving the UAE Centennial 2071 goal by being the best educational system in the world.

I am pleased to inform you that the conference coincides with the celebrations of the United Arab Emirates fiftieth anniversary of the establishment of the Union and invite you to enjoy attending the various events in our beloved country. We would also invite you to attend Expo 2020; a window to the future and the cultures of the world and to learn about the exceptional experiences.

I welcome you again in the United Arab Emirates and wish you all the best in the work of this conference, hoping that we will contribute together through the recommendations in supporting the educational systems of the world and in providing outstanding educational opportunities for students for a better future.



PROGRAM SCHEDULE	6
PROGRAM OVERVIEW	8
Session 1.....	10
Session 2.....	12
Session 3.....	14
Session 4.....	16
Session 5.....	18
Session 6.....	20
Session 7	22
LIST OF PRESENTING AUTHORS, CHAIRS, DISCUSSANTS, MODERATORS AND PANELISTS	24
ABSTRACTS	28
Workshops.....	28
Keynotes.....	30
Plenary sessions.....	32
Parallel sessions.....	34
Session 1A (Hybrid): IEA Studies and Publications - Symposium on the TIMSS 2019 Initiative to Develop Problem Solving and Inquiry (PSI).....	34
Session 1B (On-site): Practice - Influence of Parents on Childhood Learning	36
Session 1C (On-site): Methodology - Thinking Outside the Box: New Strategies for Analyzing ILSAs	38
Session 1D (Online): Policy - Using Data to Address Educational Inequalities.....	40
Session 2A (Hybrid): IEA Studies and Publications - Panel on Growing IEA Publications.....	43
Session 2B (On-site): Methodology - Exploring Classroom Determinants of Quality Through ILSAs	44
Session 2C (Online): Practice - Understanding Computer and Information Literacy and a Broadened Perspective on Citizens Education in IEA Studies	46
Session 2D (Online Exhibition Booth): SPRINGER - Talk to Springer About IEA Open-source Publications.....	49
Session 3A (Hybrid): Practice - Panel on Giving Back to Teachers: Why, What, and How?	50
Session 3B (Online): Methodology - Explaining Differences in Achievement Between Students and Countries.....	51
Session 3C (Online): Policy- Insights into the Trends Discovered in TIMSS Score Gaps	54
Session 3D (Online): IEA Studies and Publications - A Symposium on Good Citizenship for the Next Generation: A Global Perspective Using IEA ICCS 2016 Data	56
Session 4A (Hybrid): Policy - Investigating the Power of Communication and Language.....	59
Session 4B (On-site): Methodology - New Solutions for Old Problems: Fitting New and Legacy Data into New Models.....	62
Session 4C (Online): Practice - Supporting Teachers to Enhance Student Education	65
Session 4D (Online Exhibition Booth): IEA - Question and Answers with IEA.....	68
Session 5A (Hybrid): IEA Studies and Publications - Panel on IEA Research for Education Series: A First Look at Volume XIII, Dinaric Perspectives on TIMSS 2019	69
Session 5B (Online): Practice - Using IEA Data in (Re)search for Quality and Resilience	70
Session 5C (Online): Practice Gendered Perspectives in Results	73
Session 5D (Online Exhibition Booth): ILSA Gateway - Talk to IEA about the ILSA Gateway	76

Session 6A (Hybrid): IEA Studies and Publications - Symposium on the Reflections on the IEA Civic Education	77
Studies' Multi-Faceted Contributions to Research, Theory and Practice	
Session 6B (On-site): Practice - Symposium on Computer Use for Instruction and Learning Before and During	81
the Pandemic: Findings from ICILS 2018 and the ICILS Teacher Panel Session	
Session 6C (Online): Methodology - Exploring Methodological Issues when Analyzing TIMSS and ILSA Data.....	84
Session 6D (Online Exhibition Booth): American Institutes for Research (AIR) - Presentation and Hands-on	
Experience of the Virtual Tool for Teachers	86
Session 7A (Hybrid): Policy - Panel On Shaping Policy and Practice around Educational Disruptors.....	87
Session 7B (On-site): Practice - Impactful Practices in Education	89
Session 7C (Online): IEA Studies and Publications - International Civic Education and Citizenship	
Study and Society	92
Session 7D (Online Exhibition Booth): Australian Council for Educational Research (ACER).....	94
SOCIAL PROGRAM	96
FLOOR PLANS.....	97
CONTACT.....	100

PRE-CONFERENCE WORKSHOPS

14, 15 NOVEMBER 2021

Workshop 1: Statistical analysis of IEA data made easy: using the IEA IDB Analyzer (Basic level and language of instruction in Arabic).

Workshop 2: Analyzing IEA data with R (Basic level).

Workshop 3: Methods for casual inference with data from international assessments.

Sunday, 14 November 2021

08:00 - 09:00	Workshop Registration		
09:00 - 10:30	Workshop 1	Workshop 2	Workshop 3
10:30 - 11:00	Coffee / Tea Break		
11:00 - 12:30	Workshop 1	Workshop 2	Workshop 3
12:30 - 14:00	Lunch		
14:00 - 15:30	Workshop 1	Workshop 2	Workshop 3
15:30 - 16:00	Coffee / Tea Break		
16:00 - 17:30	Workshop 1	Workshop 2	Workshop 3

Monday, 15 November 2021

08:30 - 10:00	Workshop 1 (continued)	Workshop 2 (continued)	Workshop 3 (continued)
10:00 - 10:30	Coffee / Tea Break		
10:30 - 12:00	Workshop 1	Workshop 2	Workshop 3
12:00 - 13:30	Lunch		
13:30 - 15:00	Workshop 1	Workshop 2	Workshop 3
19:00 - 21:00	Reception		

CONFERENCE

16, 17, 18 NOVEMBER 2021

Tuesday, 16 November 2021

08:00 - 09:00	Conference Registration			
09:00 - 09:30	Opening Ceremony			
09:30 - 10:30	Keynote 1			
10:30 - 11:00	Coffee / Tea Break			
11:00 - 12:30	Session 1A	Session 1B	Session 1C	Session 1D
12:30 - 13:00	Meet the TIMSS and PIRLS International Study Center at Boston College			
12:30 - 14:00	Lunch			
14:00 - 15:30	Session 2A	Session 2B	Session 2C	Session 2D
15:30 - 16:00	Coffee / Tea Break			
16:00 - 17:30	Session 3A	Session 3B	Session 3C	Session 3D

Wednesday, 17 November 2021

08:00 - 09:00	Conference Registration			
09:00 - 09:30	Plenary Panel			
09:30 - 10:30	Keynote 2			
10:30 - 11:00	Coffee / Tea Break			
11:00 - 12:30	Session 4A	Session 4B	Session 4C	Session 4D
12:30 - 13:00	Meet the 9 th IEA IRC Host, the Ministry of Education UAE			
12:30 - 14:00	Lunch			
14:00 - 15:30	Session 5A	Session 5B	Session 5C	Session 5D
15:30 - 16:00	Coffee / Tea Break			
16:00 - 17:30	Session 6A	Session 6B	Session 6C	Session 6D
19:00 - 21:00	Social Dinner			

Thursday, 18 November 2021

08:00 - 09:00	Conference Registration			
09:00 - 09:30	Plenary Panel			
09:30 - 10:30	Keynote 3			
10:30 - 11:00	Coffee / Tea Break			
11:00 - 12:30	Session 7A	Session 7B	Session 7C	Session 7D
12:30 - 13:00	Meet the IEA Data Experts			
12:30 - 14:00	Lunch			
14:00 - 15:00	Closing Ceremony			
15:30 - 20:00	Tour of Expo 2020			

Online only

Hybrid: on-site and online

On-site only

PRE-CONFERENCE WORKSHOPS (ON-SITE)

Sunday & Monday, 14-15 November 2021, 9.00-17:30*

Workshop 1	Statistical Analysis of IEA Data Made Easy: Using the IEA IDB Analyzer (Basic) Instructor: Yasin Afana <i>Language of instruction in Arabic</i>	Room: Lecture Hall 1 Abstract Page: 28
Workshop 2	Analyzing IEA Data with R (Basic) Instructor: Umut Atasever and Diego Cortes	Room: Lecture Hall 4 Abstract Page: 28
Workshop 3	Methods for Causal Inference with Data from International Assessment Instructors: Rolf Strietholt and Andrés Strello	Room: Lecture Hall 5 Abstract Page: 29

*All workshops end at 15:00 on Monday, 15 November.

KEYNOTE PRESENTATIONS (HYBRID)

Tuesday, 16 November 2021 09:30-10:30	Keynote 1: Global Trends in Education: Opportunities and Challenges Speaker: Mohammed Al Mualla Chair: Andrea Netten Session Manager: Laura Cheeseman	Room: Auditorium Abstract Page: 30
Wednesday, 17 November 2021 09:30-10:30	Keynote 2: Assessing Deep Learning Speaker: Geoff Masters Chair: Dirk Hastedt Session Manager: Alan Egbert	Room: Auditorium Abstract Page: 30
Thursday, 18 November 2021 09:30-10:30	Keynote 3: Applications of Artificial Intelligence in Educational Testing and International Assessment Speaker: Matthias von Davier Chair: Thierry Rocher Session Manager: Laura Cheeseman	Room: Auditorium Abstract Page: 31

PLENARY SESSIONS (HYBRID)

Tuesday, 16 November 2021 09:00-09:30	Opening Ceremony Speakers: Amna Al Dahak (Undersecretary - Activities and Care Sector, UAE) and Dirk Hastedt (Executive Director, IEA) Moderator: Andrea Netten	Room: Auditorium
Tuesday, 16 November 2021 12:30-13:00	Meet the TIMSS and PIRLS International Study Center at Boston College Moderator: Katie Hill Session Manager: Laura Cheeseman	Room: Auditorium
Wednesday, 17 November 2021 09:00-09:30	Panel on the UAE's Educational System in Relation to IEA Studies Panelists: Hamad Al Yahyaei, Shaikha Al Zaabi, and Khaled Temsah Moderator: Moza Al Ghufli	Room: Auditorium Abstract Page: 32
Wednesday, 17 November 2021 12:30-13:00	Meet the 9 th IEA IRC host, the Ministry of Education UAE Moderator: Katie Hill Session Manager: Laura Cheeseman	Room: Auditorium
Thursday, 18 November 2021 09:00-09:30	Panel on Environmental Topics as Covered by TIMSS Data Panelists: Ina V.S. Mullis and Michael O. Martin Moderator: Dirk Hastedt	Room: Auditorium Abstract Page: 33
Thursday, 18 November 2021 12:30-13:00	Meet the IEA Data Experts Moderator: Katie Hill Session Manager: Laura Cheeseman	Room: Auditorium
Thursday, 18 November 2021 14:00-15:00	Closing Ceremony & Invitation to 10 th IEA IRC in 2023 Speakers: HE Hussain Bin Ibrahim Al Hammadi (Minister Of Education, UAE), Dirk Hastedt (Executive Director, IEA) and Sergey Kravstov (Minister of Education, Russian Federation) Moderator: Andrea Netten	Room: Auditorium

SESSION 1

Tuesday, 16 November 2021, 11:00–12:30

Session 1A (Hybrid): IEA Studies and Publications

Symposium on the TIMSS 2019 Initiative to Develop Problem Solving and Inquiry (PSI)

On-site Chairs: Ina V.S. Mullis and Michael O. Martin

On-site Presenters: Pierre Foy and Bethany Fishbein

Online Discussant: Franck Salles

Session Manager: Laura Cheeseman

Room: Auditorium

Abstract Page: 34

Introduction and Findings from the Mathematics Tasks | *Ina V. S. Mullis*

Findings from the Science Tasks | *Michael O. Martin*

Adding the PSI Items to the TIMSS Reporting Scales | *Pierre Foy*

Examining Omitted and Not Reached in TIMSS | *Bethany Fishbein*

Session 1B (On-site): Practice

Influence of Parents on Childhood Learning

Chair: Andrea Netten

Discussant: Lauren Musu

Room: Lecture Hall 1

Abstract Page: 36

The Influence of Nordic Parents' Reading Interest on 10-year-olds' Reading Achievement | *Hildegunn Støle, Åse Kari Wagner, and Knut Schwippert*

The Impact of Parental Involvement on the Mathematics and Science Performance of Grade 4 Students in the Arabian Gulf Countries. Based on TIMSS 2019 Data | *Shaikha Alzaabi, Nada Ruban, Nayel Hijazeen, Emad Adel Fraij, and Ali Juma AlRasbi*

The Interplay between Students' Home Language, Parental Education, School Belonging, and Reading Achievement in Norwegian PIRLS 2016 | *Olaug Strand and Maria Therese Jensen*

Session 1C (On-site): Methodology

Thinking Outside the Box: New Strategies for Analyzing ILSAs

Chair: Diego Cortes

Room: Lecture Hall 5

Abstract Page: 38

Capturing Quality. Educational Quality in Secondary Analyses of International Large-Scale Assessments: A Systematic Review | *Lies Appels, Sven de Maeyer, Jerich Faddar, and Peter van Petegem*

Non-response Bias in TIMSS Home Questionnaires | *Rune Müller Kristensen and Christian Christrup Kjeldsen*

Sampling Weights in Multi-level Modelling: An Investigation Using LSA Sampling Structures | *Julia Mang, Sabine Meinck, Helmut Küchenhoff, and Manfred Prenzel*

RALSA: The R Analyzer for Large-Scale Assessments | *Plamen Mirazchiyski*

Session 1D (Online): Policy

Using Data to Address Educational Inequalities

Online Chair: Maciej Jakubowski

On-site Moderator: Andrés Strello

Room: Case Method Hall

Abstract Page: 40

Educational Inequalities in Mathematics: An Analysis of National and International Assessment Data for Ireland | *Anastasios Karakolidis, Alice Duggan, Gerry Shiel, and Joanne Kiniry*

What Keeps Schools Behind in Saudi Arabia and MENA Countries? Latent Profile and Multi-level Approach | *Tomasz Gajderowicz, Maciej Jakubowski, and Mohammed Binhindi*

What Explains the Gap Between Mathematics Achievement in Saudi Arabia and Other Countries? Decomposition Analysis of 4th Grade Results in TIMSS 2019 | *Maciej Jakubowski, Nayyaf Aljabri, and Tomasz Gajderowicz*

The Role of Pre-school Education on Students' Mathematics Achievement in Fourth Grade: Lithuanian Case | *Saulė Ražienė, Laura Ringienė, and Audrone Jakaitiene*

SESSION 2

Tuesday, 16 November 2021, 14:00–15:30

Session 2A (Hybrid): IEA Studies and Publications

Panel on Growing IEA Publications

On-site Moderator: Katie Hill

On-site Panelists: Dirk Hastedt, Sabine Meinck, Seamus Hegarty, and Maria Magdalena Isac

Room: Auditorium

Abstract Page: 43

During the panel, the IEA series editors and authors of IEA publications will reflect on their uptake and experiences in publishing with IEA. Different modes of contributions will be discussed, including special issues, volumes, calls, and approaches to IEA publications.

Session 2B (On-site): Methodology

Exploring Classroom Determinants of Quality Through ILSAs

Chair: Alan Egbert

Room: Lecture Hall 1

Abstract Page: 44

Time Spent in School: Does it Count? | *Natalija Curkovic, Sanja Fulgosi, and Ivana Katavic*

Relation of Student Achievement to Teacher-related Constructs: Evidence from 43 Countries in TIMSS 2019
| *Nurullah Eryilmaz, Tianqi Lu, Dan Zhao, Kalyan Kumar, and Andres Sandoval-Hernandez*

The Association Between Educational Achievement and Computer and Information Literacy: Differences Across Sub-populations | *Diego Cortes*

Investigating the Relationships of Students' Attitudes Toward Mathematics and Technology-Aided Mathematics Instructions to Mathematics Achievement in United Arab Emirates: A Hierarchical Linear Modelling Approach | *Amina Al Jasmi*

Session 2C (Online): Practice
Understanding Computer and Information Literacy and a Broadened Perspective on
Citizens Education in IEA Studies
Online Chair: Catalina Lomos
On-site Moderator: Lauren Musu

Room: Case Method Hall
Abstract Page: 46

The Determinants of Teachers' Use of ICT for Professional Classroom Practice: The "Technology-Driven" Approach | *Catalina Lomos, Hans Luyten, and Sabine Tieck*

Teaching with Technology: A Large-scale, International, and Multi-level Study of the Roles of Teacher and School Characteristics | *Evi-Evropi Konstantinidou and Ronny Scherer*

Using ICT is Not Enough: The Relationships Between Student ICT Expertise and Mathematics Achievement | *Elisa Caponera, Francesco Annunziata, and Laura Palmerio*

Exploring Internet and Social Media Use for Students and Teachers in ICCS 2016 | *Guillem Fernández Villà and Lauren Musu*

Session 2D (Online Exhibition Booth): SPRINGER
Talk to Springer About IEA Open-source Publications
Online Exhibitor: Claudia Acuna

Room: Online
Abstract Page: 49

Springer Nature is a leading educational and professional publisher, providing quality content through a range of innovative platforms, products, and services. This session is a unique opportunity to connect with a Springer representative about IEA open-source publications.

SESSION 3

Tuesday, 16 November 2021, 16:00–17:30

Session 3A (Hybrid): Practice

Panel on Giving Back to Teachers: Why, What, and How?

On-site Moderator: Andrea Netten

On-site Panelists: Marian Bruggink and Paulína Koršňáková

Online Panelists: Alka Arora, Teresa Neidorf, and Will Johnston

Room: Auditorium

Abstract Page: 50

IEA studies have always been a great resource for researchers and as trends accumulated and expertise in using data grew, the experts involved in the educational policy have also benefited from this resource. In the meantime, since the beginning of IEA studies, there have been discussions about how to engage with teachers and provide them with information that they would find helpful and interesting. This session will showcase some options for doing just that.

Session 3B (Online): Methodology

Explaining Differences in Achievement Between Students and Countries

Online Chair: Oliver Neuschmidt

On-site Moderator: Pierre-Emmanuel Encinar

Room: Lecture Hall 1

Abstract Page: 51

Assessment of Effectiveness and Efficiency of Primary Education from the Perspective of Inclusion and Fairness | *Rimantas Zelvy, Dovile Stumbriene, and Audrone Jakaitiene*

The Rosetta Stone Project | *Pierre-Emmanuel Encinar, Clara Beyer, Juliane Kobelt, and Oliver Neuschmidt*

An Investigation on the Structure of the TIMSS 2019 Bullying Scale on the Cyprus Sample | *Valentina Ierotheou and Michael Michaelides*

Examining Gender Differences in TIMSS 2019: The Multiple Group Hierarchical Speed-Accuracy-Revisits Model | *Dihao Leng, Ummugul Bezirhan, Lale Khorramdel, Bethany Fishbein, and Matthias von Davier*

Session 3C (Online): Policy
Insights into the Trends Discovered in TIMSS Score Gaps
Online Chair: Aidan Clerkin
On-site Moderator: Yasin Afana

Room: Case Method Hall
Abstract Page: 54

24 Years of TIMSS Excellence (Gaps) | *David Rutkowski, Leslie Rutkowski, and Jonathan Plucker*

Socioeconomic Achievement Gaps: An Analysis of Twelve Years of TIMSS Trend Data for 24 Education Systems | *Yifan Bai and Markus Broer*

Exploring Score Gaps between High- and Low-Performing Students in TIMSS Education Systems Over Time | *Ebru Erberber, Maria Stephens, Yemurai Tsokodayi, Frank Fonseca, and Paul Bailey*

Session 3D (Online): IEA Studies and Publications
A Symposium on Good Citizenship for the Next Generation: A Global Perspective Using IEA ICCS 2016 Data
Online Chairs: Diego Carrasco and Ernest Treviño
On-site Moderator: Andres Sandoval-Hernández

Room: Lecture Hall 5
Abstract Page: 56

Towards a Comparable Model of Citizenship Norms Endorsement | *David Torres-Irribarra and Diego Carrasco*

A Comparative Approach to Citizenship Norms Endorsement Cross Countries | *Cristobel Villalobos, Maria Jesús Morel, and Ernest Treviño*

Citizenship Norms and Tolerance in European Adolescents | *Andres Sandoval-Hernández, Ellen Claes, Nicola Savvides, and Maria-Magdalena Isac*

Latin American Political Culture and Students Citizenship Norms | *Daniel Miranda, Loreto Muñoz, and Catalina Miranda Riquelme*

SESSION 4

Wednesday, 17 November 2021, 11:00–12:30

Session 4A (Hybrid): Policy

Investigating the Power of Communication and Language

On-site Chair: Christian Christrup Kjeldsen

Session Manager: Laura Cheeseman

Room: Auditorium

Abstract Page: 59

The Impact of Attending Early Childhood Education on Omani Students' Performance in PIRLS 2016 | *Fathiya Al Mawali*

Exploring the Relationship Between Language Spoken at Home and Science Achievement of Immigrant | *Samantha Curle, Andres Sandoval-Hernandez, Kalyan Kumar Kameshwara, Nurullah Eryilmaz, Dogan Yuksel, and Sibel Kaya*

The Impact of Teacher Behavior on Reading Comprehension in Flanders | *Nele Bleukx, Antonis Dervenis, and Koen Aesaert*

The Meaning of Political Trust Among 14-year-olds Across 24 Countries. Testing Within- and Cross-country Measurement Equivalence of Political Trust Using Multi-Group Confirmatory Factor Analysis | *Linde Stals, Maria Magdalena Isac, and Ellen Claes*

Session 4B (On-site): Methodology

New Solutions for Old Problems: Fitting New and Legacy Data into New Models

Chair: Plamen Mirazchiyski

Room: Lecture Hall 1

Abstract Page: 62

A Survival Mixture Model for Understanding Quitting Behavior | *Leslie Rutkowski, David Rutkowski, and Heiko Sibbern*

Big-Fish-Little-Pond and Phantom Effects with SIMS80: Applying Modern Methodological Tools to a Historical Dataset | *Ioulia Televantou, Herb Mars, Jiesi Guo, Kate Xu, and Cristos Nicolaides*

When Meta-analysis Meets International Large-scale Assessment Data: Applications of the Split, Analyze, and Meta-Analyze Approach | *Diego Campos, Ronny Scherer, and Mike Cheung*

Detecting Latent Subpopulations in International Large-Scale Assessments by Fitting MixIRT Models Using NUTS | *Rehab Al Hakmani and Yanyan Sheng*

Session 4C (Online): Practice
Supporting Teachers to Enhance Student Education
Online Chair: Grace Grima
On-site Moderator: Lauren Musu

Room: Case Method Hall
Abstract Page: 65

TIMSS-based Teacher Workshops Adding Value to Policy and Practice in England | *Jennie Golding, Mary Richardson, and Grace Grima*

School Management and Leadership Activities Using ICT—Results of ICILS 2018 | *Pierre Tulowitzki, Julia Gerick, Jeppe Bundsgaard, and Birgit Eickelmann*

Teachers' Technological Pedagogical Content Knowledge (TPACK) Self-efficacy Beliefs and the Role of Schools in Seven Countries Using ICILS 2018 Data | *Catalina Lomos, Falk Brese, and Sibel Telli*

Who Caters for the Teacher's Needs? Exploring Associations Between Teachers' Work Environment and Students' Outcomes | *Elisa Salinas, Ides Nicaise, and Agnes Stancel-Piatak*

Session 4D (Online Exhibition Booth): IEA
Question and Answers with IEA
Online Exhibitor: Katie Hill

Room: Online
Abstract Page: 68

IEA's online exhibition booth is a space all IEA IRC attendees are welcome to explore. This planned session will be an opportunity for attendees to connect with IEA, ask any questions and is a chance to generate meaningful conversation between IEA colleagues and attendees.

SESSION 5

Wednesday, 17 November 2021, 14:00–15:30

Session 5A (Hybrid): IEA Studies and Publications

Panel on IEA Research for Education Series: A First Look at Volume XIII, Dinaric

Perspectives on TIMSS 2019

On-site Moderator: Paulína Koršňáková

On-site Panelists: Sabine Meinck, Branislav Randjelović, and Eva Klemenčič Mirazchiyski

Online Panelists: Ines Elezović and Ivana Djerić

Room: Auditorium

Abstract Page: 69

This panel session offers a first ever look at IEA's latest volume in the Research for Education series: Dinaric Perspectives on TIMSS 2019, a regional report that was made possible through the funding and support of the European Commission.

Session 5B (Online): Practice

Using IEA Data in (Re)search for Quality and Resilience

Online Chair: Sue Thomson

On-site Moderator: Diego Cortes

Room: Lecture Hall 1

Abstract Page: 70

Profiles of Instructional Quality and Their Relationships to Student Outcomes in Science: Linking TIMSS 2019 and Classroom Video Observation Data | *Nani Teig*

Responsive Early Childhood Parenting, Preschool Enrollment, and Eventual Student Learning Outcomes: A Cross-Country Analysis Using Hierarchical Linear Modeling with TIMSS 2019 Data | *Aditi Bhutoria and Nayyaf Aljabri*

Exploring the Relationship Between Students' Civic Engagement and Civic Knowledge in Italy | *Valeria Damiani, Gabriella Agrusti, Elisa Caponera, Laura Palmerio, and Bruno Losito*

The Shift to Digital Reading Literacy: Can Digital Reading Literacy Scenarios Be a Key Driver in Developing Critical Reading Skills in the UAE? A White Paper on Utilizing Digital Reading Literacy Scenarios to Develop Critical Reading Skills | *Chris Jenkinson*

Session 5C (Online): Practice
Gendered Perspectives in Results
Online Chair: Irini Moustaki
On-site Moderator: Lauren Musu

Room: Case Method Hall
Abstract Page: 73

Class Gender Composition and Student Math Achievement: An International Comparison Using TIMSS data | *Zahra Kamal*

Who Teaches Me? Teacher Gender and Student Achievement in Muslim-majority Countries | *Zahra Kamal*

Explaining the Gender Gap in Political Engagement: The Role of Gender Stereotypes | *Elisabeth Graf*

Students' Gender and ICT Self-efficacy: The Moderating Role of ICT Use in IEA ICILS 2018 | *Kerstin Drossel, Mario Vennemann, and Nadine Fröhlich*

Session 5D (Online Exhibition Booth): ILSA Gateway
Talk to IEA about the ILSA Gateway
Online Exhibitors: Nathalie Mertes and Aysel Gojayeva

Room: Online
Abstract Page: 76

The ILSA Gateway is a particularly useful tool for researchers in the early phases of a new research project, when identifying and exploring possible topics and available data. This session offers an opportunity to talk with ILSA Gateway colleagues about the entry to comprehensive information on international large-scale assessments in education.

SESSION 6

Wednesday, 17 November 2021, 16:00–17:30

Session 6A (Hybrid): IEA Studies and Publications

Symposium on the Reflections on the IEA Civic Education Studies' Multi-Faceted

Contributions to Research, Theory and Practice

On-site Chairs and Presenters: Maria Magdalena Isac and Andres Sandoval-Hernandez

Online Presenters: Kerry Kennedy, Citlalli Sánchez-Alvarez, and Wiel Veugelers

Session Manager: Laura Cheeseman

Room: Auditorium

Abstract Page: 77

Advancing Theory and Engaging Asia's Citizenship Education Researchers with the Results from IEA's Civic Studies | *Kerry Kennedy*

The Influence of IEA Civic Education Studies on Policy and Practice in Latin America | *Andres Sandoval-Hernandez and Daniel Miranda*

Citizenship Education in Mexico and the Role of ICCS | *Maria-Eugenia Luna-Elizarraras, María Teresa Meléndez-Irigoyen, and Citlalli Sánchez-Alvarez*

The Contribution of the IEA Civic and Citizenship Education Studies to Educational Research and Policy in Europe | *Maria Magdalena Isac*

A Broadened Perspective on Citizenship Education and on IEA's International Civic and Citizenship Studies | *Wiel Veugelers*

Session 6B (On-site): Practice

Symposium on Computer Use for Instruction and Learning Before and During the

Pandemic: Findings from ICILS 2018 and the ICILS Teacher Panel

Chairs: Rolf Strietholt and Sabine Meinck

Discussant: Lauren Musu

Room: Lecture Hall 1

Abstract Page: 81

Design of the ICILS Teacher Panel | *Rolf Strietholt, Yuan-Ling Liaw, and Justin Wild*

Changes in the Level of Inequality in the Use of ICT During the Pandemic | *Justin Wild, Rolf Strietholt, and Yuan-Ling Liaw*

Longitudinal Evidence on the Determinants of Computer Use | *Yuan-Ling Liaw, Rolf Strietholt, Justin Wild, Agnes Stancel-Piqtak, and Ann-Kristin Koop*

Session 6C (Online): Methodology**Exploring Methodological Issues when Analyzing TIMSS and ILSA Data****Online Chair:** Ebru Erberber**On-site Moderator:** Andrés Strello**Room:** Case Method Hall**Abstract Page:** 84

The Review of R Packages for ILSA Data: Hard or Easy? | *Laura Ringienė, Julius Žilinskas, and Audrone Jakaitiene*

Talking about Teachers: Sampling Weights for Teacher-Centric Inferences for TIMSS | *Martin Hooper, Markus Broer, Lisa Yarnell, and Juliet Holmes*

Measurement Invariance in TIMSS 2019 Background Scales: A Partial Invariance Modelling Approach | *Katherine Reynolds and Lale Khorramdel*

Identification and Cross-country Comparison of Students' Test-taking Behaviors in Selected eTIMSS 2019 Countries | *Xiaying Zheng, Fusun Sahin, Ebru Erberber, and Frank Fonseca*

Session 6D (Online Exhibition Booth): American Institutes for Research (AIR)**Presentation and Hands-on Experience of the Virtual Tool for Teachers****Online Exhibitors:** Alka Arora, Teresa Neidorf, and Will Johnston**Room:** Online**Abstract Page:** 86

Researchers at the American Institutes for Research (AIR) are developing a web-based resource for teachers. In this special session, presenters will demonstrate a prototype of the AIR Educator Tool which gives teachers access to sets of mathematics and science assessment items organized in a database searchable by learning goals for selected topics and provides contextual information teachers need for instruction or classroom assessment across grade levels.

SESSION 7

Thursday, 18 November 2021, 11:00–12:30

Session 7A (Hybrid): Policy

Panel On Shaping Policy and Practice around Educational Disruptors

On-site Panelists: Branislav Randjelović and Danijela Djukić

Online Panelists: Patrícia Costa and Mario Vennemann

On-site Moderator: Dirk Hastedt

Room: Auditorium

Abstract Page: 87

The last year has been challenging and the work of education stakeholders has been affected by the pandemic. This panel provides a view into diverse activities happening during this period. The session will combine research papers with other relevant inputs from educational stakeholders and ILSA implementing institutions. While schools were affected by the closures, researchers worked on forecasting the impact of pandemic on students and education at large.

What TIMSS 2019 Can Tell Us About Covid-19 Learning Losses and Educational Inequalities in Europe? | Zsuzsa Blaskó, Patrícia Costa, and Sylke Schnepf

How Do Schools Contribute to Student Resilience in Computer and Information Literacy? Results from IEA ICILS 2018 | Mario Vennemann, Nadine Fröhlich, Kerstin Drossel, and Birgit Eickelmann

Session 7B (On-site): Practice

Impactful Practices in Education

Chair: Sabine Meinck

Room: Lecture Hall 1

Abstract Page: 89

The Effect of Between-school Tracking on School Segregation: International Evidence on Socioeconomic and Gender Segregation | Andrés Strello, Rolf Strietholt, and Isa Steinmann

Relationship Between Students' Computational Thinking and Problem-Solving: Investigating Affine School-Learning-skills and Gender in Four IEA ICILS 2018 Countries | Amelie Labusch and Birgit Eickelmann

Measuring Educational Equity Across Nordic Countries. Conceptual and Methodological Choices as Implications for Educational Policies | Oleksandra Mittal, Trude Nilsen, and Julius Kristjan Björnsson

The Validity of Student Ratings of Instructional Quality: Internal Structure, Comparability, and the Relationship to Student Achievement | Bas Senden, Trude Nilsen, and Nani Teig

Session 7C (Online): IEA Studies and Publications
International Civic Education and Citizenship Study and Society
Online Chair: Simona Boudova
On-site Moderator: Lauren Musu

Room: Case Method Hall
Abstract Page: 92

Systematic Review of Empirical Studies on International Large-scale Assessments of Civic and Citizenship Education | *Eunjung Myoung and Pey-Yan Liou*

Lower-secondary Students' Perceptions of Climate Change as a Global Threat. Results from ICCS 2016 | *Wolfram Schulz and John Ainley*

The Influence of Religious Attachment on Civic Engagement Among Lower-Secondary Students | *Wolfram Schulz and John Ainley*

Citizenship Education in Latvia: Education Content and Monitoring at a Policymaking Level | *Ireta Cekse*

Session 7D (Online Exhibition Booth): Australian Council for Educational Research (ACER)
Online Exhibitor: Alan Egbert

Room: Online
Abstract Page: 94

ACER's online exhibition booth welcomes all IEA IRC attendees. This planned session will provide an opportunity to learn about ACER and its work in the region and experience an interesting exchange.

LIST OF PRESENTING AUTHORS, CHAIRS, DISCUSSANTS, MODERATORS AND PANELISTS

(c) = chair
(d) = discussant
(m) = moderator
(p) = panelist

NAME	INSTITUTION / ORGANIZATION	SESSION
Aditi Bhutoria	Education and Training Evaluation Commission, India	5B
Aidan Clerkin	Educational Research Centre, Ireland	3C(c)
Alan Egbert	Australian Council for Educational Research, Australia	2B(c)
Alka Arora	American Institutes for Research, US	3A(p)
Amelie Labusch	Paderborn University, Germany	7B
Amina Al Jasmi	Emirates College for Advanced Education, UAE	2B
Anastasios Karakolidis	Educational Research Centre, Ireland	1D
Andrea Netten	IEA	Keynote 1(c), 1B(c), 3A(m)
Andres Sandoval-Hernández	The University of Bath, UK	3D(m), 6A(c)
Andrés Strello	IEA	Workshop 3, 1D(m), 6C(m), 7B
Ase Kari Wagner	University of Stavanger, Norway	1B
Bas Senden	University of Oslo, Norway	7B
Bethany Fishbein	TIMSS and PIRLS International Study Center at Boston College, US	1A
Branislav Randjelović	Institute for Education Quality and Evaluation, Serbia	5A(p), 7A(p)
Catalina Lomos	Luxembourg Institute of Socio - Economics Research, Luxembourg	2C(c), 4C
Chris Jenkinson	Ministry of Education, UAE	5B
Christian Christrup Kjeldsen	Aarhus University, Denmark	4A(c)
Citlalli Sánchez-Alvarez	Universidad Autónoma de Baja California, Mexico	6A
Daniel Miranda	Pontificia Universidad Católica de Chile, Chile	3D
Danijela Djukić	Institute for Education Quality and Evaluation, Serbia	7A(p)
David Rutkowski	Indiana University, US	3C
Diego Campos	University of Oslo, Norway	4B
Diego Carrasco	Pontificia Universidad Católica de Chile, Chile	3D(c)
Diego Cortes	IEA	Workshop 2, 1C(c), 2B, 5B(m)
Dihao Leng	TIMSS and PIRLS International Study Center at Boston College, US	3B
Dirk Hastedt	IEA	2A(p), Keynote 2(c), 7A(m), Plenary 2(m)
Ebru Erberber	American Institutes for Research, US	3C, 6C(c)
Elisa Caponera	National Institute for the Educational Evaluation of Instruction and Training, Italy	2C
Elisa Salinas	KU Leuven, Belgium	4C
Elisabeth Graf	University of Vienna, Austria	5C
Ellen Claes	KU Leuven, Belgium	3D
Ernest Treviño	Pontificia Universidad Católica de Chile, Chile	3D(c)
Eunjung Myoung	Korea University, Korea	7C
Eva Klemenčič Mirazchijski	Educational Research Institute, Slovenia	5A(p)
Evi-Evropi Konstantinidou	University of Cyprus, Cyprus	2C
Fathiya Al Mawali	Ministry of Education, Oman	4A
Franck Salles	Ministry of Education, France	1A(d)
Grace Grima	Pearson, UK	4C(c)
Hamad Al Yahyaei	Ministry of Education, UAE	Plenary 1
Heiko Sibberns	IEA	4B
Hildegunn Støle	University of Stavanger, Norway	1B
Ina V. S. Mullis	TIMSS and PIRLS International Study Center at Boston College, US	1A(c), Plenary 2
Ines Elezović	National Centre for External Evaluation of Education, Croatia	5A(p)
Ioulia Televantou	Theological School of the Church, Cyprus	4B
Ireta Cekse	University of Latvia, Latvia	7C
Irini Moustaki	London School of Economics, UK	5C(c)
Ivana Đerić	Institute for Education Quality and Evaluation, Serbia	5A(p)
Jennie Golding	UCL Institute of Education, UK	4C
Julia Gerick	Technische Universität Braunschweig, Germany	4C
Katherine Reynolds	TIMSS and PIRLS International Study Center at Boston College, US	6C

LIST OF PRESENTING AUTHORS, CHAIRS, DISCUSSANTS, MODERATORS AND PANELISTS

(c) = chair
(d) = discussant
(m) = moderator
(p) = panelist

NAME	INSTITUTION / ORGANIZATION	SESSION
Katie Hill	IEA	2A(m)
Kerry Kennedy	The Education University of Hong Kong, Hong Kong	6A
Khaled Tamsah	Department of Education and Knowledge, UAE	Plenary 1
Laura Ringienė	Vilnius University, Lithuania	6C
Lauren Musu	IEA	1B(d), 2C(m), 4C(m), 5C(m), 6B(d), 7C(m)
Lies Appels	University of Antwerp, Belgium	1C
Linde Stals	KU Leuven, Belgium	4A
Maciej Jakubowski	University of Warsaw, Poland	1D(c)
Maria Magdalena Isac	KU Leuven, Belgium	2A(p), 6A(c)
Marian Bruggink	Dutch Center for Language Education, the Netherlands	3A(p)
Mario Vennemann	Paderborn University, Germany	5C, 7A(p)
Martin Hooper	American Institutes for Research, US	6C
Michael O. Martin	TIMSS and PIRLS International Study Center at Boston College, US	1A(c), Plenary 2
Mosah Al Gufai	Ministry of Education, UAE	Plenary 1(m)
Nani Teig	University of Oslo, Norway	5B
Natalija Curkovic	National Centre for External Evaluation of Education, Croatia	2B
Nele Bleukx	KU Leuven, Belgium	4A
Olaug Strand	University of Stavanger, Oslo	1B
Oleksandra Mittal	University of Oslo, Norway	7B
Oliver Neuschmidt	IEA	3B(c)
Patricia Costa	Joint Research Center, European Commission, Belgium	7A(p)
Paulina Koršňáková	IEA	3A(p), 5A(m)
Pierre Foy	TIMSS and PIRLS International Study Center at Boston College, US	1A
Pierre Tulowitzki	FHNW University of Applied Sciences and Arts, Switzerland	4C
Pierre-Emmanuel Encinar	IEA	3B(m)
Plamen Mirazchiyski	Educational Research Institute, Slovenia	1C, 4B(c)
Rehab Al Hakmani	Emirates College for Advanced Education, UAE	4B
Rimantas Zelvys	Vilnius University, Lithuania	3B
Rolf Strietholt	IEA	Workshop 3, 6B(c)
Rune Muller Kristensen	Aarhus University, Denmark	1C
Sabine Meinck	IEA	1C, 2A(p), 5A(p), 6B(c), 7B(c)
Samantha Curle	The University of Bath, UK	4A
Saulė Raižienė	Vilnius University, Lithuania	1D
Seamus Hegarty	University of Warwick, UK	2A(p)
Shaikha Alzaabi	Ministry of Education, UAE	1B, Plenary 1
Simona Boudova	Czech School Inspectorate, Czech Republic	7C(c)
Sue Thomson	Australian Council for Educational Research, Australia	5B(c)
Teresa Neidorf	American Institutes for Research, US	3A(p)
Thierry Rocher	Ministry of Education, France	Keynote 3(c)
Tianqi Lu	University of Bath, UK	2B
Tomasz Gajderowicz	Education and Training Evaluation Commission, Poland	1D
Umut Atasever	IEA	Workshop 2
Valentina Ierotheou	University of Cyprus, Cyprus	3B
Valeria Damiani	LUMSA University, Italy	5B
Wiel Vleugeliers	University of Utrecht, the Netherlands	6A
Will Johnston	American Institutes for Research, US	3A(p)
Wolfram Schulz	Australian Council for Educational Research, Australia	7C
Xiaying Zheng	American Institutes for Research, US	6C
Yasin Afana	IEA	Workshop 1, 3C(m)
Yifan Bai	American Institutes for Research, US	3C
Zahra Kamal	Otto-Friedrich University of Bamberg, Germany	5C



Researching education, improving learning

COMPASS

BRIEFS IN EDUCATION

IEA ADVERT

This series addresses issues of interest to a broad range of educational stakeholders, especially those involved in influencing educational decision and policymaking.

Volume 10, *International large-scale assessments in education: A brief guide*, is now available in Arabic, English, French, German, Japanese, Russian, and Spanish.

If you are interested in producing translations of the articles, please contact IEA Amsterdam via secretariat@iea.nl.

iea.nl/publications/series-journals/iea-compass-briefs-education-series



An IEA-ETS Research Institute (IERI) Journal

IEA ADVERT

LARGE-SCALE ASSESSMENTS IN EDUCATION

EDITORS-IN-CHIEF:

Dirk Hastedt
Executive Director IEA

Eugenio Gonzalez
Director IEA-ETS Research Institute (IERI)

ELECTRONIC ACCESS:

largescaleassessmentsineducation.com



Open Access

Supporting Open Science and ensuring high visibility and reach for your article.

No Fees

The journal is fully sponsored by IERI and authors do not need to pay an article-processing charge.

Retain Copyright

The journal is Creative Commons licensed so authors retain full copyright.

144,160

Downloads 2020

3.7

CiteScore™ Tracker 2020

76

Submissions 2020

WORKSHOPS

WORKSHOP 1: Statistical Analysis of IEA Data Made Easy: Using the IEA IDB Analyzer (Basic Level and Language of Instruction in Arabic)

Instructor: Yasin Afana (IEA)

Room: Lecture Hall 1

Data from large-scale assessments are collected from complex samples and use specific methodology to examine the achievement of students. This is why base modules of statistical software packages cannot be used to derive correct statements on the state of education in the assessed populations. With the IDB Analyzer, IEA has developed an easy-to-use software that works as an add-on for SPSS, SAS and R. In this workshop we will work with the SPSS version, and will use TIMSS 2019 data for all presentations and practical examples. The goals of the workshop are to familiarize participants with the statistical complexities involved in working with international large-scale assessment databases, and familiarize participants with the data structure of TIMSS. Participants will learn how to run statistical analysis with TIMSS data, and interpret the results correctly. The workshop will balance presentations and hands-on practical assignments.

After the workshop, participants will be able to:

- Understand the complexities of large-scale assessment data;
- Merge different data files;
- Combining variables, creating and validating indices;
- Reproduce results shown in the exhibits of the TIMSS 2019 International Report; and
- Estimate percentages, means, correlation and regression coefficients and their standard errors given the complex designs.

WORKSHOP 2: Analyzing IEA Data with R (basic)

Instructors: Umut Atasever and Diego Cortes (IEA)

Room: Lecture Hall 4

In order to conduct targeted research using existing education data, researchers must have basic knowledge of statistical software in order to perform preliminary analyses, subset data to the target population of interest, and carry out primary analysis. A number of such software applications exist, but many are commercial while still requiring a steep learning curve for basic functionality. A free software application growing in use among the research and academic community is called R and has an active user base willing to discuss and exchange ideas, as well as offer solutions to basic and difficult programming questions.

R is one of the most important tools for statisticians presently used. It is an open-source project software environment and programming language with a wide variety of options that is highly extensible. It is not only used and supported by a broad and very diverse research community, but also by companies like Microsoft, Google, RStudio, and Data Camp that are actively promoting R as a lead platform.

This hands-on workshop is targeted to individuals who want to learn the basics of R and become familiar with this free and flexible software application. It will introduce participants to the differences between R and other statistical software such as SPSS. Participants will become familiar with installing R “packages,” the software’s use of functions to perform analyses, and data set manipulation. Furthermore, participants will be introduced to the recently implemented IEA IDB Analyzer integration with R to perform analyses with large-scale assessment data.

After the workshop, participants will be able to:

- Understand the differences between R and SPSS;
- Install packages in R;
- Import data into R;
- Perform subsetting, filtering, and recoding with data;
- Understand different methods for storing information on missingness in data with R;
- Use functions to perform descriptive and inferential analyses;
- Use R in conjunction with the IEA IDB Analyzer; and
- Understand the troubleshooting resources available for R users;

Programming knowledge learned during this course aims to create a foundation for researchers in their use of R and R resources.

Prerequisites:

Participants should have knowledge of basic descriptive and inferential analyses (e.g., frequencies, correlation, regression, significance testing) and some basic knowledge of large-scale assessment (e.g., weighting, plausible values) to understand the integration between R and the IEA IDB Analyzer.

WORKSHOP 3: Methods For Causal Inference With Data From International Assessments

Instructors: Rolf Strietholt and Andrés Strello (IEA)

Room: Lecture Hall 5

Much comparative educational research poses questions about causal effects but cannot employ experimental techniques to investigate them. However, during the last couple of decades analytical techniques have been developed within statistics, econometrics, and other disciplines, which support causal inference from cross-sectional and longitudinal data. The workshop presents designs that incorporate so-called fixed effects for the identification of causal effect: trend analyses (e.g., TIMSS 2015, 2019), comparisons between educational stages (e.g., grade 4, grade 8), within-student-between-grade designs (e.g., math, science), and school fixed effects.

In this workshop, the Rubin causal model (RCM) will be used as a framework of potential outcomes to define causal effects. Key differences between experimental and observational designs will be discussed to explain issues such as selection into treatments, omitted variable bias, and reversed causality. Thereafter, we will introduce different methods that address these issues in a non-technical way. We will review some studies that have employed the data from international assessments such as PIRLS and TIMSS to illustrate the methods. In a hands-on session, we will use data from IEA-studies for practical and interactive activities.

After the workshop, participants will be able to:

- Understand what a causal effect is;
- Be able to identify issues related to the identification of causal effects with observational data;
- Understand limitations of regression analysis; and
- Know designs that incorporate fixed effects for countries, schools, students, years, and educational stages.

The workshop will be a mixture of lectures and hands-on training, to ensure participants gain both sound knowledge and practical expertise.

Prerequisites:

Participants should have solid knowledge of regression analysis and be familiar with the use of syntax code in some statistical software such as R, SPSS, or Stata.

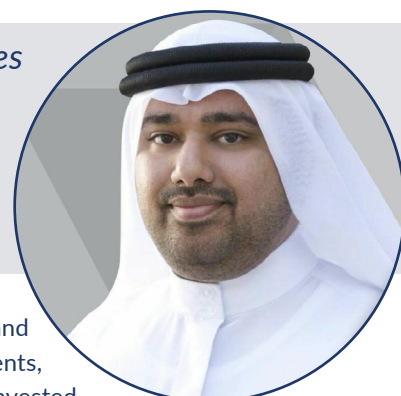
KEYNOTES

KEYNOTE 1: *Global Trends in Education: Opportunities and Challenges*

Speaker: Mohammed Al Mualla (Ministry of Education, United Arab Emirates)

Chair: Andrea Netten (IEA)

Room: Auditorium



The United Arab Emirates (UAE) is constantly seeking to develop the educational system and occupy an advanced position to be able to provide the best education in the world to its students, according to the 2071 Centennial. During this inspiring journey, the UAE adopted many trends, invested in many opportunities, and faced several challenges. This keynote session aims to present information on the challenges, opportunities, and trends facing the educational system.

KEYNOTE 2: *Assessing Deep Learning*

Speaker: Geoff Masters (Australian Council for Educational Research, Australia)

Chair: Dirk Hastedt (IEA)

Room: Auditorium



Many countries are revising their school curricula, tests, and examinations to provide less focus on the memorization and reproduction of facts and procedures, and more focus on deep conceptual understanding, including students' abilities to transfer and apply their understandings to a range of real-life contexts. Often this means reducing the volume of factual content in subjects and instead prioritizing core disciplinary concepts, principles, and methods. A focus on what is core to a subject invites a consideration of how students' understandings unfold and are best developed across the years of school, and of how these understandings are best assessed and monitored. A future measurement challenge will be not so much to assess how well students have mastered a body of grade-specific curriculum content as to establish where students are in their long-term development of deeper disciplinary understandings and skills and their practical application—a challenge that will require the construction of continuous measurement scales not limited to particular instruments, assessment programs or grade levels. This keynote presentation will consider implications for IEA studies.

KEYNOTE 3: Applications of Artificial Intelligence in Educational Testing and International Assessment

Speaker: Matthias von Davier (*TIMSS & PIRLS International Study Center at Boston College, U.S.*)

Chair: Thierry Rocher (*IEA*)

Room: Auditorium



Artificial Intelligence (AI) is a field that increasingly supports human decision-making in a variety of fields. Applications range from organizing the results of a web search to autonomously driving cars to the detection of medical conditions, to deriving questions and answers from a text. Education research as well as assessment development has discovered and is increasingly using AI and related approaches such as Natural Language Processing (NLP) and Machine Learning (ML) for tasks such as Automated Item Generation (AIG) and the scoring of essays using algorithms instead of or in addition to human scorers.

The use of AI is rare in multi-language international assessments, but the number of potential applications increases by the day. This talk will present application of Bioinformatics methods to issues such as the scoring of multilingual text and action sequences, the use of AI for generating clinical vignettes for medical licensing applications, and finally an example of how AI driven image classification can be used in automated scoring of free responses. The talk will discuss how these methods may be applied in IEA studies, such as TIMSS and PIRLS. Advantages such as increased reliability and potential disadvantages such as biases and shrinkage in classifications and predictions of the different approaches will be discussed.

PLENARY SESSIONS

Panel on the UAE's Educational System in Relation to IEA Studies

Panelists: Hamad Al Yahyaei, Shaikha Al Zaabi (*Ministry of Education, UAE*), and Khaled Temsah (*Department of Education and Knowledge, UAE*)

Moderator: Moza Al Ghufli (*Ministry of Education, UAE*)

Room: Auditorium

The United Arab Emirates (UAE) always seeks to implement the best educational practices and, by reviewing the results of international large-scale assessments, initiatives and projects may be developed or proposed. International assessments were listed in the National Agenda in 2014 and the targets were placed for the year 2021 for the UAE to be within the top 15 performing education systems in TIMSS and top 20 in PISA. The system went through drastic improvements, from an overhaul to the curriculum to assessment practices, to the creation of a national exam center. In this session, the most important initiatives and educational plans will be identified. The UAE attaches a great importance to international studies, particularly with regard to research studies and benchmarking, in an effort to improve the level of student performance and develop the educational system in the country, especially in lights of the UAE Centennial 2070, which aspired to make the UAE the best educational system in the world. However, it is vital to understand the UAE data in context as far as sampling, type of schools, multiple curricula in private and public schools, languages of instruction, and school improvement versus results accuracy. What works in the UAE does not mean these procedures would work in other countries. The UAE is unique in its demographics and challenges. Prior to any assessment the UAE embarks on multiple initiatives and training, such as awareness campaigns to students, teachers, and parents to ensure understanding and buying in. Additionally, following each assessment the UAE produces reports at a school, media, and executive levels. In this session many of these approaches from UAE will be explored and discussed. Changes in education do not happen overnight, but for the last two years UAE's focus has been on literacy skills engrossed in the curriculum and guided by the frameworks of international assessments. It is expected to see progress in the next cycle of TIMSS and PIRLS through the collective effort of the people of UAE and the amount of time and money invested in promoting educational progress.

Panel on Environmental Topics as Covered by TIMSS Data

Panelists: Ina V.S. Mullis and Michael O. Martin (*TIMSS and PIRLS International Study Center at Boston College, US*)

Moderator: Dirk Hastedt (*IEA*)

Room: Auditorium

In the past decade, international motivation to protect the environment has increased, with growing concerns about the negative consequences of human actions on our planet. To provide more information about how students around the world think about these issues, the TIMSS & PIRLS International Study Center constructed environmental awareness scales at the fourth and eighth grades for countries that participated in TIMSS 2019. The scales consist of items that relate to environmental issues and cover a wide range of topics, from the adverse effects of plastic waste in the ocean to the benefits of planting trees for the environment. At the fourth grade, 33 items were used with data from 53 countries, and at the eighth grade, 41 items were used with data from 37 countries. The environmental awareness scales were constructed using the same procedure as the TIMSS 2019 science content domains. The corresponding science item parameters and conditioning models were used to estimate student proficiency for the environmental subscales at both grades. A series of validation analyses found that the generated plausible values from a latent regression population model had no observable relationship with the number of environmental items in the assessment booklets, indicating that the scales were accurate and reliable. At the fourth grade, the majority of participating countries had scores above the TIMSS centerpoint of 500. Additionally, achievement for girls was higher than for boys in 10 countries, compared to only three countries having higher achievement for boys than for girls. Fourth grade students demonstrated understanding of some issues related to ecology and pollution. However, they tended to struggle with items related to farming, deforestation, and renewable energy sources. At the eighth grade, there was an even distribution of countries across the scale, with approximately half the countries having average scores above the TIMSS centerpoint of 500. Significant achievement differences between genders were seen in 16 countries, with eight having higher achievement for girls than for boys. Additionally, eighth grade students tended to perform well on items related to global warming and the benefits of urban gardening. Conversely, they found items relating to climate and weather challenging.

PARALLEL SESSIONS

Session 1A (Hybrid): IEA Studies and Publications

Symposium on the TIMSS 2019 Initiative to Develop Problem Solving and Inquiry (PSI) Tasks: Results and Reflections

On-site Chairs: Ina V.S. Mullis and Michael O. Martin (TIMSS & PIRLS International Study Center at Boston College, US)

On-site Presenters: Pierre Foy and Bethany Fishbein (TIMSS & PIRLS International Study Center at Boston College, US)

Online Discussant: Franck Salles (Ministry of Education, France)

Session Manager: Laura Cheeseman (IEA)

Room: Auditorium

This symposium features presentations and discussion among the authors of the recently released report: Findings from the *TIMSS 2019 Problem Solving and Inquiry Tasks (2021)*. As summarized below, the report covered a variety of successes and surprises related to the challenges of developing interactive items and new digital approaches to response capture, including scaling the PSI tasks with the TIMSS 2019 achievement scales, patterns of student' non-response styles, and automated scoring.

Introduction and Findings from the Mathematics Tasks

Ina V. S. Mullis (TIMSS & PIRLS International Study Center at Boston College, US)

This presentation will introduce the symposium by briefly describing 1) the goal of the PSI tasks to enhance TIMSS assessment of problem solving, and inquiry as already described in the TIMSS mathematics and science frameworks, 2) the characteristics of the PSI tasks, 3) TIMSS's history of such ambitious assessment efforts, and 4) the lengthy process of developing the PSI tasks in collaboration with the countries that participated in eTIMSS 2019. The presentation also will provide an overview of the recently released report: Findings from the TIMSS 2019 Problem Solving and Inquiry Tasks, focusing particularly on example items and results from the two chapters devoted to PSI tasks in mathematics--one at fourth grade about planning a school party and one at eighth grade about constructing a storage building.

Findings from the Science Tasks

Michael O. Martin (TIMSS & PIRLS International Study Center at Boston College, US)

This presentation will describe the basic assessment design of 14 Blocks and Booklets per subject and grade in TIMSS 2019 and how the PSI tasks were allocated to separate eBooklets rotated along with the 14 booklets. The presentation also will present example items and results from the two chapters describing PSI tasks in science—one at fourth grade about investigating which animal ate the plants in the garden and one at eighth grade about designing an experiment to determine the most effective fertilizer for pepper plants. The results indicated that eighth grade students have a reasonable grasp of an experiment as a fair test, but less understanding of an effective experimental control.

Adding the PSI Items to the TIMSS Reporting Scales

Pierre Foy (TIMSS & PIRLS International Study Center at Boston College, US)

As a separate initiative that only could be administered to the eTIMSS countries and not the paper countries, the data from students taking the PSI tasks (12 percent of 600,000) were not initially included as part of the achievement reported in TIMSS 2019 International Results in Mathematics and Science. This presentation will describe the methods and procedures for including the PSI items in the TIMSS 2019 mathematics and science scales at the fourth and eighth grades. Essentially, the PSI items were calibrated on the TIMSS 2019 achievement scales and used to estimate achievement for students that responded to the PSI eBooklets. The discrimination parameters estimated for the PSI items had about the same range as the eTIMSS (fixed) discriminations used in the joint eTIMSS and PSI scaling, which was a very good indicator that these two sets of items measure the same construct. For each grade and subject, there was essentially no difference (0 scale score points on average) between eTIMSS average achievement excluding the PSI students compared to average achievement including the PSI students.

Examining Omitted and Not Reached in TIMSS

Bethany Fishbein (TIMSS & PIRLS International Study Center at Boston College, US)

This presentation will provide an example of using timing data to investigate non-response in the TIMSS 2019 PSI tasks. TIMSS routinely has reported results for two types of non-response omitted and not reached (defined as all the blanks to the end of a booklet part following two omitted items). For the PSI tasks, the event log data enabled determining whether a student actually visited an item screen, the time they arrived, and how long they spent. The screen level (item level for screens with only one item) timing analysis showed that a non-ignorable percent of students stopped responding with time remaining in the assessment session, for a variety of potential reasons. The timing data, especially in mathematics, showed that higher percentages of students stopped responding (21%) than ran out of time (14%). In science, the results were 13 percent and 11 percent, respectively. At the eighth grade, the results in mathematics were 14 percent stopped responding and only 3 percent ran out of time. In science, there were similar completion rates between eTIMSS and the PSI tasks.

Session 1B (On-site): Practice***Influence of Pre-school Education and Parents on Childhood Learning*****Chair:** Andrea Netten (IEA)**Discussant:** Lauren Musu (IEA)**Room:** Lecture Hall 1**The Influence of Nordic Parents' Reading Interest on 10-year-olds' Reading Achievement**Hildegunn Støle¹, Åse Kari Wagner¹, and Knut Schwippert² (University of Stavanger, Norway¹; Hamburg Universität, Germany²)

Considering the decline between 2001 and 2016 in parents' reading interest observed in the Progress in International Reading Literacy Study (henceforth PIRLS), the main aim of the present study was to determine whether parents' reading interest contributes to student reading achievement in the relatively homogenous Nordic countries when the socio-economic factors parental education and number of books in the home are controlled for. A second aim was to find out whether parental reading interest might compensate for low parental education level. Norway and Sweden have participated in all PIRLS cycles since 2001 and can be compared to the other Nordic education systems of Denmark, Finland, and Iceland across time for more robust findings. To enable comparison on parents' reading interest across cycles, only two consistently used variables were explored: parents' spare time reading frequency and parental reading enjoyment. Predictably, four multiple regression analyses revealed that parents' level of education and number of books in the home contribute substantially to student reading achievement in all Nordic countries and all PIRLS cycles. However, parental reading enjoyment also contributes significantly and systematically to student achievement in all Nordic countries when social background is controlled for (with the sole exception of Norway in 2016). In contrast, parents' spare time reading frequency did not contribute to student reading achievement in either cycle or country. Secondly, comparing results from 2016 shows that expected student achievement is significantly higher when parents enjoy reading compared to those who do not, in all countries and education groups. Finally, it was found that parental reading enjoyment did compensate for lack of high (tertiary) education in Denmark and Finland in 2016. However, relatively few parents with little education report high levels of reading enjoyment. If the trend continues and fewer parents in the future enjoy reading, more children may go without the opportunity of developing reading enjoyment themselves. Unfortunately, this will affect more children from low SES backgrounds than from higher SES backgrounds. Therefore, it is important that both kindergartens and schools promote reading enjoyment among young children to ensure that all children have equal opportunity of learning to like to read, regardless of their social background.

The Impact of Parental Involvement on the Mathematics and Science Performance of Grade 4 Students in the Arabian Gulf Countries. Based on TIMSS 2019 Data

Shaikha Alzaabi, Nada Ruban, Nayel Hijazeen, Emad Adel Fraij, and Ali Juma AlRasbi (Ministry of Education, UAE)

Throughout the GCC, governments give the utmost importance to education. Within the context of regional educational initiatives, Trends in International Mathematics and Science Study (TIMSS) has shown that Arabian Gulf students' performance in math and science is still below the international average. One of the crucial elements that have proven to have a strong impact on students' achievement is parental involvement. Research has linked many positive educational outcomes—specifically behavioral and cognitive aspects to parental involvement—to improved outcomes. Researchers have defined parental involvement in terms of home-based activities such as helping with assignments and talking about their

child's educational syllabus. This paper aims to explore the link between parental involvement in the Arabian Gulf countries with high-performing countries in TIMSS, based on gender and socio-economic status. It uses data from the TIMSS 2019 assessment of fourth-grade students in the Arabian Gulf countries and two high performing countries. The parental involvement forms in this paper refer to: parents participate in activities, parents commit to ensure that their children are ready to learn, parents' expectations in regard to their children performance and achievement, and parent support for their children to achieve better results. A series of mean comparisons and correlation analyses were conducted to determine the percentages of fourth-grade parents who are active in their children's learning, based on questionnaire responses from mathematics and science teachers and school principals. The focus is on the impact of parental involvement in the Arabian Gulf Countries—on a student's mathematics and science achievement compared with two selected high-performance countries (Singapore and South Korea). Results from this study indicate a variation in the percentages of parental involvement in the four aspects. For example, teachers' questionnaire responses indicate that the highest percentage of parental involvement across the four aspects was in the United Arab Emirates. Whilst school principals' responses indicate that the highest percentage of parental involvement across the four aspects were in South Korea, Qatar, Singapore, and Bahrain. There is a statistically significant correlation between parental involvement of fourth grade students in the UAE and their children's performance in mathematics and science, regardless of the student's socioeconomic level. Whilst there is statistically significant correlation between parental involvement and students' performance in science and mathematics within the Emirates, Singapore, and South Korea, there is no statistical significance correlation in other sample countries such as Bahrain.

The Interplay between Students' Home Language, Parental Education, School Belonging, and Reading Achievement in Norwegian PIRLS 2016

Olaug Strand and Maria Therese Jensen (University of Stavanger, Oslo)

In the last decade, the number of immigrants has tripled in Norway, consequently leading to more linguistic and culturally diverse classrooms. Simultaneously, socioeconomic inequalities have increased significantly. Immigrant students tend to more often find themselves in a family situation of lasting low-income compared to with families without an immigration history. However, in Norway, persistent low-income is becoming more widespread among non-immigration families as well. Ever since international large-scale assessments, e.g., PISA, started ranking countries according to their equitability, Norway and the other Nordic countries have been in the top layer of these rankings. However, even though the impact of SES and immigrant background on students' educational achievements are smaller in these education systems than in most other OECD countries, they are still significant. Having solid reading skills is at the heart of students' achievement and therefore must be part of the progressive work towards greater educational equity. The main aim of this study was to investigate how parents' level of education and students' home language (how often the students claimed to speak the language of the test (Norwegian) at home) is associated with school belonging and with reading achievement, and how school belonging relates to students' reading achievement. Further, it investigates the indirect associations between parents' education, students' home language, and reading achievement through school belonging. Data from Norwegian PIRLS conducted in 2016 ($n = 4,232$ students, mean age 10.8) were applied. The construct of school belonging was measured by five items in the student questionnaire and validated using confirmatory factor analysis. By using structural equation modelling, this study finds that parents' educational level is significantly related to both students' sense of school belonging and reading achievement. Further, a significant association was found between students' home language and students' sense of school belonging and between students' home language and reading achievement. Finally, a significant positive relation between students' sense of school belonging and reading achievement was found. No indirect associations were found to be statistically significant. The findings implicate that the hope that students' sense of school belonging - a priority field in Norwegian education policy for decades - can compensate efficiently for possible achievement gaps in reading that could not be substantiated with the present data.

Session 1C (On-site): Methodology

Thinking Outside the Box: New Strategies for Analyzing ILSAs

Chair: Diego Cortes (IEA)

Room: Lecture Hall 5

Capturing Quality. Educational Quality in Secondary Analyses on International Large-Scale Assessments: A Systematic Review

Lies Appels, Sven de Maeyer, Jerich Faddar, and Peter van Petegem (University of Antwerp, Belgium)

The discourse of quality as a major policy aim has permeated everyday discussions about education, yet, the concept as such remains complex. Moreover, during the constant struggle to improve educational quality, governments have increasingly devoted attention to the results of highly standardized international large-scale assessments. As those results are used to inform policy decisions to improve countries' educational quality, it is important to understand how this concept of quality is handled. Lacking a synthesis on how quality is conceptualized and operationalized in this body of research, the current paper seeks to fill that gap by presenting a systematic review. Our analysis incorporated an identification of definitional patterns and an exploration regarding the corresponding methods for measuring quality. Based on this analysis of the reviewed studies, a framework of four approaches toward quality emerged to render the concept more accessible. We outline both the diversities and similarities in the conceptualization and operationalization emerging from the selected literature. In the light of these results, benefits and limitations of the concept's complexity are discussed and implications for research are forwarded.

Non-Response Bias in TIMSS Home Questionnaires

Rune Müller Kristensen and Christian Christrup Kjeldsen (Aarhus University, Denmark)

Response rates are a major issue in survey-studies and assessments—including in ILSAs—why high standards are set for overall response rates for students and schools in order to minimize non-response bias. Parent participation is not used as an indicator for study quality of ILSAs when considering study quality for the participating countries. This is reflected in the differing response rates on Home Questionnaires between countries, and a few countries do not use the Home Questionnaire at all. It is well-known that there is a bias in these responses, as students whose parents participate in the studies on average score higher than students whose parents do not. When data are brought together by several sources, the non-response structure in one source may be informed by information in the other. At a general level, the missing participation can be divided into two parts. One part is related to randomness and hence not related to student achievement, e.g., due to the test being administered online vs. on paper. The other part is correlated with students' achievement, and hence an expression of bias in responses. Using data from the last three rounds of TIMSS (2011-2019), the presentation examines whether changes in response rates within a country across the three cycles are related to changes in bias in relation to student attainment or could be attributed to randomness. Further, the study investigates whether the same pattern in bias and randomness recur in relation to scale scores constructed from responses on the student questionnaire. Using a resampling strategy, the presentation investigates to which degree changes in response rate is related to the two types of non-response, and whether changes in response rates seems to be related to the mode of data collection—paper vs. online—in the TIMSS 2019 study. Preliminary analyses of response rates in the Nordic countries indicates that a not insignificant part of the non-responses relate to bias in student attainment, but that the changes in response rates mostly seem to relate to randomness. The presentation is expected to provide insights into how analyses using responses from Home Questionnaires in ILSAs can be reported taking bias in these responses into consideration.

Sampling Weights in Multilevel Modelling: An Investigation Using LSA Sampling Structures

Julia Mang¹, Sabine Meinck², Helmut Küchenhoff³, and Manfred Prenzel⁴ (Technical University of Munich, Germany¹; IEA²; Ludwig-Maximilian's-Universität München, Germany³; Universität Wien, Austria⁴)

Standard methods for analyzing data from large-scale assessments (LSA) cannot merely be adopted if hierarchical (or multilevel) regression modelling should be applied. Currently various approaches exist; they all follow a generally design-based model of estimation using the pseudo maximum likelihood method and adjusted weights for the corresponding hierarchies. Specifically, several different approaches to using and scaling sampling weights in hierarchical models are promoted, yet no study has compared them to provide evidence of which method performs best and therefore should be preferred. Furthermore, different software programs implement different estimation algorithms, leading to different results. In this study, we determine based on a simulation, the estimation procedure showing the smallest distortion when inferring from samples mimicking typical LSA sampling structures to the actual population features. We consider different estimation, optimization, and acceleration methods, and different approaches on using sampling weights. Three scenarios have been simulated using the statistical program R. The analyses have been performed with two software packages for hierarchical modelling of LSA data, namely Mplus and SAS. The simulation results revealed three weighting approaches performing best in retrieving the true population parameters. One of them implies using only level two weights (here: final school weights) and, because of its simple implementation, is the most favorable one. This finding should provide a clear recommendation to researchers for using weights in multilevel modelling (MLM) when analyzing LSA data, or data with a similar structure. Further, we found only small differences in the performance and default settings of the software programs used with the software package Mplus, providing slightly more precise estimates. Different algorithm starting settings or different accelerating methods for optimization could cause these distinctions. However, it should be emphasized that with the recommended weighting approach, both software packages perform equally well. Finally, two scaling techniques for student weights have been investigated. They provide both nearly identical results.

RALSA: The R Analyzer for Large-Scale Assessments

Plamen Mirazchiyski (Educational Research Institute, Slovenia)

Large-scale assessments and surveys have a history of more than 60 years now. Different organizations have conducted both national and international large-scale assessments all over the world. The large-scale assessments initially started as “experiments” and served well to researchers globally and nationally. In recent decades, they have turned into one of the main driving forces of policy making in education, initiating, or guiding ongoing reforms. Due to their methodology, however, the large-scale assessments’ data have a number of characteristics which require special analysis techniques. This article presents a new R package for analyzing these data: the R Analyzer for Large-Scale Assessments RALSA. Other software packages for analyzing the data from large-scale assessments exist as well. RALSA, however, possesses some unique features which distinguish it from other software solutions. RALSA converts the originally provided as SPSS (or text) data into native R data sets. The converted data sets also contain the user-defined missing values for the variables, which is different from the typical way R handles the missing data. RALSA also has the capability to recognize the study, its cycle, and the available respondent types to select the appropriate design variables and apply the pertinent computational routines for the study in scope. Further, the package has a graphical user interface which eases the analysis for users with limited technical skills. Last, but not least, RALSA has a comprehensive output system which exports the results in MS Excel workbook with multiple embedded sheets (estimates, analysis information, model statistics, and the used analysis syntax). The entire package, including the graphical user interface and the output system, was built entirely in R without relying on any other platform or programming language. The package was built for user experience with a flexible design and architecture which permit quick addition of new studies and functionality.

Session 1D (Online): Policy Using Data to Address Educational Inequalities

Online Chair: Maciej Jakubowski (University of Warsaw, Poland)

On-site Moderator: Andrés Strello (IEA)

Room: Case Method Hall

Educational Inequalities in Mathematics: An Analysis of National and International Assessment Data for Ireland

Anastasios Karakolidis, Alice Duggan, Gerry Shiel, and Joanne Kiniry
(Educational Research Centre, Ireland)

Evaluations of effectiveness of educational reforms are often based on the level of improvement in student performance from one cycle of a particular assessment to the next. However, improvements in overall performance do not necessarily translate to improved equality. Indeed, improvements that favor certain subgroups of students can exacerbate educational performance gaps and thus, inequalities. This research examines changes in equality of mathematics achievement and subgroup performance differences in Irish primary school students over time. Ireland constitutes an interesting case study due to the introduction of a new National Literacy and Numeracy Strategy in 2011, the initial implementation of which has been linked to significant improvements in student mathematics performance. Using data from the Irish National Assessments of Mathematics and English Reading (NAMER) and the Trends in International Mathematics and Science Study (TIMSS) from the period before and after the introduction and initial implementation of the Strategy, this paper aims to investigate whether these improvements have been accompanied by improvements in equality. The results showed a considerable decrease in variance in mathematics performance attributed to between-school differences over time, both in NAMER and TIMSS. Regarding performance gaps and variance in mathematics performance explained by background characteristics, this study provided mixed results. In NAMER, subsequent to the introduction of the Strategy, the performance gaps and variance in mathematics achievement explained by selected demographic and socioeconomic characteristics decreased considerably. However, this was not the case for TIMSS. The evidence provided by this study suggests that Ireland has made reasonable progress in addressing inequality. However, there is room for improvement, as a significant proportion of the variance in student mathematics performance is still explained by demographic and socioeconomic characteristics.

What Keeps Schools Behind in Saudi Arabia and MENA Countries? Latent Profile and Multi-level Approach

Tomasz Gajderowicz¹, Maciej Jakubowski¹ and Mohammed Binhindi² (Education and Training Evaluation Commission, Poland¹; King Saud University, Kingdom of Saudi Arabia²)

The aim of this paper is to identify and portray heterogeneous groups of schools in the Kingdom of Saudi Arabia and other MENA countries, and to provide tailored recommendations to improve disadvantaged schools' performance. One of the most challenging issues for the educational systems worldwide is improving the quality of low-performing schools. These schools face specific challenges and thus often need a different approach than others. Identifying groups of schools with similar problems ensures that the solutions and treatments are tailored and that schools that need the most help receive the targeted measures. The empirical analyses conducted in this paper are based on the eight-graders micro-data from TIMSS 2019. This study focuses on the Kingdom of Saudi Arabia, showing also the perspective of evidence from other MENA countries. To identify groups of homogeneous schools, two methods were used: k-means clustering and latent profile analysis (LPA). Statistical grouping allowed to identify of the sub-groups of

school and latent patterns of their performance. After identifying the main differences between school clusters, the weighted regressions on the mathematics and science achievements were performed using the explanatory variables describing the school, teacher, and student characteristics. Finally, the multilevel model was performed to find the share of variance explained on the class- level, school- and student-level. Results show that the low-performing cluster is on average around 150 score points below the top-performing cluster (that performs close to international average), which means that students from disadvantaged cluster are far behind basic curriculum requirements. Those schools differ fundamentally concerning student and school resources, environment, teaching method, and teachers characteristics. Data show that in these schools, support for students is indispensable, including providing them with access to appropriate educational materials, which they cannot access at home. Policy recommendations for low-performing schools should focus on linking parents with schools, dealing with absenteeism and bullying. Disorder problems common in these schools require also providing targeted teacher education to provide them with knowledge and skills needed for work with these issues. In these schools the teaching methods seem to be inadequate and the absence of teachers is a problem. For the medium- and high-performing school profiles, separate analyses were conducted and adjusted recommendations were proposed. Most of the school- success factors are consistent across MENA countries, but some of them are specific for particular educational systems. Findings in this paper justify the need for heterogeneous policies targeting low-performing schools.

What Explains the Gap Between Mathematics Achievement in Saudi Arabia and Other Countries?

Decomposition Analysis of 4th-grade Results in TIMSS 2019

Maciej Jakubowski, Nayyaf Aljabri, and Tomasz Gajderowicz (University of Warsaw, Poland)

This paper compares the mathematics achievement distribution of fourth grade students in Saudi Arabia to the pooled distribution of achievement of all other countries in the TIMSS 2019 study. On average, students in Saudi Arabia score around 70 points behind the TIMSS international center point. Using Oaxaca-Blinder decomposition, we estimate how the achievement difference is associated with factors related to student early education activities, family background, attitudes, behavior, and teaching. We also provide a detailed analysis for selected variables related to the most considerable differences in achievement. We found that part of the achievement gap is related to differences in the levels of variables. The gap could be reduced by around 17% with higher participation in preschool education and smaller student absenteeism in Saudi Arabia. More significant are differences in the effects of various variables, especially those reflecting student background, discipline, and math instruction. The most privileged students in Saudi Arabia achieve less than their peers of similar backgrounds in other countries, and students' higher motivation does not translate into better achievement. Behavior and discipline-related issues are more strongly and negatively associated with Saudi Arabia's achievement. We discuss possible explanations and provide recommendations for changes in education policy and school practices. First, the results show that early education investment is crucial for leveraging student achievement in the early grades. Second, student absenteeism and school discipline are key factors to address by education policy to improve learning outcomes. Third, the results show that relative to other countries, even students who have full support from their families and are highly motivated do not achieve their potential. We hypothesize that curricula and instruction quality are partly responsible for the achievement gap between Saudi Arabia and other countries. Finally, the paper shows how decomposition methods can help understand how both levels of resources and their associations with achievement can explain achievement differences between different countries. Similar techniques can be applied to data from any country to improve our understanding of cross-country differences in TIMSS and other large-scale surveys. We present in the paper how to properly use these methods to international student assessment data by taking into account complex sampling and psychometrics.

The Role of Pre-school Education on Students' Mathematics Achievement in Fourth Grade:**Lithuanian Case**

Saulė Raižienė, Laura Ringienė, and Audrone Jakaitiene (Vilnius University, Lithuania)

In light of the increasing evidence that the long-lasting effects of preschool education on children's learning and development depend on their subsequent educational experience (see Ansari & Pianta, 2018; Han, O'Connor, & McCormick, 2019), we used two-level random effects models to examine the links between the length of preschool education of students and their mathematics achievement in fourth grade, controlling for the family SES of the students. In addition, we tested compositional and interaction effects with respect to students' preschool education on student achievement. And finally, since Lithuania in 2016 had introduced compulsory pre-primary education for one year prior to starting primary school, we tested if the patterns of associations between students' preschool education and mathematics achievement are the same in TIMSS 2015 and TIMSS 2019. The Lithuanian sample consists of 4,529 fourth grade students in TIMSS 2015 and, respectively, 3,741 students in TIMSS 2019. We estimated models using all plausible values, appropriate weighting schemes, and grand mean centering. In both studies parents provided information about the child preschool education and their highest education level that we used as indicator for family SES. TIMSS 2015 results indicate significant positive effect of preschool education on mathematics achievement at the student and school levels; however, school composition based on preschool education strengthens the within-school relationship between student SES and achievement. After educational reforms and the introduction of compulsory pre-primary education, the TIMSS 2019 results show no effects of preschool education on mathematics achievement in the fourth grade, with the remaining effects of individual SES and school composition SES on student mathematics achievement. The results are discussed in light of the effectiveness of introduced compulsory pre-school education in Lithuania.

Session 2A (Hybrid): IEA Studies and Publications

Panel on Growing IEA Publications

On-site Moderator: Katie Hill (IEA)

On-site Panelists: Dirk Hastedt¹, Sabine Meinck¹, Seamus Hegarty², and Maria Magdalena Isac³
(IEA¹; University of Warwick, UK²; KU Leuven, Belgium³)

Room: Auditorium

IEA is committed to ensuring that the results of its comparative research projects reach a wide audience of researchers, policymakers, technical experts, educators, and all others working to enhance teaching and learning around the world. IEA publications serve as essential vehicles to highlight the work of IEA and its study findings. Over the past five years, there has been significant growth in the number of IEA publications and their reach. Publications include results and supporting information for IEA studies, three open access publication series with Springer and a special IEA Compass series aimed at policymakers and practitioners, not to mention the special standalone volumes like this year's ICCS Influences. The IERI Large-scale Assessments in Education journal continues to grow from year to year, with downloads nearly doubling last year to 144,000 for 2020. Undoubtedly, much of this growth reflects the high-quality contributions that are received. The panel session aims to consider the multitude of factors that have influenced the growth of IEA's publication portfolio, and how this work can continue to be shaped moving forward. As an author of IEA publications there is a bounty of benefits. All works published by IEA are open access—allowing authors to reach the widest audience possible—and undergo a thorough peer-review process. IEA places a high emphasis on quality and protecting the intellectual property of academic researchers and writers. Further, IEA covers all the costs of open-source publishing and dedicates attention to the dissemination and promotion of all publications. During the panel, the IEA series editors and selected authors of IEA publications will reflect on their uptake and experiences in publishing with IEA. Different modes of contributions will be discussed, including special issues, volumes, calls, and approaches to IEA publications. During the panel, the IEA series editors and selected authors of IEA publications will reflect on their uptake and experiences in publishing with IEA. Different modes of contributions will be discussed, including special issues, volumes, calls, and approaches to IEA publications.

Session 2B (On-site): Methodology***Exploring Classroom Determinants of Quality Through ILSAs*****Chair:** Alan Egbert (*Australian Council for Educational Research, Australia*)**Room:** Lecture Hall 1**Time Spent in School: Does it Count?**

Natalija Curkovic¹, Sanja Fulgosi¹, and Ivana Katavic² (National Centre for External Evaluation of Education, Croatia¹; Education and Teacher Training Agency, Croatia²)

When trying to improve the quality of education and raise students' achievements, some policy makers suggest that students spending more time in school could help them accomplish better school results. Research differentiates between instructional and non-instructional time spent in school. Instructional time is devoted to tutoring, while non-instructional time is used for organizational or administrative activities, classroom management, and discipline. There is a limited body of research that studies the association between time spent in school and students' achievement, and the results are somewhat conflicted. In the last few years, comprehensive educational reform in Croatia has started a lively debate about whether students spend enough time in school. Therefore, the goal of this research is to examine the association between time spent in school and cognitive as well as non-cognitive variables. The analysis was done by using the TIMSS 2015 and TIMSS 2019 datasets. The participants of the TIMSS 2015 and TIMSS 2019 in Croatia were the fourth-grade students, hence the study was focused on this age group. As a dependent cognitive variable, students' achievement in math and science were taken and calculated as a test score in TIMSS 2015 and TIMSS 2019. Students' sense of school belonging, and student bullying were used as non-cognitive dependent variables. Since the TIMSS results do not include data about total time spent in school (both instructional and non-instructional time), only the instructional time was used. Data were analyzed by using regression analyses in R intsvy package made specifically for the international education surveys such as TIMSS. In both years, 2019 and 2015, multiple regression models weren't significant, meaning there is no connection between total instructional time and used measures. Since there is very limited scientific evidence on this topic when it comes to the Croatian population, the insights from this study would be very helpful in shaping educational policy and planning especially if it is taken into account that curriculum reform is going on.

Relation of Student Achievement to Teacher-Related Constructs: Evidence from 43 Countries in TIMSS 2019.

Nurullah Eryilmaz, Tianqi Lu, Dan Zhao, Kalyan Kumar, and Andres Sandoval-Hernandez (University of Bath, UK)

Teacher effectiveness is an extensively researched topic in educational research. Nevertheless, there is no consensus regarding the structural relationship between certain teacher-related variables and student achievement at a cross-national level, particularly with respect to student mathematics achievement. This work presents an analysis, deriving a model of the effects of teacher variables on student's mathematics achievement, based on data from the Trends in International Mathematics and Science Study (TIMSS) 2019, focusing on eighth grade classrooms across a sample of 43 countries. The study uses TIMSS 2019 data to implement multilevel modelling for each participating country. We identified a stable pattern of statistically significant positive correlation between teacher educational background and student achievement across the sample's participant countries, while other aspects of teacher quality only weakly and inconsistently correlate with student achievement. We also identified a significant correlation between instructional quality and student achievement. Recommendations for future studies and implications for theory, practice, and policy are discussed.

The Association Between Educational Achievement and Computer and Information Literacy: Differences Across Subpopulations

Diego Cortes (IEA)

In this study, I investigate the association between students' computer and information literacy (CIL) and their outcomes in teacher assessments and standardized tests across different subpopulations in Chile. Over the past few decades, information and communication technologies have become increasingly prevalent in the Chilean education system. This suggests that CIL may now be an essential input in the production of education. To investigate this, I construct a unique student-level database by linking data from several student assessments at different points in time to a population-based sample of eighth graders originally drawn for the International Computer and Information Literacy Study in 2013. A population descriptive analysis suggests that variation in CIL scores, measured in Grade 8, is associated with an increase in reading and math scores derived from the National System for the Evaluation of Education Quality test (SIMCE) in Grade 10. I also find little or no evidence that CIL is associated with student outcomes in teacher assessments, as captured by grade repetition and GPA in Grade 10. This association is conditional on various measures of student achievement in Grade 8, and on a rich set of background characteristics. To explore the heterogeneity of these results across subpopulations, I proceed by looking at the association of interest across socioeconomic groups. I exploit the fact that data for ICILS in Chile were collected using a sample that was stratified by type of school. This characteristic of the sample design allowed to control that sample sizes are kept large enough within strata to attain a more precise estimation of parameters. Finally, to shed light on the possible problem arising from omitted variables, I provide a quantitative assessment of the impact that potential unobserved inputs might have had on my results. For this, I follow the framework developed by Oster (2019) and investigate how my baseline results change given different assumptions regarding (1) the strength of the association between CIL and potential unobserved inputs; and (2) the amount of variance explained by the "true" model generating students' outcomes. I find that my results are robust to a limited range of these assumptions.

Investigating the Relationships of Students' Attitudes Toward Mathematics and Technology-Aided Mathematics Instructions to Mathematics Achievement in United Arab Emirates: A Hierarchical Linear Modelling Approach

Amina Al Jasmi (Emirates College for Advanced Education, UAE)

Mathematics is one of the subjects that is considered challenging by most students. There is a significant reduction in mathematics achievement among current learners, and this deficiency raises concerns among leaders and policymakers in the field of education. Although a growing corpus of research, conducted primarily in a Western setting, has documented the factors linked to adolescents' mathematics achievement, there is a dearth of such research on the United Arab Emirates (UAE). Such research is warranted in the context of UAE, given the poor performance of Grade 8 students in the UAE on TIMSS 2015 mathematics assessment. Grade 8 students are seriously affected as they tend to have lower performance in mathematics compared to other learners. In the United Arab Emirates (UAE), Grade 4 students exhibit higher levels of fondness for mathematics, but the attitudes change drastically in Grade 8 students. This finding is important because learners' attitudes toward mathematics largely influence their performance in the subject. Hence, the purpose of the present study was to investigate of attitudes toward mathematics and technology-aided mathematics instructions to mathematics achievement, after controlling for students' demographic and home educational resources. The sample consists of 30,284 Grade 8 students from 477 schools in UAE, who took part in the 2015 Trends in International Mathematics and Science Study (TIMSS). The results of hierarchical linear modeling (HLM) approach indicated that students' perceptions of mathematics importance and technology-aided mathematics instructions were statistically significantly and positively related to mathematics achievement. On the other hand, students' enjoyment of mathematics subject was statistically significant but negatively related to students' mathematics achievement. Implications of the findings are discussed briefly for policy and practice.

Session 2C (Online): Practice***Understanding Computer and Information Literacy and Broadened Perspective on Citizens Education in IEA Studies*****Online Chair:** Catalina Lomos (*Luxembourg Institute of Socio - Economics Research, Luxembourg*)**On-site Moderator:** Lauren Musu (*IEA*)**Room:** Case Method Hall**The Determinants of Teachers' Use of ICT for Professional Classroom Practice: The "Technology-Driven" Approach**Catalina Lomos¹, Hans Luyten², and Sabine Tieck³ (*Luxembourg Institute of Socio-Economic Research, Luxembourg¹; University of Twente, the Netherlands²; IEA³*)

The integration of ICT in education is realized through its use by teachers in classroom practice. Empirical evidence has shown that an ICT innovation requires high initial financial investment in technology. Once the necessary financial investment in ICT technology has been made, the key question that comes to the fore is, which other factors are required to increase the use of ICT in teaching practices. In 2018, through the results of the International Computer and Information Literacy Study (ICILS), Luxembourg had one of the highest reported levels of technology-related resources for teaching and learning, but a relatively low reported use of ICT classroom practice. Using the data for the 420 teachers in Luxembourg who participated in the ICILS 2018 large-scale study, we identified that within such a "technology-driven" approach to digitalization, teachers' vision of ICT use in teaching, level of expertise, and the use of digital learning materials in class are the significant support factors. Leadership and collaboration, in the form of an explicit vision of setting ICT as a priority for teaching and learning in the school, also proved to be important factors. Considering the high rate of teacher nonresponse and the relevance of the sampling demographic characteristics to the outcomes of interest in this study, teacher and school weights were re-estimated to work with a more precise population estimate for the teacher population. Details of the re-weighting procedure and of the teacher and school weights used in this study are part of this paper. Through these findings, we learn that the initial investment in school infrastructure for ICT requirements needs to be associated with teachers' ICT-related beliefs, attitudes, and knowledge, and in a school where there is a shared explicit vision regarding ICT. The value added of the current study lies in testing the educational factors of teachers' use of ICT in practice, in an educational system that has invested all the necessary initial ICT resources, offering empirical evidence about how this process can be further enhanced.

Teaching with Technology: A Large-Scale, International, and Multilevel Study of the Roles of Teacher and School CharacteristicsEvi-Evropi Konstantinidou¹ and Ronny Scherer² (*University of Cyprus, Cyprus¹; University of Oslo, Norway²*)

Providing high-quality instruction with technology has become more important than ever before. However, the instructional practices and the degree to which key skills, such as digital literacy and computational thinking, are emphasized in classrooms varies considerably between teachers, schools, and countries. The present study was aimed at explaining this variation in the frequency of teaching practices with technology and teachers' emphasis on developing students' computer and information literacy and computational thinking by key aspects of teacher motivation and expertise, school conditions and priorities, and countries' economy and innovation. Utilizing large-scale, representative data from the International Computer and Information Literacy Study (ICILS) 2018 (15,015 teachers in 1,195 schools and 8 countries), we performed multilevel structural equation modeling and regression trees and found that teacher motivation and collaboration were positively and consistently linked to teaching practices across countries. Besides,

principals' expectations concerning the teaching with technology explained variation in Finnish and German schools. In three countries, teachers' professional development was related to their teaching practices. Finally, countries' economic development and innovation explained variation in the teacher-level effects. Our study sheds new light on the possible factors related to teaching with technology and advances the field by taking a multilevel and international perspective on these factors.

Using ICT is Not Enough: The Relationships Between Student ICT Expertise and Mathematics Achievement

Elisa Caponera, Francesco Annunziata, and Laura Palmerio (National Institute for the Educational Evaluation of Instruction and Training, Italy)

Today, people—regardless of gender, age, socio-economic status—have access to digital devices, but not always having access to these devices corresponds to skills in the use of ICT. Even though the COVID-19 pandemic has led to increased efforts by various governments to address digital literacy, integrating ICT in learning and teaching is still a challenge for most teachers and school systems. Although it is widely acknowledged that ICT are now a part of students' daily life, both in and out of school, the relationship between ICT use and performance remains a crucial aspect to be investigated. The aim of this study was twofold: 1) investigate the ICT expertise of students, considering both ICT use and skills; 2) explore the relationship between students' expertise and their mathematics achievement. Data from IEA's ICILS (International Computer and Information Literacy Study) survey at the beginning of the school year 2018–2019 (October 2018) and mathematics achievement in the Italian national standardized test at the end of the school year (April 2019) were utilized. The representative sample consisted of 2,519 eighth-grade students participating in both ICILS and the national assessment. Latent profile analysis (LPA) with one distal outcome, using MPLUS software, was used to create homogeneous groups of the level of expertise in using ICT, considering both students Computer and Information Literacy (CIL) results and questions derived from the ICILS international questionnaire about their experience and use of computers and ICT. Three latent profiles were identified: 1) noobs, students who use ICT little and poorly; 2) bots: students who spend a lot of time using ICT but do not master them; 3) pros: students who use ICT moderately but use them well. The three profiles were then treated as independent variables and mathematics achievement was considered dependent variable. The student socio-economic and cultural index (SES) and the student gender were used as covariates. After controlling for the students' SES and gender, the results evidenced that students with a higher level of expertise at the beginning of the school year had better results in mathematics at the end of the school year. Based on the analyses performed, some possible implications for school policy are discussed.

Exploring Internet and Social Media Use for Students and Teachers in ICCS 2016

Guillem Fernández Villà and Lauren Musu (IEA)

Internet and social media can be a source for positive engagement and knowledge about relevant political and social issues. However, findings from ICCS 2016 show that the social media use scale (which measures internet and social media use for engagement in political and social issues among students) is negatively correlated with students' civic knowledge scores. The social media use scale is composed of three items that explore different ways of using internet and social media for engagement in political and social issues: (1) searching information online, (2) posting, and (3) sharing or commenting on another person's post. Therefore, this study explores the individual relationship between each of these three items and civic knowledge scores using student-level data. Moreover, teacher variables were examined to assess to what extent responsible internet use is addressed in the classroom. We found that the pattern of how students' civic knowledge scores related to internet and social media use differed by the type of engagement captured by the item. (1) Searching information online (individually focused engagement) was related to higher civic knowledge scores when done at least once a month. Conversely, (2) posting and (3) sharing or commenting online (interactively focused engagement) were related to lower civic knowledge scores. There were, however, some differences in these patterns across countries. At the classroom level, most teachers perceived themselves as prepared to teach responsible internet use. However, most of them had never participated in professional development activities on the topic, and there was no correlation between self-perceived preparation and experiences with professional development.

Session 2D (Online Exhibition Booth): SPRINGER**Online Exhibitor:** Claudia Acuna (*SPINGER, the Netherlands*)**Room:** Online

Springer Nature is a leading educational and professional publisher, providing quality content through a range of innovative platforms, products, and services. This session is a unique opportunity to connect with Springer representatives about IEA open-source publications.

Session 3A (Hybrid): Practice & IEA Studies and Publications

Panel on Giving Back to Teachers: Why, What, and How?

On-site Moderator: Andrea Netten (IEA)

On-site Panelists: Marian Bruggink¹ and Paulina Korsnakova² (*Dutch Center for Language Education, the Netherlands¹; IEA²*)

Online Panelists: Alka Arora, Teresa Neidorf, and Will Johnson (*American Institutes for Research, US*)

Room: Auditorium

IEA studies have always been a great resource for researchers and as trends accumulated and expertise in using data grew, the experts involved in the educational policy have also benefited from this resource. In the meantime, since the beginning of IEA studies, there have been discussions about how to engage with teachers and provide them with information that they would find helpful and interesting. For a long time, IEA recommended against reporting back to schools and teachers that took part in an IEA study, because IEA studies' design and instruments target the system level, not classrooms nor individuals. The desire, however, remained to give something back to those schools and teachers who responded to studies and provided the valuable information that is freely available in the form of an international database. Here, however, it is just a sample of target populations of students, their parents, teachers, and school directors, who provided their responses in benefit of all represented grades and professionals. Thus, why to focus solely on those, who sat to the test and filled in the questionnaires? What if instead sending back to schools some delayed descriptive reports with statistics that are not matched to school or classroom levels, we would focus on sharing some lessons learned, potentially useful observations or interesting findings that can be used by teachers in their classrooms with their students? IEA's new teacher publication marking beginning of a new book series IEA Research for Educators–Evidence-based and Instructional Materials for Teachers using Data from the International Association for the Evaluation of Educational Achievement aims to do exactly that: to give back to teachers and show them how IEA studies can not only provide information on a country and national curriculum level but can help them to shape their classroom practices and instructions. This first teacher publication describes how IEA's PIRLS study can be put to use for teachers. What reading skills are needed to fully understand a text and how can teachers help their (multilingual) students develop these skills? While teachers are always watching out for inspirations, something that works, they may not necessarily opt for a book format. Indeed, there are other avenues to share some information and findings in another form. The information from research reports or sections of reports can be distilled into key points with recommendations for teachers and shared in short formats. IEA Teacher Snippets link results and important findings with promising practices and provide references for further study. Another avenue is through the development of web-based resources that are accessible, relevant and useful for teachers. Building on results from a recent study conducted for the IEA Research for Education Series (Student Misconceptions and Errors in Physics and Mathematics: Exploring Data from TIMSS and TIMSS Advanced), researchers at the American Institutes for Research (AIR) are developing a web-based resource for teachers. Presenters will demonstrate a prototype of the AIR Educator Tool which gives teachers access to sets of mathematics and science assessment items organized in a database searchable by learning goals for selected topics and provides contextual information teachers need for instruction or classroom assessment across grade levels.

Session 3B (Online): Methodology***Explaining Differences in Achievement Between Students and Countries*****Online Chair:** Oliver Neuschmidt (IEA)**On-site Moderator:** Pierre-Emmanuel Encinar (IEA)**Room:** Lecture Hall 1**Assessment of Effectiveness and Efficiency of Primary Education from the Perspective of Inclusion and Fairness**

Rimantas Zelvys, Dovile Stumbriene, and Audrone Jakaitiene (Vilnius University, Lithuania)

During the last decades there has been a steady increase of research publications on effectiveness and efficiency in education. Generally, it is expected that education should achieve high results in student learning. However, it is also possible to look at effectiveness from the angle of equity. In this respect both student achievement and equity can be treated as criteria for measuring effectiveness. Equity can be examined in two ways: equity as inclusion and equity as fairness. The most commonly used theoretical framework in effectiveness and efficiency studies is the CIPO (context-input-process-output) model. The CIPO model is also applied in the current research. The object of the research is equity in primary education of 15 old and new EU member states, which took part in the IEA TIMSS 2015 and PIRLS 2016 international student achievement studies. The aim of the research is to assess the effectiveness and efficiency of primary education from the perspective of inclusion and fairness. The effectiveness and efficiency evaluation is done by using the Data Envelopment Analysis (DEA). It is a data-oriented approach to evaluate the performance of a set of decision-making units in the process of transforming resources (inputs) into desired results (outputs). The input indicator is the expenditure per 1000 students in million euro in PPS (purchasing power standards); the output indicators are the standard deviations of PIRLS 2016 reading scores, TIMSS 2016 math and science scores, percentage of resilient students in PIRLS 2016 reading, and TIMSS 2015 math and science. The standard deviation of scores can explain how skills and knowledge are distributed across the student population, and the percentage of resilient students indicates to what extent the socio-economic background precludes or does not preclude the student success. Findings reveal that countries which participated in PIRLS 2016 and TIMSS 2015 studies do not follow the common policy pattern for ensuring equity in primary education. Several countries demonstrate both high level of effectiveness and efficiency; however, the research also shows that in some cases levels of both efficiency and effectiveness are low. Results of the research confirm the hypothesis that the pattern of being rather efficient, but not very effective, in making primary education inclusive and fair is more peculiar to post-socialist countries. Research is funded by the European Social Fund according to the activity 'Improvement of researchers' qualification by implementing world-class R&D projects' of Measure No. 09.3.3-LMT-K-712. The project No. DOTSUT-39 (09.3.3-LMT-K-712-01-0018) / LSS-250000-57.

The Rosetta Stone Project

Pierre-Emmanuel Encinar, Clara Beyer, Juliane Kobelt, and Oliver Neuschmidt (IEA)

The IEA Rosetta Stone project is based on a strategy to measure global progress toward the UN Sustainable Development Goal (SDG) for quality in education (4.1) by linking regional assessment results to the TIMSS and PIRLS International Benchmarks of Achievement. By administering both a subset of test items which allow for the placement of results on the TIMSS and PIRLS achievement scales as well as test items from regional assessments to a sample of students in selected countries which participate in the regional assessment, the Rosetta Stone Project aims to greatly expand the potential of the TIMSS and PIRLS scales to measure global progress towards the SDG 4.1. This proposal focuses on one of the first two Rosetta linkage studies: the Rosetta Stone PASEC project, which in 2020 re-administered both the Program for the Analysis of Education Systems of Confemem (the Conference of the Ministers of Education of French

speaking countries) (PASEC) assessment from 2019; and a subset of TIMSS and PIRLS items which were carefully designed allow for the statistical linking of the two assessments. The Rosetta PASEC project, which took place in 2020—despite the challenges presented by administering a study during the COVID-19 global pandemic—successfully gathered data from three countries which administered the 2019 PASEC in Africa: Senegal, Burundi, and Guinea. The administration of a multi-day assessment included different procedures to fulfill IEA's international quality control standards and ensure that the regional assessment's procedures and guidelines were also followed. This presented unique opportunities for knowledge exchange, problem-solving, and collaboration between IEA, the CONFEMEN, and participating countries. As the project is currently in a stage where data has been successfully collected but the analysis is still in a nascent phase, this proposal aims to describe and elucidate the various unique and interesting aspects of the project which can already be described, comprising elements of project design, sampling techniques, test administration, and analysis potential which are unique to IEA studies.

An Investigation of the Structure of the TIMSS 2019 Bullying Scale on the Cyprus Sample

Valentina Ierotheou and Michael Michaelides (University of Cyprus, Cyprus)

Bullying has been a well-studied social phenomenon in schools, with a variety of scales and questionnaires used to address the different types, frequency, and intensity. In the current study, alternative factor structures were investigated in the school bullying scale of TIMSS 2019 on a Cypriot sample of eighth-graders; gender differences in the factor structure were also explored. 3521 Cypriot students completed the TIMSS 2019 questionnaire, and their answers on the Bullying Scale were used in a secondary analysis. Confirmatory factor analysis was conducted, and according to the results, the unidimensional bullying factor and a Direct/Indirect/Cyberbullying three-factor model had the best fit. The three-factor model had as the best fit indices. A multigroup analysis for gender differences, showed that configural and metric models were satisfied, but scalar was not acceptable. Partial scalar invariances were tested, and the final model was acceptable. Gender differences were investigated with latent mean comparisons and revealed higher reported direct forms of victimization for males than females. No significant gender differences were found for indirect and online forms of victimization. Reliability and validity will be further discussed.

Examining Gender Differences in TIMSS 2019: The Multiple Group Hierarchical Speed-Accuracy-Revisits Model

Dihao Leng, Ummugul Bezirhan, Lale Khorramdel, Bethany Fishbein, and Matthias von Davier (TIMSS and PIRLS International Study Center at Boston College, US)

Gender differences in achievement on international large-scale assessments (ILSAs) are observed across countries, assessments, and over time, varying in direction and magnitude depending on the particular country and domain assessed. Previous studies have found achievement gender gaps to be related to factors such as gender stereotypes, test-taking motivations, item types, and differential item functioning. Differences in test-taking behaviors also are assumed to be a potential source, but historically difficult to measure using paper-based assessments. Newly available process data from computer based ILSAs provide avenues for examining the ways that students navigate assessments and respond to items. This research capitalizes on process data from the TIMSS 2019 eighth grade mathematics Problem Solving and Inquiry (PSI) tasks to investigate gender differences in test-taking behavior in relation to performance. These scenario-based, interactive, and dynamic tasks allow for gaining insight into students' response processes and navigation behaviors. Students had 45 minutes to complete two tasks with a total of 24 items across 19 assessment screens. Although each task presented the scenario in a linear fashion, students were free to navigate between screens at their own pace and could revisit previous screens. Ten participating countries with sufficient item revisit behaviors were selected for the study to represent a variety of performance levels and magnitudes of gender achievement gaps (Georgia, Hungary, Israel, Italy, Malaysia, Portugal, Qatar, Singapore, Korea, Turkey). A recently proposed hierarchical speed-accuracy-revisits (SAR) model was extended to multiple country-by-gender groups to examine whether mathematics ability, response speed, item revisit propensity, and the relationship among them differ between boys and girls. The multiple-group SAR model jointly estimates person and item parameters in each subpopulation, capturing differences in the relationships across groups. The Rasch model was used for responses and revisits, and a lognormal distribution was assumed for response times. Model estimation used the Bayesian approach, specifically an adaptive form of Hamiltonian Monte Carlo sampling implemented in STAN. Results across countries showed that boys responded faster than girls, but there were no clear patterns in boys' and girls' tendency to revisit item screens. Both genders had moderate to strong negative correlations between mathematics ability and response speed, weak correlations between ability and revisit propensity, and weak to moderate negative correlations between speed and revisit propensity. No consistent patterns between boys and girls were found in the magnitude of the correlations across countries. Results are discussed in light of the utility of process data for examining gender gaps.

Session 3C (Online): Policy***Insights into the Trends Discovered in TIMSS Score Gaps*****Online Chair:** Aidan Clerkin (*Educational Research Centre, Ireland*)**On-site Moderator:** Yasin Afana (*IEA*)**Room:** Case Method Hall**24 Years of TIMSS Excellence (Gaps)**David Rutkowski¹, Leslie Rutkowski¹, and Jonathan Plucker² (Indiana University, US¹; Johns Hopkins, US²)

Although a number of studies have looked at general achievement gaps of subpopulations, this study uses a longitudinal modeling approach to focus on excellence achievement gaps between differing subpopulations (Plucker et al., 2010) in TIMSS data. In other words, we compare the proportion of high achieving students in the focus group of interest to the proportion of high achieving students in the associated reference group. Specifically, we examine both gender and immigration status as two groups of policy importance in many TIMSS participating countries. Further, exploring the existence of mathematics and science excellence gaps over 24 years of TIMSS data allows us to see which countries have improved and if national policy interventions can be associated with those improvements. Our focus on excellence gaps is purposeful in that we wish to place emphasis on the need for a diverse group of high achieving students to demonstrate that educational excellence is not the purview of a specific group but rather a necessary outcome for a more just and equal educated society.

Socioeconomic Achievement Gaps: An Analysis of Twelve Years of TIMSS Trend Data for 24 Education SystemsYifan Bai and Markus Broer (*American Institutes for Research, US*)

Educational inequality exists in many forms and has been a challenge across the globe. It is a common policy goal in many countries to provide quality education for all students regardless of their family socioeconomic status (SES). This study aims to track changes in educational inequality in the form of SES achievement gaps across 24 education systems over a twelve-year period (2003--2015). IEA's Trends in International Mathematics and Science Study (TIMSS) is used for the analyses, and a trend measure of students' socioeconomic background is generated to answer the following research questions: (1) How have socioeconomic achievement gaps in mathematics changed in 24 education systems between 2003 and 2015? (2) Has the mathematics achievement of socioeconomically disadvantaged students improved over this 12-year period? (3) What macro-level factors are related to the SES achievement gap changes? Results show significant variations across education systems so that policymakers can compare trends in SES gaps and gain awareness of how other education systems have fared in reducing educational inequality and what possibly can be learned from others.

Exploring Score Gaps between High- and Low-Performing Students in TIMSS Education Systems Over Time

Ebru Erberber, Maria Stephens, Yemurai Tsokodayi, Frank Fonseca, and Paul Bailey (American Institutes for Research, US)

The recent release of the results from TIMSS 2019 has sparked considerable concern in the United States about the equity of educational outcomes. The results show that score gaps between high- and low-performing U.S. students increased from 2011 to 2019 in both mathematics and science at both the fourth and eighth grades. Of even greater concern is that the increases were largely due to drops in the scores of low performers. This study explores whether these widening score gaps were also prevalent in other education systems. It thus updates the field on trends in score gaps in mathematics and science at grades 4 and 8—a topic of only limited study in the past—and presents novel analyses focusing on patterns in changes in score gaps. The study uses data from 47 education systems at grade 4 and 36 education systems at grade 8 that have data for both 2011 and 2019. It identifies which education systems had score gaps that widened or narrowed and describes how score gap changes were related to changes in average scores and 90th and 10th percentile scores. Notably, the study finds that of the 29 education systems that participated in TIMSS 2011 and 2019 at both grades, the United States was the only one where the achievement gap widened in both mathematics and science at both grades. In fact, no more than a quarter of the participating TIMSS education systems in any grade or subject showed an increase in their achievement gaps. However, in those education systems where the achievement gaps did widen, it was frequently related to a decline in low performers' scores—as was the case in the United States—which sometimes also resulted in a decline in the average score. In contrast, in some education systems, achievement gaps narrowed over time because low performers' scores improved, and average performance often improved as well.

Session 3D (Online): IEA Studies and Publications

A Symposium on Good Citizenship for the Next Generation: A Global Perspective Using IEA ICCS 2016 Data

Online Chairs: Diego Carrasco and Ernest Treviño (*Pontificia Universidad Católica de Chile, Chile*)

On-site Moderator: Andres Sandoval-Hernández (*the University of Bath, UK*)

Room: Lecture Hall 5

Citizenship norms endorsement is a multidisciplinary and multidimensional concept entailing values, ethical ideals, and behaviors, regarding civic and citizenship engagement. This symposium aims at disentangling citizenship norms conceptually and empirically. Following the work of Hooghe and colleagues (Hooghe and Oser 2015; Hooghe et al. 2016), this study uses 12 different items which resemble injunctive norms, included in the International Civic and Citizenship Education Study (ICCS) 2016. These items describe what people ought to do in contrast what people tend to do. We use latent class models to represent how students from 24 different countries endorse citizenship norms. Citizenship norms endorsement is configured into five different profiles: i) duty-based, ii) socially engaged, iii) comprehensive, iv) monitorial, and v) anomic. These configurations are used in later studies included in the present symposium. The second presentation uses a comparative approach to explore three groups of factors that can potentially condition citizenship norms endorsement: i) the political (forms of democracy, legal system, levels of corruption, and authoritarianism); ii) the economic (growth and economic inequality) and iii) the cultural (values and norms, levels of tolerance, and role of the Internet). The results show that there are important differences in the distribution of citizenship norms profiles across countries. National income and use of social media are the two most significant variables to explain differences in notions of good citizenship between countries. The third presentation focuses its research question among the European participating countries in ICCS 2016. Within Europe, globalization and Europeanization have transformed young peoples' sense of citizenship and identity. In this context, the increased flows of migration and immigration has been coupled with a rise of intolerant and xenophobic attitudes. In this presentation we inquire: what is the relationship between intergroup attitudes and student's citizenship norms adherence? Multi-group multinomial logit models were fitted between countries to assess how egalitarian attitudes, the support of equal rights for women, and equal rights for immigrants are related to each of the citizenship norms profiles. Finally, the fourth presentation focuses on the Latin American participating countries. The history of the region is plagued by political unrest, and military dictatorships, which have interrupted the development of democracies. In this context: To what extent do democratic ideals coexist with antidemocratic ideas? To this end, the study uses regression models, with robust standard errors, to explain students' support for authoritarian government practices, conditioned by student's citizenship norms endorsement.

Towards a Comparable Model of Citizenship Norms Endorsement

David Torres Iribarra and Diego Carrasco (*Pontificia Universidad Católica de Chile, Chile*)

Latent class analysis has been used in previous research to compare the configuration of citizenship norms endorsement among students in different countries. This study fits a different model specification, a homogenous model, in order to produce interpretable and comparable unobserved profiles of citizenship norms in different countries. This analysis was conducted using data from IEA's International Civic and Citizenship Education Study (ICCS) 2016, which includes responses from students in 24 countries in Europe, Latin America, and Asia. The five-class citizenship norms profiles results and the trade-offs in model specifications are discussed in this chapter. The five-class solution presented here is comparable to previous studies assessing citizenship concepts in various settings.

A Comparative Approach to Citizenship Norms Endorsement across Countries

Cristobal Villalobos, Maria Jesús Morel, and Ernesto Treviño (Pontificia Universidad Católica de Chile, Chile)

This chapter seeks to understand the relationship between profiles of good citizenship and sociodemographic, economic, political, and cultural country variables, seeking to deepen the understanding of good citizenship in the participating countries of IEA's International Civic and Citizenship Education Study (ICCS) 2016. Using a comparative policy approach, the chapter explores three groups of factors that may relate to contextual differences in notions of good citizenship: i) political (forms of democracy, legal system, levels of corruption, and authoritarianism); ii) economic (growth and economic inequality); and iii) cultural (values and norms, levels of tolerance, role of the internet). The results show that, although there are common patterns among all or most countries (low proportion of anomic profiles, high proportion of comprehensive and socially-engaged profiles), there are also important differences in the distribution of these profiles across countries, depending on the geographic location and type of government regime. National income and use of social media are the two most significant variables to explain differences in notions of good citizenship between countries.

Citizenship Norms and Tolerance in European Adolescents

Andres Sandoval-Hernandez¹, Nicola Savvides¹, Ellen Claes², and Maria Magdalena Isac² (the University of Bath¹, UK; KU Leuven, Belgium²)

Within Europe, numerous political, economic, social, and cultural changes brought about by globalization and Europeanization have challenged and transformed young people's sense of citizenship and identity. An important aspect of good citizenship is attitudes of tolerance and support for the equal rights of others. Yet, in recent times, there has been a rise in the levels of intolerant and xenophobic attitudes, due, in part, to negative perceptions over increasing flows of migration, immigration, refugees, and asylum seekers. In this chapter, multiple group multinomial logistic regression models are estimated to determine how different profiles of citizenship norms (i.e., comprehensive, socially engaged, duty-based, monitorial, and anomic) relate to European adolescents' political tolerance, i.e., their attitudes towards equal rights of others (immigrants and women). Data from IEA's International Civic and Citizenship Education Study (ICCS) 2016, including 51,040 grade 8 students (aged 14) across 14 European countries was used. The study reveals two clear patterns. First, students classified within the comprehensive citizenship profile deal well with the ambivalence present in the definition of tolerance, especially regarding equal rights for immigrants. Second, students within the other citizenship profiles (socially engaged, duty-based, monitorial, and anomic) show significantly lower support for equal rights for immigrants than the students classified as comprehensive. The findings contribute toward understanding the mechanisms underpinning citizenship norms profiles and their relationship to attitudes toward others. The results may be used to inform targeted intervention policies for the promotion of tolerance in Europe.

Latin American Political Culture and students Citizenship Norms Endorsement

Daniel Miranda¹, Catalina Miranda Riquelme¹, and Loreto Muñoz² (Pontificia Universidad Católica de Chile, Chile¹; Datavoz, Chile²)

Latin American countries have a history of democracies interrupted by political unrest, civil war, human rights abuses, and military dictatorships. In the region, there have been several attempts to establish representative governments throughout the last decade, especially in post-dictatorship periods. However, scholars have questioned the quality of these achieved regimes, especially regarding their democratic quality. To what extent do democratic ideals coexist with authoritarian ideas? This chapter explores the extent to which support for authoritarian government practices is associated with different types of citizenship norms and evaluates the role of civic knowledge. Using a series of regression models with clustered errors, and data from Latin American countries in IEA'S International Civic and Citizenship Education Study (ICCS) 2016, both the role of citizenship norms and civic knowledge in explaining students' support for authoritarian practices were analyzed. The results indicate that, in Latin America, there exists a significant level of support for authoritarian ideas in younger age groups, which is consistent with previous research focused on the adult population. Additionally, results indicate that those students classified in duty-based and comprehensive citizenship profiles show higher levels of support for authoritarian practices. In contrast, students with monitorial and anomic profiles are less likely to support these types of practices. Finally, civic knowledge protects young people from authoritarian ideas and moderates the effect of different conceptions of citizenship norms. Results highlight the relevance of education for democratic citizenship, which could help on the legitimacy of the democratic system.

Session 4A (Hybrid): Policy***Investigating the Power of Communication and Language*****On-site Chair:** Christian Christrup Kjeldsen (Aarhus University, Denmark)**Session Manager:** Laura Cheeseman (IEA)**Room:** Auditorium**The Impact of Attending Early Childhood Education on Omani Students' Performance in PIRLS 2016**

Fathiya Al Mawali (Ministry of Education, Oman)

This paper aims to identify the effects of early childhood education on students' literacy performance in PIRLS 2016 using the linear regression method (IEA's IDB Analyzer). This analysis allowed us the best predictions from independent variables (childhood education and how long they spent in these programs) to the dependent variable (their performance and its importance in the context of Oman). When considering these variables, it is important to understand the historical context and emphasis that has supported the positive impact of pre-schooling on literacy. The paradigm-shift during last decade, which received a great push forward with the 1998 publication by the United States' National Research Council titled Preventing Reading Difficulties in Young Children, has increasingly emphasized early education as the solution to various pressing problems. It is important to note that, in the context of Oman, public schools do not provide pre-school programs; students at these schools start primary school first to fourth grades without being exposed to these pre-learning environments. These pre-primary school programs are only provided by private and international schools (known as nursery, KG1 & KG2). Early education is the time in which young children first develop skills, knowledge, and interest in the code-based and meaning aspects of written and spoken language. These early abilities and interests are referred to as "pre-literacy" or "early literacy" abilities which emphasize their role as precursors to conventional literacy. Early literacy is defined as the skills child learns before they learn to read and write which include letter knowledge, phonological awareness, print/text awareness, and storytelling. The current emphasis on early literacy is an essential part of early education which is supported by growing bodies of research, showing that children who develop good conversation and early literacy skills in kindergarten, particularly those with greater quality of adult-child interactions, are at a higher advantage when learning to read and write at the start of primary school. The findings indicated the significant effects of preschool education and the number of years spent in these programs to the reading performance. Therefore, policy makers in Oman should make use of the data and indicators gained from PIRLS and make an informed decision towards educational development in Oman. This has become a key focus area of the Oman vision 2040 strategy, where one of its aims is to develop national competencies and skills to a level that can compete locally and internationally.

Exploring the Relationship between Language Spoken at Home and Science Achievement of ImmigrantSamantha Curle¹, Andres Sandoval-Hernandez¹, Kalyan Kumar Kameshwara¹, Nurullah Eryilmaz¹, Dogan Yuksel², and Sibel Kaya² (The University of Bath, UK¹; Kocaeli University, Turkey²)

According to World Immigration Report 2020, the scale of international migration and displacement has increased in recent years due to conflict, violence, economic and political instability, and environmental and climate change (McAuliffe et al., 2019). Some countries now have to accommodate large numbers of school-age immigrants. School achievement of immigrant children differs widely across countries which might be caused by, among other factors, different immigration and education policies (Behr & Fugger, 2020). Prior studies have focused on immigrant students' mathematics and reading achievement in PISA; however, immigrant students' science literacy achievement or the impact of home language use on science achievement in TIMSS have not been studied. This presentation will therefore focus on a study that examines the association between the language spoken at home (most likely the mother tongue) and science achievement levels. The empirical analysis is conducted by using the TIMSS 2019 (Grade 8) dataset

to construct hierarchical linear models with random intercepts and random slopes. The study is delimited to five Anglophone countries that participated in TIMMS: Australia, Ireland, New Zealand, England, and USA. The models are controlled for various student-level and school-level factors, including the immigration background of the child, which otherwise might have shaped the outcome. Preliminary results suggest that students who speak Languages Other Than English (LOTE) perform significantly lower in science achievement in all countries except Ireland. There are mixed patterns in performance levels with respect to students who are first-generation and second-generation immigrants. In Australia and the USA, there is heterogeneity in the effects of not speaking English across schools. The effects are starker or higher in low-performing schools. The effects (slopes) do not vary significantly across schools in the contexts of New Zealand and the UK. Implications of these findings for policy and pedagogy will be presented.

The Impact of Teacher Behavior on Reading Comprehension in Flanders

Nele Bleukx, Antonis Dervenis, and Koen Aesaert (KU Leuven, Belgium)

Several systematic reviews and meta-analyses within the field of educational effectiveness research indicate that the instructional behaviour of teachers is one of the most important elements contributing to students' academic achievement. Furthermore, teacher behaviour (TB) is assumed to be effective for some groups of students but not for others. The evidence for teacher differential effectiveness according to students' background characteristics is however mixed. Further research on the impact of TB and its differential effects is needed. The research goals are twofold: to measure the effectiveness of TB on 6th graders' reading comprehension performance and differentiate the results for students' home resources and home language (RG1) and to measure the effectiveness of TB on learning gains in reading comprehension between 4th and 6th grade, again assessing differential effects (RG2). TB was defined according to the eight teacher factors of instructional quality of the Dynamic Model of Educational Effectiveness. Data on TB and students' reading performance were retrieved from PIRLS 2016 and PIRLS 2018 Repeat. The latter is a Flemish edition of PIRLS, in which students' learning gain in reading performance between fourth and sixth grade was assessed. Multilevel value-added (RG1) and multilevel change score (RG1) models were used. Regarding RG1, only classroom management had a significant impact on the reading comprehension performance of students. No significant interaction effects were found between TB and students' home resources or home language, indicating that the impact of TB on student reading performances is not related to students' background characteristics. Regarding RG2, no significant relationships, nor interaction effects, were found between TB, home resources, home language, and students' learning gain. This study confirms the importance of classroom management for students' reading comprehension performances: the less classroom disorder, the better the reading performances. Apart from this, no other impact of TB is found in this study. Furthermore, TB appears not to interact with the background characteristics of students. These findings could indicate the limited impact of the researched TB on reading comprehension. Other explanations for these findings can be found in the way in which TB is operationalized. PIRLS questionnaire items, used to construct TB in this study, may not successfully capture the teacher factors defined in the Dynamic Model. Alternatively, those PIRLS items refer to the quantity and not the quality of TB. Further research should investigate whether the quality of TB does impact reading comprehension and reading comprehension growth.

The Meaning of Political Trust among 14-year-olds across 24 Countries. Testing Within- and Cross-Country Measurement Equivalence of Political Trust using Multi-Group Confirmatory Factor Analysis.

Linde Stals, Maria Magdalena Isac, and Ellen Claes (KU Leuven, Belgium)

In adult populations, the concept of political trust has been conceptualized and studied as a one-dimensional evaluation shaped by "the political culture that is prevailing within a political system" (Hooghe, 2011, p. 270); or as multidimensional attitude encompassing distinct trust judgements depending on the object within the political system (Rothstein & Stolle, 2008). But how do young adolescents develop trust judgements in their state's institutions, and are these judgements comparable across different groups and countries? This article uses a representative sample of eight grade students across 24 European, Asian, and Latin-American countries that participated in the International Civic and Citizenship Education Study (ICCS) 2016 to propose a theory-driven (Easton, 1965; Warren, 2018) two-dimensional structure of political trust among youth and to investigate its within- and cross-country comparability. Preliminary confirmatory factor analyses using only the Flemish (Belgium) sample show that political trust is best described by two distinct dimensions. The first dimension includes trust in the 'order' institutions of the state, which are responsible for providing public goods such as education, health care, and security (e.g., the judiciary, the police, and the civil service). The second dimension includes trust in the representative institutions (e.g., the government, the national parliament, and political parties), which are considered 'political' in the sense that 'interests between the institution and citizens do not necessarily align' (Warren, 2018, p. 90). In the context of Flanders (Belgium), this two-dimensional structure shows a superior fit to the data as compared to a unidimensional conceptualization of political trust. Building on these initial results, we intend to test whether the two-factorial measurement model of political trust can be generalized to the other regions and countries that participated in ICCS 2016 (i.e., cross-country measurement equivalence). When possible, within-country (or across-group) measurement equivalence is tested to examine whether the meaning of political trust (i.e., dimensionality) differs by level of political sophistication (i.e., proficiency in the ICCS's civic knowledge test); that is, whether we can use the same measurement model of political trust for adolescents with higher versus lower levels of political sophistication. To this end, Multi-Group Confirmatory Factor Analysis (MGCFA) will be conducted to establish measurement equivalence or invariance. The results will offer important insights into how to study political trust in young adolescents in a reliable manner across different groups and contexts.

Session 4B (On-site): Methodology***New Solutions for Old Problems: Fitting New and Legacy Data into New Models***

Chair: Plamen Mirazchiyski (*Educational Research Institute, Slovenia*)

Room: Lecture Hall 1

A Survival Mixture Model for Understanding Quitting Behavior

Leslie Rutkowski¹, David Rutkowski¹, and Heiko Sibbern² (Indiana University, US¹; IEA²)

Especially in low-stakes tests such as TIMSS and PIRLS, students might not be fully engaged for a host of reasons. Further, those reasons might differ across countries, where cultural norms and expectations play an important role. When students are not fully engaged, undesirable behaviors can include rapid guessing (Wise, 2006), item omission/skipping (Ulitzsch, von Davier, et al., 2020), and quitting the test before completion (Ulitzsch, von Davier, et al., 2020). Taken together, disengaged test-taking behavior poses a threat to the valid interpretation and uses of test data. Until recently, methods for modeling and understanding these behaviors were limited due to a lack of information about the way that students engage in the test. For example, in a paper-and-pencil platform, available information includes whether an item is correct/incorrect, whether an item is missing, whether items around that item are also missing, and where in the test the missingness occurs. International large-scale assessments (ILSAs) such as TIMSS and PIRLS are increasingly adopting a computer platform for test administration. One product of computerized tests is timing data, which offers opportunities for understanding how long students spend on each item. Timing data also permits an investigation of whether and when students quit the test before completion. If we conceptualize quitting the test as an event of study, continuous time survival models (Kleinbaum & Klein, 2010) offer an opportunity for modeling survival time (time until quitting) and associated risk factors (demographic variables, such as sex or SES). A central challenge in ILSA analyses is that tested populations are highly heterogeneous, with differences due to language, culture, geography, and economic development. Such heterogeneity can and does translate into measurement differences (Kreiner & Christensen, 2014; Oliveri & von Davier, 2011; Rutkowski & Rutkowski, 2013), calling comparability across countries into question. A tenable solution for dealing with population heterogeneity lies in mixture survival models (McLachlan & McGiffin, 1994), where a separate survival function is modeled for each group. These models have been used in cancer research (Hunsberger et al., 2009) and to assess credit risk (Alves & Dias, 2015) in diverse populations. In this presentation, we use TIMSS 2019 data and a relatively new framework for identifying quitting behavior (Ulitzsch, von Davier, et al., 2020) to explain and demonstrate a survival mixture model for finding and describing groups of countries that share quitting behavior on tests. Risk factors are examined across country groups.

Big-Fish-Little-Pond and Phantom Effects with SIMS80: Applying Modern Methodological Tools to a Historical Dataset

Ioulia Televantou¹, Herb Marsh², Jiesi Guo², Kate Xu³, and Cristos Nicolaides⁴ (Theological School of the Church, Cyprus¹; Australian Catholic University, Australia²; Open University, the Netherlands³; University of Cyprus, Cyprus⁴)

At the heart of various debates of educational reform lies the assessment of the school- or the class- level peer (or compositional) effect, said to be revealed when students' individual outcomes are found to be associated with the composition, or the ability mix of their school- or class- mates (Epple & Romano, 2011; Sacerdote, 2011). Our study merely replicates the methodological approach of recent studies (multilevel latent variable models; see Dicke et al., 2018; Televantou et al., 2015, 2021) to investigate effects of average mathematics achievement at the school- and the class-level on students' subsequent mathematics achievement ("the peer spill-over effect") and mathematics self-concept ("the big-fish-little-pond-effect;

bflpe"), controlling for individual differences in mathematics prior achievement. We use a historical dataset, namely the Second International Mathematics Study (SIMS80), to provide evidence of how conclusions of the aforementioned studies are replicated in analyses of data from three distinct educational systems: Canada (Ontario), USA, and New Zealand. We demonstrate a positive bias in the estimated effects, one that can be attributed to the presence of measurement error in the data and to the omission of important student-level covariates. Once more appropriate models are incorporated, peer spillover effects become less positive, or disappear altogether, while negative BFLPEs become more negative. Importantly, revisiting research questions originally raised by older studies based on this database (Zimmer et al., 2000), we show that some conclusions can be changed when multilevel latent variable models are used – instead of the conventional approach at that time. In this respect, we investigate whether the school type (private or public) can influence student outcomes (mathematics achievement and mathematics self-concept) over and above school-average achievement; no such effect is detected. Further, addressing the peer effect separately for private and public schools, we find no evidence for the existence of a positive effect in either type of institution. Our findings question empirical results of past and current research evaluating school- and class-level compositional effects based on sub-optimal models, that fail to control for measurement error and background variables. Our findings can be relevant to debates on test-based value-added measures of teacher performance, parental choice, selective schooling, and the provision of school vouchers.

When Meta-Analysis Meets International Large-Scale Assessment Data: Applications of the Split, Analyze, and Meta-Analyze Approach

Diego Campos¹, Ronny Scherer¹, and Mike Cheung² (University of Oslo, Norway¹; National University of Singapore, Singapore²)

International large-scale assessments (ILSAs) provide educationally relevant findings from different populations on a common topic. Researchers can use ILSA data to examine whether an effect size is consistent across the body of data, summarize the relationships among variables, and quantify possible heterogeneity in the data. Common multilevel modeling approaches face computational issues with synthesizing the data from multiple ILSAs or ILSA cycles and cannot quantify explicitly the heterogeneity of effect sizes that are derived from the parameters of a specific model. However, meta-analytic approaches, such as the Split, Analyze, and Meta-analyze (SAM) approach, offer ways to circumvent these issues by bringing together the best features of multilevel modeling and meta-analysis. In this study, we showcase how the SAM approach can be used to synthesize findings from ILSA data, focusing on the Big-Fish-Little-Pond-Effect (BFLPE) in mathematics, that is, the negative contextual effect of classroom mathematics achievement on students' mathematics self-concept. We analyzed the data from fourth-grade students across five TIMSS cycles. As part of the SAM approach, we performed multi-group multilevel confirmatory factor analysis (MG-MCFA) and two-level MSEM to obtain the BFLPE per country and synthesized the resultant effect sizes via cross-classified random-effects meta-analysis. Our results will shed light on the average effect size of the BFLPE, the heterogeneity within and between countries and cycles, and the extent to which country-level variables can explain variation in the BFLPE. Overall, this study illustrates how researchers can use the SAM approach for the analysis and synthesis of research evidence using ILSA data.

Detecting Latent Subpopulations in International Large-Scale Assessments by Fitting MixIRT Models Using NUTS

Rehab Al Hakmani¹ and Yanyan Sheng² (Emirates College for Advanced Education, UAE¹;
The University of Chicago, US²)

To overcome the limitation of conventional unidimensional item response theory (IRT) models for international large-scale assessments (ILSAs) such as the trends in international mathematics and science study (TIMSS), Mixture IRT (MixIRT) models have been developed to capture the presence of multiple latent subpopulations, with each subpopulation requiring its own unique set of item parameters. Although prior studies have explored the latent structure of data from ILSAs using MixIRT models, only a few of them have implemented the fully Bayesian approach via the use of Gibbs sampling, and to date, no study has considered the more efficient No-U-Turn Sampler (NUTS). The focus of this study is to use the MixIRT model while implementing NUTS for investigating the presence of latent classes among eighth-grade students who were administered the TIMSS 2019 mathematics subtest in paper format from four gulf cooperation council countries. Specifically, data were fit with the mixture Rasch (MixRasch), two-parameter (Mix2PL), and restricted three-parameter (Mix3PL) models with one, two, three, or four classes via NUTS. The performance of each fitted model was evaluated using Bayesian information criteria, including DIC, WAIC, WBIC, and LOO, and compared across models. Results suggest that the data can be best represented by a two-class Mix2PL model. It is further noted that when comparing with MixIRT models, the conventional unidimensional models were the worst as indicated by DIC, LOO, and WAIC. The effective number of parameters associated with either LOO or WAIC suggests that the conventional Rasch model was the least complex, whereas the conventional 2PL or restricted 3PL was the most complex, when compared with MixIRT models with two, three, or four classes. On the other hand, WBIC favored the one-class solution across the three different models. It is noteworthy to mention that estimates of the effective number of parameters associated with DIC are negative for the restricted Mix3PL model. This is consistent with the previous findings that the effective number of parameters for DIC can yield negative values. This study not only adds to the existing literature on fitting MixIRT models to data from ILSAs such as the TIMSS on assessing heterogeneous subpopulations from a fully Bayesian approach, but also sheds light on the limitation of using conventional unidimensional IRT models with ILSAs. It further provides empirical evidence on the use of mixture IRT models that can explain the cross-cultural data adequately using advanced Bayesian estimation techniques such as NUTS.

Session 4C (Online): Practice Supporting Teachers to Enhance Student Education

Online Chair: Grace Grima (Pearson, UK)

On-site Moderator: Lauren Musu (IEA)

Room: Case Method Hall

TIMSS-Based Teacher Workshops Adding Value to Policy and Practice in England

Jennie Golding¹, Mary Richardson¹, and Grace Grima² (UCL Institute of Education, UK¹; Pearson, UK²)

England has participated in all cycles of TIMSS. TIMSS 2019 in England included several deliverables, including the development, impact, and evaluation of TIMSS-focused workshops targeted at mathematics and science teachers. In 2019, year 5 (grade 4) students showed significantly improved performance in mathematics and maintained their performance in science compared with the 2015 results; year 9 (grade 8) students maintained their performance in mathematics but showed significantly weaker performance in science than in TIMSS 2015. Historically in England, media have focused on such high-level messages and some academics have engaged with findings in more depth, but the teacher professional impact has been very limited—as was also widely reported during a 2019 IEA IRC discussion forum in Copenhagen. Against this background, this paper reports on the design, impact, and evaluation of workshops for professionals in mathematics and science education, intended to add value to TIMSS participation locally by promoting interest in and understanding of TIMSS19 findings—but also probing those findings in professionally-informed and collaborative ways. The goals are to support both professional development and illumination of policy, enhancing the return on the TIMSS-related financial and other investment. For specificity, the paper analyses the approach to the mathematics workshop design, the choices made in relation to TIMSS findings focused on during the workshop, and the uses made of assessment items. It makes early reference to workshop outcomes, which will be further analysed for the IEA IRC 2021 presentation in relation to both professional practice and policy. That presentation will also analyse strengths and areas for development of future such workshops.

School Management and Leadership Activities Using ICT Results of ICILS 2018

Pierre Tulowitzki¹, Julia Gerick², Jeppe Bundsgaard³, and Birgit Eickelmann⁴ (FHNW University of Applied Sciences and Arts, Switzerland¹; Technische Universität Braunschweig, Germany²; Aarhus University, Denmark³; Paderborn University, Germany⁴)

Nowadays, there is a solid research base linking educational leadership and management to teaching practices and (indirectly) student achievement. Additionally, an increasing amount of attention is being paid to possible links between leadership practices using ICT and the overall ICT usage and competence levels in schools. This is often done using case-study type studies, while approaches making use of quantitative data and large datasets are rare. In this vein, the main objective of this study is to provide a comparison of leadership and management activities of school leaders using ICT with the ICILS 2018 dataset. This main objective can be broken down into three research questions: 1. Is it possible to empirically identify distinct clusters of school leaders across Chile, Denmark, Germany, Republic of Korea, and the USA based on their leadership and management activities using ICT? 2. If so, are there differences in the distribution of the identified clusters across these five countries? 3. Are the identified clusters related to students' competence in CIL? In order to answer the questions, an LCA was conducted using data from the school questionnaire from the second cycle of ICILS. Additionally, the means of students score in the computer based CIL test were taken into account. Regarding the results, a three-cluster model showed the best fit. The three clusters can be characterized as "comprehensive digital school management," "partial digital school management," and "rudimentary digital school management." Proportions of school leaders' distribution across the clusters varied significantly across the countries, with Chile and the United States having a particular high

proportion of principals belonging to the “comprehensive digital school management” cluster. Denmark, on the other hand, showed a particularly low proportion of school leaders belonging to the third cluster (rudimentary). Regarding any possible links to CIL, no significant relation between the identified clusters and the average level of students’ competence in CIL could be found. This could indicate that there is no significant relation or that a possible link is mediated by various factors that were not taken into account in the context of this study. Future research around educational leadership research could therefore look into possible links between the activities of school leaders making use of ICT and those factors.

Teachers’ Technological Pedagogical Content Knowledge (TPACK) Self-efficacy Beliefs and the Role of Schools in Seven Countries Using ICILS 2018 Data

Catalina Lomos¹, Falk Brese², and Sibel Telli³ (Luxembourg Institute of Socio-Economic Research, Luxembourg¹; IEA²; Canakkale Onsekiz Mart University, Turkey³)

Digitalization and its skills are indispensable demands of the 21st century. However, information and computer technology (ICT) innovation is sometimes still perceived as a burden, and many schools, teachers, and students cannot benefit from the best practices of digital education. This study follows the Technological Pedagogical Content Knowledge (TPACK) model to report the teachers’ expertise regarding the educational use of digital technologies and focuses on TCK, TPK, and TK, as core TPACK determinants that should be covered in teacher ICT development programs. With this aim, two research questions are explored: (1) What are the determinants of teachers’ TPACK self-efficacy across subject-domains and across the countries? (2) What is the effect of TK, TCK and TPK for teachers’ TPACK self-efficacy? To answer these questions, data from the IEA International Computer and Information Literacy Study (ICILS) in 2018 were used. ICILS investigates the use of and knowledge about ICT for teaching and learning. The paper analyzes data collected from eighth grade teachers and students in seven education systems participating in ICILS 2018, namely Chile, Denmark, Finland, Italy, Kazakhstan, Republic of Korea, and Portugal. All TPACK-related latent concepts used in this study have been tested for measurement invariance across countries, taking a confirmatory uni- and multi-dimensional perspective. The tested ICILS items were selected to represent the concepts for this secondary analysis, based on the review of qualified (calibrated) measures from the literature. Several linear regression models were tested to answer the research questions using the IEA IDB Analyzer to account for the study design. Based on the results, the teachers’ TPACK self-efficacy in using ICT for learning in general is strongly related to teachers’ age in all seven countries, younger teachers being more confident. There are differences between countries also related to the different teachers’ subject groups. The use of digital learning tools shows up as the second most prominent predictor of teachers’ TPACK self-efficacy. This relation is significant in almost all teacher groups in Denmark, Finland, Italy, and Portugal, whereas in Chile, Kazakhstan, and Korea, it is significant only for one subject group (non-STEM and non-language teachers). The findings provide new insights from an international perspective on teacher TPACK self-efficacy to the digital teaching and learning and implicitly on future professional development.

Who Caters for the Teacher's Needs? Exploring Associations Between Teachers' Work Environment and Students' Outcomes

Elisa Salinas¹, Ides Nicaise¹, and Agnes Stancel-Piatak² (KU Leuven, Belgium¹; IEA²)

Schools play a dual role being both the environment in which students learn and the environment in which teachers work. The second feature is often neglected when researching teaching and learning. Aimed at filling this gap in previous research, this article describes the associations between teachers' work environment and students' results applying the Model of Job Demands and Resources to the school context. Based on the assumption that teachers' working conditions have knock-on effects for students cognitive and non-cognitive results, it is expected that students' results are limited by high levels of job demands and enhanced by high levels of job resources. These hypotheses are tested using structural equation models on data from six middle-income countries participating in TIMSS 2015. Drawing on responses from teachers' questionnaire, two scales representing job demands (Teaching Workload, Students Limiting Teaching) and three scales representing job resources (Material Resources, Safe and Orderly School, Parental Support) were built. Teachers' qualifications (experience, degree, specialization) are also considered as resources and were included as observed variables. The associations of students' mathematics achievement and motivation for mathematics with teachers' job demands and resources were assessed through path models. The results show important variations between countries and variables. On the demands side, teachers' perception of students limiting their teaching predicts student achievement and motivation in four of the analyzed countries. In contrast, teaching workload does not appear to limit students' outcomes. On the resources side, parental support is associated with students' achievement and motivation in two of the six analyzed countries. The findings indicate that social resources are more consistently related to students' outcomes than material resources and teachers' qualifications. Also, the results show that achievement and motivation are not necessarily predicted by the same factors. For instance, teachers' qualifications are positively associated with students' achievement in some countries where no such relation is found with motivation. The main contribution of this research is to underscore the relevance of teachers' working conditions for students' achievement and motivation by applying the Model of Job Demands and Resources to six middle-income countries. In doing so, it broadens the students' outcomes and the geographical horizon commonly considered in the literature.

Session 4D (Online Exhibition Booth): IEA
Question and Answers with IEA**Online Exhibitor:** Katie Hill (IEA)**Room:** Online

IEA's online exhibition booth is a space all IEA IRC attendees are welcome to explore. This planned session will be an opportunity for attendees to connect with IEA, ask any questions and is a chance to generate meaningful conversation between IEA colleagues and attendees.

Session 5A (Hybrid): IEA Studies and Publications

Panel on IEA Research for Education Series: A First Look at Volume XIII Dinaric Perspectives on TIMSS 2019

On-site Moderator: Paulina Korsnakova (IEA)

On-site Panelists: Sabine Meinck (IEA), Branislav Randjelovic (*Institute for Education Quality and Evaluation, Serbia*), and Eva Klemenčič Mirazchiyski (*Educational Research Institute, Slovenia*)

Online Panelists: Ines Elezovic (*National Centre for External Evaluation of Education, Croatia*) and Ivana Djerić (*Institute for Educational Research, Serbia*)

Session Manager: Laura Cheeseman (IEA)

Room: Auditorium

This panel session offers a first ever look at IEA's latest volume in the Research for Education series: Dinaric Perspectives on TIMSS 2019, a regional report that was made possible through the funding and support of the European Commission (EC). TIMSS 2019 happened to be the first IEA study where past constituents of the Former Republic of Yugoslavia met, together with Albania. This enrolment was enabled by EC's attention and support for the Western Balkan region, making possible, above all, mutual acquaintance, socializing, exchange of opinions and challenges, and cooperation among TIMSS 2019 national research coordinators across the region. Some of them had remarkable previous TIMSS experience, some were new to the study, but this was the biggest difference, which quickly became obsolete. As the national research coordinators formed the regional group, they also formed a vision of a new region they would like to live in. The new region that would not be based on flawed and contested geopolitical terms anymore, but rather nested in the beautiful natural environment of Dinaric Alps and their surroundings and inhabited by people willing to co-recreating the space and ways of doing. In pursuing the dream, co-authors created workflows and agreements, like to refrain from presenting any ranking tables and to instead focus on salient issues in the region by concentrating on relationships between variables and differences for specific groups of students. This was first report benefiting from analytical support of IEA's Research and Analysis colleagues from IEA Hamburg. The result is a dedicated report that offers great value to researchers, policymakers, principals, and teachers in the region, as it creates the opportunity to address specific research questions relevant to their regional contexts. However, it is more than the contents of each chapter that makes this new publication unique. Therefore, the session aims to reflect on the process of creating this regional report, and the benefits and lessons learned for future projects of a similar nature.

Session 5B (Online): Practice Using IEA Data in (Re)search for Quality and Resilience

Online Chair: Sue Thomson (Australian Council for Educational Research, Australia)

On-site Moderator: Diego Cortes (IEA)

Room: Lecture Hall 1

Profiles of Instructional Quality and Their Relationships to Student Outcomes in Science: Linking TIMSS 2019 and Classroom Video Observation Data

Nani Teig (University of Oslo, Norway)

Teachers implement different types of instruction, and the quality of their instruction is crucial for enhancing student outcomes. However, studies examining various patterns of teachers' instructional quality and how they relate to student outcomes are scarce, especially in science teaching. Even fewer studies have investigated the nature of science teaching practices in primary schools. Such knowledge is beneficial for educational policy and practice to support teachers in implementing science instruction that address the needs of diverse learners. This study links Norwegian data from the Trends in Mathematics and Science Study 2019 with classroom video observation in Grade 5. Using multilevel latent class analysis, the present study identified three profiles of instructional quality that showed a different emphasis on teacher support, clarity of instruction, and cognitive activation, at the student- and classroom-levels. Further analyses revealed that science achievement and enjoyment of learning science varied across these profiles. Data from classroom video observation will also be used as a showcase to represent the varying classroom interactions (i.e., students-teacher and students-students) across the profiles of instructional quality. The implications of these findings for teacher education and professional development aimed at improving teaching practices in primary science classrooms are discussed.

Responsive Early Childhood Parenting, Preschool Enrollment, and Eventual Student Learning Outcomes: A Cross-Country Analysis Using Hierarchical Linear Modeling with TIMSS 2019 Data

Aditi Bhutoria¹ and Nayyaf Aljabri² (Education and Training Evaluation Commission, India¹; Education and Training Evaluation Commission, Kingdom of Saudi Arabia²)

An important aspect of human capital formation is providing quality early childhood care and education (ECCE). It not only helps in developing the cognitive abilities of children but also appeases learning gaps at early stages. ECCE involves different types of interventions, the most important of which include: (i) parental care at home and (ii) preschool enrollment and participation. This paper employs student data from 52 countries to investigate how variations in the interactions of these two interventions can lead to different learning outcomes at later stages. Using the latest TIMSS 2019 dataset, the paper employs a Hierarchical Linear Modeling (HLM) approach to account for the nested nature of data at the school and country levels. The results show that the joint effect of preschool enrollment and parental engagement on students' achievement scores sustains till Grade 4. Compared to those who do not attend preschool, a unit increase in parental engagement in early literacy and numeracy tasks increases math test scores by 1.25, 1.48, and 0.76 units, when the student attends preschool for up to 1 year, up to 2 years, and 3 years or more, respectively. Parental engagement in early numeracy activities finds a higher effect on Grade 4 test scores than the literacy activities, for all levels of preschooling. Further, the estimated marginal effects of increased parental engagement, for any given year of preschooling, are positive and significant for children with low levels of primary school preparedness compared to the ones who are very well prepared. Evidently, countries exhibit different profiles where the governance of ECCE is concerned. Cases for countries with integrated ECCE systems (with a single lead authority like the ministry of education) such as New Zealand, or split systems (with multiple authorities potentially leading to differences in objectives, operations, funding, or quality standards) such as France or Saudi Arabia are presented. Higher parental engagement, for each

level of preschool attended, is likely to be more effective in countries with split and fragmented systems rather than those with integrated ECCE systems. Overall, the recent trend of schoolification of ECCE with focus only on the preschooling component may not be sufficient to improve eventual learning outcomes. Instead, a comprehensive and country-specific ECCE policy must integrate quality care in ECCE provision. In the case of fragmented systems, pre-primary education can be supplemented with incentivized parental engagement and conducive home environments for enhancing educational achievement and fostering human capital development.

Exploring the Relationship Between Students' Civic Engagement and Civic Knowledge in Italy

Valeria Damiani¹, Gabriella Agrusti¹, Elisa Caponera², Laura Palmerio², and Bruno Losito³ (LUMSA University, Italy¹; INVALSI, Italy²; Roma Tre University, Italy³)

Civic engagement represents a key aspect of a democratic society and is itself a multifaceted construct. Research has shown that the promotion of civic engagement is an important component of civic and citizenship education intended in a broad sense, pertaining to formal, non-formal, and informal learning situations. Other studies have found associations between students' level of civic engagement and their level of academic achievement and self-esteem. This study further investigates ICCS 2016 findings on civic engagement of Italian students. It aims at identifying diverse profiles of participation, and at verifying whether these profiles are related to different levels of students' achievement. A latent profile analysis was conducted on a sample consisted of 3,361 Italian eight-grade students participating in IEA ICCS 2016. Three subgroups of Italian students with different profiles of civic engagement (high, medium, and moderate participation) were identified. The results showed a widespread willingness towards participation inside and outside the school contexts and in relation to future civic and political engagement. The associations with students' achievement highlighted that only students pertaining to the "high participation" subgroup had higher levels of civic knowledge. Albeit the limitations of this study, which does not consider contextual factors, results stress the relevance of a strong orientation toward youth civic engagement at school in order to foster students' achievement.

The Shift to Digital Reading Literacy: Can Digital Reading Literacy Scenarios be a Key Driver in Developing Critical Reading Skills in the UAE? A White Paper on Utilizing Digital Reading Literacy Scenarios to Develop Critical Reading Skills

Chris Jenkinson (Ministry of Education, UAE)

Due to changes in technology and increasing access to the internet, reading literacy is shifting from print to digital texts. To participate actively in society—from school to the workplace—students increasingly need to engage with real-world digital texts, including websites, emails, forums, and blogs. The literature shows that students, from as young as upper primary level, are emerging users of internet-enabled technology, that primary students read text messages, social media, and websites for social interaction and fun. Accordingly, reading in the UAE today is very different from just 20 years ago. Within UAE, the spread of information and communication technology has led to a fundamental shift in reading, from print-based texts to digital texts, with new genres of communication becoming increasingly popular. The concept of reading, as being simply decoding printed text, has shifted to a functional purpose for reading within a range of digital scenarios, where students have to evaluate website search results, determine an author's point of view, corroborate information across multiple texts, and judge the credibility of digital sources of information. As the UAE was one of only 14 countries to participate in both PIRLS (Progress in International Reading Literacy Study) and ePIRLS (2016), the relative performance for reading information online at primary level can be analyzed. International assessment data on reading literacy in the emirate shows there is a significant gap between the relative performance in print-based texts (PIRLS) and digital reading literacy (ePIRLS). A focus on primary school literacy, and the effects of new emerging technologies on reading, would be helpful for future educational initiatives. Accordingly, the research aims to establish whether authentic digital reading scenarios can be motivating to students and an effective driver of critical reading. As there is little research within the UAE on digital reading, the white paper will reference the literature on whether reading skills are transferable from print-based texts to digital texts, and—as the UAE has a dual language approach to education—between Arabic and English. ePIRLS and PIRLS data will be analyzed against the variables pertinent to the emirate, such as curriculum alignment, gender, access to digital resources, and teaching and learning related to digital texts. The research will use a mixed methods approach, triangulating international and national quantitative and qualitative data, against the literature, to show that a bilingual digital reading literacy framework can be a key driver for developing critical reading.

Session 5C (Online): Practice Gendered Perspectives in Results

Online Chair: Irini Moustaki (*London School of Economics, UK*)

On-site Moderator: Lauren Musu (*IEA*)

Room: Case Method Hall

Class Gender Composition and Student Math Achievement: An International Comparison using TIMSS data

Zahra Kamal (*Otto-Friedrich University of Bamberg, Germany*)

Does it matter who you sit next to in class? Does the gender composition of peers in the classroom affect how much you learn and how you perform in exams? In theory, class gender composition potentially affects the students' academic outcomes through possible changes in overall class atmosphere and teacher's or student's behavior and attitudes. Empirically, however, previous literature on the gender peer effect points out that the answer largely depends on the context. Most of the existing studies on the gender interaction effect focused on western countries where the social concept of "gender" has nearly been "undone," and stereotypical views on gender roles are less pronounced. In this regard, the context of developing countries has remained nearly untouched, most probably due to the lack of adequate data on confounding factors from nationally representative samples. Given that the channels of the effect and the dominant mechanisms could vary markedly across nations with divergent cultural backgrounds, one could hardly extrapolate the findings of the existing studies to other countries. This study contributes to the existing literature on the gender peer effect on student achievement via a cross-country analysis of TIMSS 2015 international data. The results of the hierarchical linear model for the pooled sample shows that, in general, students academically benefit from a higher proportion of female classmates, and at the same time, from the presence of the opposite gender in learning environments. More specifically, a ten percent increase in class female proportion improves students' math scores by 4 percent of a standard deviation. The relationship shows a nonlinear pattern across the female ratio range though. Students who participated in single-sex classrooms underperformed their counterparts in coeducational settings by 20 percent of a standard deviation. The results vary slightly between genders and vastly across the countries. Overall, the findings pinpoint the potential importance of class gender composition in the international education production function, a factor that has been less emphasized by previous international comparisons of student achievements.

Who Teaches Me? Teacher Gender and Student Achievement in Muslim-majority Countries

Zahra Kamal (*Otto-Friedrich University of Bamberg, Germany*)

Does it matter who teaches you? Do you learn the same content from a female teacher better than from a male teacher? Does your own gender play a role herein? While several studies have examined the causal impact of student-teacher gender interaction in the developed world, only few studies focused on this issue in developing countries, most probably due to the lack of adequate data on confounding factors from nationally representative samples. However, the issue of gender interaction effect is highly relevant in these countries because on the one hand, studies have shown that teacher and school factors are generally more influential in the developing countries than in the developed world. On the other hand, the results of the existing studies are not easily applicable in different contexts, particularly in Muslim-majority countries where girls and boys grow up mostly in separated environments and with different expectations, leading to highly distinctive social constructs with implications on the mechanisms of teacher gender effect. Using the rich international TIMSS data, I study how the gender of teacher influences student's academic performance in Muslim-majority countries with higher gender salience. I also investigate how the impact might differ between single-sex and mixed-gender classes and across the countries. A hierarchical modeling approach

is applied to account for the nesting structure of the data, and a within-student strategy is used to address the causal concerns about student fixed-effects. The results show that both girls and boys gain academic benefit by around 10% of a standard deviation from having a male rather than a female teacher. Also, the gender composition of peers in classroom has a considerable moderating effect on the impact of teacher gender. In single-sex environment, a male teacher produces an average uplift of around 21 and 24 points in male and female students' TIMSS scores, nearly two times the effect in coeducational settings. The impact varies across the countries. Additionally, a comparison between the estimated coefficients obtained from different models in this study provides important insights for the choice of methods in the examination of teacher gender impact. That is, when data limitation does not allow for fixed-effect estimations, say when only one performance per student is available in cross-sectional data, a multilevel approach which adds a random offset at class-level might considerably reduce the selection bias, and is thus advisable.

Explaining the Gender Gap in Political Engagement: The Role of Gender Stereotypes

Elisabeth Graf (University of Vienna, Austria)

Studies on political engagement have widely shown a gender gap in political interest and internal political efficacy: male participants typically show higher values on both concepts than female participants. Though often mentioned, the role of gender stereotypes in politics has rarely been analysed in this context. Based on gender schema theory, I hypothesize that gender stereotypes moderate the effect of gender on political engagement. More specifically, I expect a reduced gender gap among adolescents with more egalitarian attitudes towards women in politics. Using data from ICCS 2009, on average, no significant interaction effect of gender stereotypes and gender could be found. However, results in 10 countries show in fact a reduced gender gap in internal political efficacy with more egalitarian attitudes towards women in politics. For political interest, no specific pattern could be identified. Possible explanations for the country-variation and implications for future studies are discussed.

Students' Gender and ICT Self-efficacy: The Moderating Role of ICT Use in IEA-ICILS 2018

Kerstin Drossel, Mario Vennemann, and Nadine Fröhlich (Paderborn University, Germany)

In terms of the transition to an information society, knowledge and the competent use of information technologies have become essential, and differences in ICT self-efficacy may be appearing between school-age female and male students. For lack of data, the genders “female” and “male” will be discussed in this paper. Research has shown that in all countries, despite the better performance of girls, boys had significantly higher levels of self-efficacy regarding the use of specialist applications. However, in the International Computer and Information Literacy Study (ICILS 2013 and ICILS 2018), boys did not achieve higher mean competencies in the domain of Computer and Information Literacy (CIL) than girls in any participating country. As explanatory approaches for this result, for example, the computer-related self-concept—or also the use of digital media for various purposes—was examined. These factors are also located in the theoretical framework model of the study. Already existing research in this context further suggests that in addition to students' gender, the use of ICT in terms of ICT experience can explain variations in students' ICT-related self-efficacy. From the perspective of empirical educational research, this raises the question of what mechanisms lay behind the interrelation between students' gender, their ICT-related self-efficacy, and the use of ICT for different purposes. To address this desideratum, this paper uses structural equation modeling (SEM) to conduct secondary analyses of the ICILS 2018 database with all countries to determine the interaction between students' gender and their use of ICT for multiple purposes to explain variations in students' self-efficacy. The results indicate that the covariation between students' gender and their self-efficacy is not independent from their use of ICT for different purposes. In terms of preventing gender inequities in students' self-efficacy toward the use of ICT, the results of the SEM analyses indicate that the use of ICT for accessing content from the internet has the highest potential in this regard. Moreover, the results indicate (without controlling for any covariates) that the use of ICT can be a setscrew for educational policy and teachers to prevent social inequity in CIL since the relation between gender and self-efficacy is significantly lower in those countries reported where students report a high amount of ICT usage.

Session 5D (Online Exhibition Booth): ILSA Gateway***Talk to IEA about the ILSA Gateway*****Online Exhibitors:** Nathalie Mertes and Aysel Gojayeva (IEA)**Room:** Case Method Hall

The ILSA Gateway is a particularly useful tool for researchers in the early phases of a new research project, when identifying and exploring possible topics and available data. This session offers an opportunity to talk with ILSA Gateway colleagues about the entry to comprehensive information on international large-scale assessments in education.

Session 6A (Hybrid): IEA Studies and Publications

Symposium on the Reflections on the IEA Civic Education Studies' Multi-Faceted Contributions to Research, Theory and Practice

On-site Chairs and Presenters: Maria Magdalena Isac (*KU Leuven, Belgium*) and Andres Sandoval-Hernandez (*The University of Bath, UK*)

On-site Presenters: Kerry Kennedy (*The Education University of Hong Kong, Hong Kong*), Citlalli Sánchez-Alvarez (*Universidad Autónoma de Baja California, Mexico*), and Wiel Veugelers (*University of Utrecht, the Netherlands*)

Session Manager: Laura Cheeseman (*IEA*)

Room: Auditorium

The International Association for the Evaluation of Educational Achievement (IEA) has been involved in 50 years of international large scale studies of civic and citizenship education. Recently, the IEA decided to take advantage of this to invite participants who have organized these studies to contribute reflections on the influences of the study in their particular country or on the broader impact of the studies (by region or focusing on a particular topic). The session builds on the release of a book containing chapters in Part one that consider the influences of the IEA civic education studies on practice, policy and research in fourteen countries. The second part of the book contains nine chapters presenting overviews by comparative educators and social scientists across the European, Asian and Latin American regions as well as broader reflections.

Advancing Theory and Engaging Asia's Citizenship Education Researchers with the Results from IEA's Civic Studies

Kerry Kennedy (*The Education University of Hong Kong, Hong Kong*)

Secondary data analysis of survey data is often seen as a technical process that simply utilizes new methodological approaches. This paper argues that with appropriate framing such analysis can also be transformative. New meanings can be discovered, and new ideas can be identified that provide greater insight into theoretical approaches as well as the data themselves. Transformative secondary data analysis has the potential to open new ways of thinking about students' civic values across the Asian region and the complex contexts in which they seek to turn these values into action. These contexts are important because they represent patterns that are not always present in countries broadly described as Western in orientation. This can range from broad contexts of inequality or political conflict to complex deeply rooted social and political values, as well as pressures related to educational performance and career development. This paper is based on a chapter in the recently released book on the IEA civic education studies. It will demonstrate how data about civic and political understanding can be better grasped when the contexts in which data were gathered are considered. Comparing students' responses in one country with those in other countries or regions may tell one story. But when similar contexts are compared, new possibilities for theoretical insights can occur. For example, it has often been argued that many Asian students are weighed down by traditional values that have the potential to impede the development of democratic values. Secondary analysis of the IEA studies, however, has shown that one of the challenges for Asian students has been to balance tradition and democracy, and this does not always dampen their enthusiasm for democracy. The theoretical insights that can be generated from secondary analysis are important for developing an inclusive in-depth picture of students' civic values. This is an important message for researchers in Asian societies where participation in large scale assessments of civic values and actions is relatively uncommon. As participation declines, valuable perspectives and ideas are being lost along with the important theoretical perspectives that can be derived from them. As shown here, in-depth analysis is important. This is a key issue for future research in citizenship education and for the

possibility of expanding theoretical perspectives in the field, as well as the relevance of research findings for education in particular settings.

The Influence of IEA Civic Education Studies on Policy and Practice in Latin America

Andres Sandoval-Hernandez¹ and Daniel Miranda² (The University of Bath, UK¹; P. Universidad Católica de Chile, Chile²)

There is increasing disaffection from traditional forms of political involvement around the world, particularly in the youth population. However, this pattern has been accompanied by diversification in participation repertoires, with new generations participating in democratic spaces via alternative channels. It is in this context that a growing interest in civic and citizenship education in Latin America has emerged. This paper is based on a chapter of the book *Influences of the IEA Civic and Citizenship Education Studies*. Its aim is to present an analytical review of scholarly products based on these studies and their influence on policy and practice in the Latin American region. We found that scholars of the region have been mainly interested in two topics: citizenship participation and students' attitudes toward equality and tolerance. Both topics are related to societal changes in the region. The first is connected to the decline of political participation, and the second is consistent with the changing patterns of migration and demands for equality from socially disadvantaged groups. These identifiable lines of research have been coupled with the development of a network of researchers and practitioners. However, there has been a range of different outcomes depending on national, political, and institutional factors. For example, a large proportion of the research publications with CIVED and ICCS data have been focused on three Latin American countries: Mexico, Chile, and Colombia. The other Latin American countries that have participated in ICCS—such as Guatemala, Dominican Republic, Paraguay, Guatemala, and Peru—have received less attention. This could be partially due to the availability of skilled personnel in well-developed evaluation centers in Mexico, Colombia, and Chile and also to some senior scholars there who have provided reflections about the meaning and direction of democratic processes in the region. Concretely at the base of these lines of development of the 'emergent field' of Latin American studies of civic education are capacity, networking, and cooperation-building processes that cross the north/south classification in new ways. Research on Latin America is now mainly based in the region, and its volume and quality are increasing. We suggest that in order to continue with this trend, the following strategies could play a decisive role:

- Establish partnerships among national governments, international organizations and academic institutions in Latin America and beyond.
- Develop user-friendly, open-source software to analyze large-scale assessment data.
- Enhance consideration of theoretical perspectives.

Citizenship Education in Mexico and the Role of ICCS

Maria-Eugenia Luna-Elizarraras¹, María Teresa Meléndez-Irigoyen², and Citlalli Sánchez-Alvarez³

(Independent consultant, Mexico¹; Federal Educational Authority, Mexico²; Universidad Autónoma de Baja California, Mexico³)

This paper presents a brief description of the information published in the recently released book, *Influences of the IEA Civic and Citizenship Education Studies: Practice, Policy, and Research Across Countries and Regions*, on how Mexico's participation in the last two cycles of the IEA's International Civic and Citizenship Education Study (ICCS) has influenced educational discourse. A historical overview of civic education in Mexico is presented, along with some legislative issues that have profoundly impacted civic education, curriculum reforms, and teacher pre-service and in-service training. A discussion is presented on the perspective of how participation in the IEA civic studies, its framework, and results contributed to educational discourse in Mexico, trends in current national research, and as an important source of information for Mexico's Public Education Secretariat.

The Contribution of the IEA Civic and Citizenship Education Studies to Educational Research and Policy in Europe

Maria Magdalena Isac (KU Leuven, Belgium)

In Europe, civic and citizenship education has been the subject of growing attention and initiatives, especially over the last three decades. This interest was largely motivated by several factors, which include the collapse of communism, growing concerns about the consequences of globalization, and increased immigration, as well as anti-democratic and xenophobic movements. Many policy actions have been taken to address these challenges. For example, the European Union (EU) and the Council of Europe (CoE) launched initiatives to promote social cohesion and active citizenship. As a result, European countries have established common policy frameworks for coordinating their efforts in promoting and evaluating their policies regarding civic and citizenship education. These policy initiatives have provided important context and motivation for the participation of European countries in the IEA civic and citizenship education studies. European countries have been a prominent part of CIVED 1999, ICCS 2009, and ICCS 2016; these studies have stimulated a great deal of research and reflection that are highly connected to topics of interest for European educational policy. This paper is based on a chapter in the recently released book on the IEA civic education studies. It aims to reflect on the context, main education research, and policy priority areas regarding civic and citizenship education in Europe and to show how the participation of European countries in IEA's studies was intertwined with growing interest in civic and citizenship education in these countries, each coping with the need for examining and enhancing civic and democratic education. Then, it highlights the main research themes and topics that were enabled by examining the IEA studies, leading to conclusions that are informative for scholarly research, policy, practice, and reflection about civic and citizenship education in the European context. For example, established research themes such as the development of citizenship competences and promoting democratic school practices are identified and discussed. Moreover, several topics of interest that could be further covered by the information collected by the IEA ICCS studies as well as by research employing secondary data analysis of these data are proposed. Lastly, the paper concludes with a deeper reflection on the meaning of these findings, on opportunities for further research, as well as for increasing the impact of the IEA studies in the European and national policy and practice contexts.

A Broadened Perspective on Citizenship Education and on IEA's International Civic and Citizenship Studies

Wiel Veugelers (University of Utrecht, the Netherlands)

The presentation will consider ways in which the IEA civic education studies have been interacting with conceptualizations and processes of citizenship education:

1. Broadening and deepening the concept of citizenship and education for democracy: Traditionally citizenship was only linked to the political domain of one's country; in recent decades the concept has been 'broadened' and linked to regional identities such as the European Union. The concept of citizenship has been 'deepened' because it pertains not only to the political level of society but also in the social and cultural domain. This deepening makes citizenship a normative and therefore a contested concept.
2. Conceptualizing citizenship and citizenship education as having three aspects: A national concept of citizenship can be conceptualized into three types: adapted, individualized, and critical-democratic. Research into global citizenship also shows three types: an open global citizenship with an emphasis on cultural openness; a moral global citizenship focusing on the well-being of humanity; and a social-political global citizenship aimed at greater social justice. Global citizenship focuses on human rights principles as moral guidelines for improving the world; national citizenship focuses on strengthening national culture.
3. Recognizing the importance of attitudes in citizenship: People can have knowledge about democracy, and they can have democratic skills, but it is crucial for them to have attitudes supportive of rights for others and principles of participatory democracy if they are to act in a democratic way. Intentions and concrete behavior are essential elements of citizenship in practice. The attitude component makes a real difference. Psychological concepts like involvement and engagement are part of citizenship and express moral values.
4. Understanding the process using the concept of objectification: Biesta speaks of subjectification, which is not captured by the term socialization. What is missing is the personal articulation: the individual student interprets concepts in a subjective fashion and through dialogue with others. This points to the relevance of individuals' construction of meaning. This suggests research studying how students develop personal narratives relating themselves to citizenship.
5. Recognizing variations in the meaning of "democratic citizenship": All nations have a more or less explicit citizenship policy related to a more or less formal curriculum of citizenship education. Nations have political regimes, ranging from authoritarian to democratic. All nations have ideas of citizenship and practices of citizenship education. In reality, ICCS is a study not of citizenship but of democratic citizenship.

Session 6B (On-site): Practice***Symposium on Computer Use for Instruction and Learning Before and During the Pandemic: Findings from ICILS 2018 and the ICILS Teacher Panel*****Chairs:** Rolf Strietholt and Sabine Meinck (IEA)**Discussant:** Lauren Musu (IEA)**Room:** Lecture Hall 1

The symposium on computer use for instruction and learning provides results from data collected before and during the COVID-19 pandemic. The aim of the symposium is to bring together findings on teachers' attitudes towards ICT use for instruction and teaching and their actual practice, as well as gain an understanding of the socioeconomic digital divide. The presentations are based on the ICILS 2018 and the ICILS Teacher Panel study. In the first presentation, insights into study motivation, key features of the study design and instruments, and a non-response bias analysis are discussed. This is followed by a description of changes in the level of inequality in ICT use during the pandemic analyzed in the second presented study. The symposium closes with a presentation on the ICT use for instruction and learning before and during the pandemic. The study is based on the extended technology acceptance model (TAM) and provides insights into the relationship between ICT use for instruction and learning, teacher and context characteristics, and cross-country differences in digital divide.

Design of the ICILS Teacher Panel

Rolf Strietholt, Yuan-Ling Liaw, Justin Wild (IEA)

Expectations are high that digital learning can mitigate the consequences of the temporary school lockdowns for learning and instruction. While several ad-hoc-surveys have revealed considerable variation in how schools use digital learning in times of educational disruption, at present, the reasons for such differences are not well understood. Questions remain such as, which schools successfully managed the transition to distance and digital learning during the school lockdown? How important are factor such as teacher professional development, the availability of a learning platform at school, or how well students are equipped with digital, online devices at home? To address these questions, the IEA has conducted its first panel study in forty years using the 2018 samples of ICILS (International Computer and Information Literacy Study) as a baseline. The ICILS questionnaires for teachers were re-administrated to the same sample of ICILS 2018 teachers to construct a teacher panel dataset. Unlike recent ad-hoc surveys, such a design provides a solid basis to investigate the determinants of digital learning and teacher use of online devices to facilitate instruction. While education systems in general are slow to change and reforms often take years, the COVID-19 pandemic has created massive pressure to expand digital learning. The aim is to utilize this unique opportunity to study the determinants of digital learning in a longitudinal study: technically speaking, school lockdowns are an external shock that has led to an unprecedented investment into digital learning. The ICILS Teacher Panel promises groundbreaking knowledge of the impact of the COVID-19 pandemic on education and the conditions for a successful transition to digital learning. In this paper, we present key feature of the design of the ICILS Teacher Panel including the samples and the instrument. Three countries, Denmark, Finland, and Uruguay, participated in the ICILS Teacher Panel. The samples of 2020 comprise 445 teachers in Denmark, 1247 teachers in Finland, and 470 teachers in Uruguay, which corresponds to a panel response rate of one to two thirds of the original samples of 2018. Further, we present findings from analyses of nonresponse bias. The analyses suggests few demographic differences between teachers in the original sample and the subsample of panel teachers, which implies that the findings from the ICILS Teacher Panel are representative for the respective countries.

Changes in the Level of Inequality in the Use ICT During the Pandemic

Justin Wild, Rolf Strietholt, Yuan-Ling Liaw (IEA)

One of the primary aims of the ICILS (International Computer and Information Literacy Study) Teacher Panel study is to describe the change in information and communications technology (ICT) use affected by the severe external disruption of the COVID-19 pandemic in formal educational practices. This study investigates the overall changes in ICT use for teaching and learning in participating countries. Furthermore, the changes experienced by groups in different socioeconomic statuses within countries is examined, focusing on different strata of socioeconomic status (SES) of schools and their experience with changes in the use of ICT in formal education between 2018 and the end of 2020. The aim of this analysis is to determine if existing inequality between several socioeconomic strata within countries regarding access to and knowledge of ICT resources for instruction has increased during the educational disruption caused by the COVID-19 pandemic. The ICILS Teacher Panel was designed to collect longitudinal data on ICT use in instruction from teachers and schools. Of note, it did not re-assess students in their ICT skills. Therefore, this study will use predictors of ICT skills as shown in the ICILS 2018 study for comparisons between groups. These include access to ICT resources (including both materials and training) and teacher self-efficacy in using ICT for instruction, among others. To define the groups, established criteria is used for SES stratification. Schools are then classified according to these criteria and their reported proportion of students in each stratum. The mean and variance for each predictor is compared between 2018 and 2020 for each group to establish a measure of increased use of ICT. Finally, the level of increase of ICT use between groups is compared to determine whether significant differences exist between groups. The study found that while differences exist between these groups, significant difference depended on the nature of the education system in the country, and how equitable its practices of distributing educational resources in both materials and training. This finding provides some evidence that education systems can mitigate inequality by focusing on its practices in distributing educational resources.

Longitudinal Evidence on the Determinants of Computer Use

Yuan-Ling Liaw, Rolf Strietholt, Justin Wild, Agnes Stancel-Piątak, Ann-Kristin Koop (IEA)

The ICILS Teacher Panel is the first longitudinal study IEA has conducted in forty years. The longitudinal research is a particularly useful and valuable means of measuring change and making causal inferences. This paper seeks to investigate factors affecting teachers' attitudes and behaviors towards the use of technology for teaching and learning during the COVID-19 pandemic. Unlike cross-sectional studies, the longitudinal Teacher Panel not only features observed correlation, but aims to provide explanations on the determinants of successful digital learning. Educators are facing an urgent need for a global and unplanned change in the educational paradigm due to the COVID-19 pandemic. School buildings were (and some still are) fully or partially closed to protect the health of children or to prevent community spread, and many educators quickly pivoted to remote teaching involving information technology. The educational uses of ICT have ceased to be an option but have become a necessity to provide student instruction. Prior results using the ICILS 2018 data imply that young teachers find it easier to use ICT for teaching, which might lead to more frequent ICT use. The analysis also revealed that computers are used less frequently in schools with disadvantaged students. Similarly, the predictors of ICT use were distributed unequally, favoring the socially advantaged schools. The present study aims to contribute to the understanding of the predictors of teachers' use of technology during the pandemic. Using structural equation modeling (SEM) techniques cross-lagged and autoregressive effects as well as concurrent associations are investigated. The study is based on longitudinal data collected from the ICILS 2018 and the ICILS Teacher Panel. The theoretical framing of the analysis draws from the extended technology acceptance model (TAM). Predictors of teachers' use of technology are analyzed, such as perceived usefulness, perceived ease of use, teachers' perceptions of the expectations towards ICT use (subjective norm), and perceived availability of computer resources. Additional control variables are included, such as changes in teaching grade level or teaching subjects. Preliminary longitudinal results suggest that, aside of previous use of technology, teachers' attitudes towards ICT, ICT-friendly climate at the school, and the availability of an IT-infrastructure influence teachers' use of technology. Finally, we conclude the paper with a discussion of the variations at both across and within country level.

Session 6C (Online): Methodology***Exploring Methodological Issues when Analyzing TIMSS and ILSA Data*****Online Chair:** Erbru Erberber (*American Institutes for Research, US*)**On-site Moderator:** Andrés Strello (*IEA*)**Room:** Case Method Hall**The Review of R Packages for ILSA Data: Hard or Easy?**Laura Ringienė, Julius Žilinskas, and Audrone Jakaitiene (*Vilnius University, Lithuania*)

International Large-Scale Assessment (ILSA) data, such as TIMSS (Trends in International Mathematics and Science Study) and PISA (Programme for International Student Assessment), play an important role in various education surveys. Typically, ILSA studies have a very sophisticated study design, and statistical analysis should contain plausible values and weighting schemes. For an analysis of ILSA data, one can choose commercial programs such as SPSS, SAS, and Mplus. The International Association for the Evaluation of Educational Achievement (IEA) has developed IDB Analyzer, which operates together with SPSS. IDB Analyzer is free software; however, as of now, it is available for Windows operating system only. Other free open-source software (available for any operating system) is the R environment, where a researcher can perform various statistical ILSA analyses within one program using existing packages. The study summarizes the possibilities of R packages devoted for ILSA analysis, namely BIFIESurvey, EdSurvey, intsvy, RALSA, and svyPVPack. The comparative analysis focused on the simplicity of the use of the packages in analysing TIMSS and PISA data. We analysed the packages with regards to descriptive statistics, correlation, regression, and multilevel models. After testing and comparing the performance of the packages, we concluded that some packages might be quite complex for non-IT specialists. Some packages lack comprehensive documentation. Only the RALSA package has a graphical user interface. Almost all reviewed packages have space for improvement for more complex analyses, such as multilevel regression.

Talking about Teachers: Sampling Weights for Teacher-Centric Inferences for TIMSSMartin Hooper, Markus Broer, Lisa Yarnell, and Juliet Holmes (*American Institutes for Research, US*)

One of Trends in International Mathematics and Science Study's (TIMSS) comparative strengths, relative to other international assessments, is a design that allows for the linking teachers and their practices to the students in the classes they teach. Under current data collection practices, TIMSS does not support claims about teachers unless the inference is drawn as a student characteristic ("Half of the eighth graders in the country have mathematics teachers who have Master's degrees."). With this in mind, this paper proposes two methods that would allow for teacher-centric inferences ("More than half of the eighth-grade mathematics teachers have mMaster's degrees.") if links between sampled teachers and the unsampled yet eligible mathematics classes were known—, something that would be feasible with limited additional data collection. The first method is based on the standard Horvitz-Thompson estimator and posits that with such links it would be possible to calculate the probability of teacher selection, and with it an inverse-probability weight, despite the teacher not being directly sampled. The second method, the Multiplicity-Adjusted Indirect Sampling (MAIS) approach, posits that teacher estimates could be obtained by adjusting downward the classroom weights based on these links. A simulation study was conducted that confirms that both methods provide similar and unbiased estimates and may provide a promising way to analyze TIMSS teacher data.

Measurement Invariance in TIMSS 2019 Background Scales: A Partial Invariance Modelling Approach

Katherine Reynolds and Lale Khorramdel (TIMSS and PIRLS International Study Center at Boston College, US)

Cross-country measurement invariance in contextual scales is a topic of ongoing concern in international large-scale assessment. Invariance evaluation strategies relying on multiple-group confirmatory factor analysis often find that the strictest levels of invariance are not achieved. This work utilizes a partial invariance modelling approach in the framework of item response theory to evaluate cross-country measurement invariance in the TIMSS 2019 context scales, presenting the results of two scales from the Home Questionnaire as examples. The approach was applied using both the Rasch partial credit model and generalized partial credit model. Analyses proceeded by estimating a set of common item parameters for scale items and assigning subset-unique or country-specific item parameters according to fit statistic recommendations. Results presented suggest a high degree of invariance for the sample Home Questionnaire scales, as well as many other background scales from TIMSS 2019.

Identification and Cross-Country Comparison of Students' Test-Taking Behaviors in Selected eTIMSS 2019 Countries

Xiaying Zheng, Fusun Sahin, Ebru Erberber, and Frank Fonseca (American Institutes for Research, US)

Unfavorable test-taking behaviors, such as speediness (e.g., students running out of time before responding to all items) and disengagement (e.g., non-effortful responding), have long been a concern for the validity of scores from large-scale low-stakes assessments such as TIMSS. Understanding the presence and extent of such behaviors is important for ensuring the validity of inferences based on test scores. This study examined test-taking behaviors using item response time (RT)—a process data derived-variable included in the TIMSS 2019 database. Analyses compared the United States to three other countries of interest (England, Singapore, the United Arab Emirates) that administered the electronic version of TIMSS (eTIMSS) 2019 in English at grade 8. Test-taking behaviors were identified within each country and then compared within and across countries. Specifically, to identify distinct types of test-taking behaviors, mixture modeling techniques were employed on RT and item scores from Booklet 1, Part 1, of the eTIMSS 2019 eighth-grade assessment. The results indicated that each country had several latent classes of students with different pacing trajectories and performance. These latent classes are interpreted as steady; disengaged or very disengaged; speeded or very speeded; and efficient and high-performing test-taking behaviors. Most of the students in each country had a steady pace (medium to high sum score; steady RT throughout the test): 71 percent in England, 74 percent in both Singapore and the United Arab Emirates, and 84 percent in the United States. Disengaged or very disengaged students (low sum score; short RT) were identified in each country, but they were more prevalent in England and the United Arab Emirates (both more than 20 percent) than in the United States and Singapore (both below 10 percent). The study also revealed small percentages of speeded or very speeded students (low to medium sum score; long RT at first but very short RT toward the end) in England, the United Arab Emirates, and the United States (1, 5, and 6 percent, respectively) but not in Singapore. A unique group of efficient and high-performing students (high sum score; short RT) (24 percent) was identified only in Singapore. This research was one of the first studies to use the newly available RT data in the TIMSS 2019 database. It demonstrated that mixture modeling is an informative technique for identifying distinct test-taking behaviors and highlighted the presence and extent of unfavorable test-taking behaviors in Booklet 1, Part 1, of the eTIMSS 2019 eighth-grade assessment.

Session 6D (Online Exhibition Booth): American Institutes for Research (AIR)
Presentation and Hands-on Experience of the Virtual Tool for Teachers

Online Exhibitors: Arora Alka, Teresa Neidorf, and Will Johnston (*American Institutes for Research, US*)

Room: Online

Researchers at the American Institutes for Research (AIR) are developing a web-based resource for teachers. In this special session, presenters will demonstrate a prototype of the AIR Educator Tool which gives teachers access to sets of mathematics and science assessment items organized in a database searchable by learning goals for selected topics and provides contextual information teachers need for instruction or classroom assessment across grade levels.

Session 7A (Hybrid): Policy***Panel on Shaping Policy and Practice around Educational Disruptors***

On-site Panelists: Branislav Randjelović and Danijela Djukić (*Institute for Education Quality and Evaluation, Serbia*)

Online Panelists: Patrícia Costa (*CEMAPRE, Portugal*) and Mario Venneman (*Paderborn University, Germany*)

On-site Moderator: Dirk Hastedt (*IEA*)

Room: Auditorium

The last year has been challenging and the work of education stakeholders has been affected by the pandemic. This panel provides a view into diverse activities happening during this period. The session will combine research papers with other relevant inputs from educational stakeholders and ILSA implementing institutions. While schools were affected by the closures, researchers worked on forecasting the impact of pandemic on students and education at large.

What TIMSS 2019 Can Tell Us About COVID-19 Learning Losses and Educational Inequalities in Europe?

Zsuzsa Blaskó, Patrícia Costa, and Sylke Schnepf (*Joint Research Center, European Commission, Belgium*)

It is widely discussed that the pandemic has impacted on educational inequalities across the world. However, in contrast to data on health or unemployment, data on education outcomes are not timely. Hence, we have extremely limited knowledge about the actual impact of the pandemic on learning outcomes at the national and the cross-national level. As it might take years to get new comparative evidence on the actual extent of the problem, this paper uses the latest international student assessment data from before the pandemic, the TIMSS (Trends in International Mathematics and Science Study) 2019 data, and applies simple descriptive analysis, regressions, and logical deductions to map potential consequences of the COVID-19 crisis across Europe. We obtain the relative trajectories of children's learning loss and its unequal distribution from information on home and school resources, importance of these resources for learning outcomes and countries' school closure duration policies and compare COVID-19 related risk of learning loss between European countries. Results based on fourth graders' achievement indicate that throughout Europe educational inequalities between and within countries are likely to increase substantially. Some European countries are highly likely to face already an education crisis. Finally, short-term actions and long-term policies are discussed.

How Do Schools Contribute to Student Resilience in Computer and Information Literacy? Results from IEA-ICILS 2018

Mario Vennemann, Nadine Fröhlich, Kerstin Drossel, and Birgit Eickelmann
(Paderborn University, Germany)

The competent use of information and communication technologies (ICT) is considered an important aim of education because students need to be equipped with such competencies for their future personal and professional lives. Over the past several years, this has led to the emergence of large-scale assessments (LSA), focusing on students' computer and information literacy (CIL) and on factors contributing or hindering achievement in this domain. In this context, researchers have also been interested in identifying schools which score high in the achievement tests despite their on average less-privileged student population (so called organizationally resilient schools). Although the concept of resilience stems from the field of psychology, results toward exposing resilience that make students a focus are not readily available. Taking advantage of the representative database of the International Computer and Information Literacy Study (IEA-ICILS 2018), this research desideratum will be addressed in this contribution taking into account information from N = 46,561 students and N = 2,226 schools from 14 educational systems. In addition to identifying resilient students considering their socio-economic status (SES) and their CIL achievement, this contribution also focuses on what school-level factors (antecedents and process variables) may contribute to students' resilience in the CIL domain. Results show that the number of psychologically resilient students among those countries participating in IEA's ICILS 2018 are subject to considerable variation and that school-level antecedents (such as ICT resources of a school) seem to be more closely related to students' resilience than process variables (e.g., the use of ICT for teaching and learning). Results are discussed with respect to their relevance for practice, future research, and methodology.

Session 7B (On-site): Practice

Impactful Practices in Education

Chair: Sabine Meinck (IEA)

Room: Lecture Hall 1

The Effect of Between-School Tracking on School Segregation: International Evidence on Socioeconomic and Gender Segregation

Andrés Strello¹, Rolf Strietholt¹, and Isa Steinmann² (IEA¹; University of Oslo, Norway²)

In the present study, we investigate the effect of early between-school tracking on the between-school segregation of social groups. Specifically, we investigate if early tracking fosters the segregation of socioeconomically privileged and disadvantaged students, and of boys and girls. In previous research, socioeconomic segregation differences between early and late tracking countries have only been investigated in descriptive studies. Associations between tracking and school gender segregation have not been investigated in previous research, at all. To address this lack of evidence, we combine data from international large-scale assessments to estimate difference-in-differences models. Specifically, we regress the degree of school segregation at the secondary school level on a between-school tracking indicator, while controlling for the degree of school segregation at the primary school level. The analyses are replicated across 19 different combinations of datasets from three large-scale assessments (PIRLS, TIMSS, and PISA), encompassing 15 assessment cycles and altogether 52 different countries or regions. The results provide strong evidence for the hypothesis that early between-school tracking increases the between-school segregation of socioeconomic groups and of boys and girls.

Relationship Between Students' Computational Thinking and Problem-Solving: Investigating Affine School-Learning-skills and Gender in Four IEA –ICILS –201 Countries

Amelie Labusch and Birgit Eickelmann (Paderborn University, Germany)

Computational thinking has increasingly gained relevance as 21st century key competence in recent years. Referring to this development, research on computational thinking as an international option to the International Computer and Information Literacy Study 2018 will be presented in this contribution. In the context of a German national extension to the study, the relationship between students' computational thinking competences and problem-solving will be focused on, including reasoning in figurative domain as part of cognitive abilities. However, linear regression analyses have been conducted to examine to what extent differences in students' competences in computational thinking can be explained by problem-solving and reasoning in figurative domain, also including students' gender. The results first indicate that the ability to recognize, abstract, and describe a problem, as well as self-confidence in problem-solving and perseverance, are important skills in the context of acquiring computational thinking. Second, a strong correlation between reasoning in figurative domain as part of cognitive abilities and students' computational thinking competences (33 percent variance explanation) appears. Third, there is a gender-specific difference in computational thinking competences in favor of boys. For international comparison, it has been investigated—apart from Germany also for Finland, Denmark, and the Republic of Korea—to what extent differences in students' competences in computational thinking can be explained by their school learning of computational thinking-related skills, which have a high affinity to the previously elaborated problem-solving skills. For this purpose, linear regression analyses have been conducted, also including students' gender. It proves that there are hardly any positive significant correlations between the extent of school learning of computational thinking-related skills and students' competences in computational thinking. The results shed light on the essential requirement in all educational systems to implement computational thinking in teaching in a way that students can (further) develop their competences in this field. Furthermore, in contrast to the other three countries in the analyses, a gender-difference in

computational thinking competences is evident for Germany when controlling for school learning of computational thinking-related skills. In this context, the necessity arises to reduce differences to give all students the chance to acquire adequate computational thinking competences to actively participate in society.

Measuring Educational Equity Across Nordic Countries. Conceptual and Methodological Choices as Implications for Educational Policies

Oleksandra Mittal, Trude Nilsen, and Julius Kristjan Björnsson (University of Oslo, Norway)

It has become common that with every cycle of international large-scale student assessments (ILSAs), country-participants are ranked with regards not only to academic outcomes, but equitability of their education systems. Nordic countries have been the centre of attention for being at the top of equity rankings over most of the ILSA cycles. Nevertheless, a decline in educational equity has been reported lately. However, the process that leads to specific inferences on equity remains partly obscure to education decision-makers. Thus, the present study aims to discuss and empirically illustrate that rankings of “equity league tables” represent more of a “broad-brush picture,” as they are sensitive to the choices made by a researcher throughout the process of empirical inquiry. We used data from the international large-scale study TIMSS 2015 to investigate how the equity rankings of the Nordic education systems change in accordance with:

- 1) operationalization and measurement of the socio-economic status (SES),
- 2) levels of analysis,
- 3) subject domains,
- 4) students' grade level,
- 5) distribution of achievement scores,
- 6) achievement gaps between high and low-SES students.

We used structural equation modeling to analyze data for Denmark, Finland, Norway, and Sweden (fourth grade), and Norway and Sweden (eighth grade). To check the comparability of SES across the countries, we did measurement invariance analysis. The results confirm that analytical and methodological choices have a direct impact on the inferences on equity. Hence, we would encourage to report elaborately on the research process and its limitations as it may lead to wrong interpretations and, consequently, policy implications.

The Validity of Student Ratings of Instructional Quality: Internal Structure, Comparability, and the Relationship to Student Achievement

Bas Senden, Trude Nilsen and Nani Teig (University of Oslo, Norway)

Researchers have increasingly used student questionnaires as a measure to assess instructional quality. Despite the growing use of student ratings of instructional quality, few studies have examined the properties and usefulness of this measure in primary and secondary education, especially across grades and subjects. A novel opportunity arose when the Trends in Mathematics and Science Study (TIMSS) renewed its focus on instructional quality in 2019, contributing to new and updated items. In addition, Norway included several national items, thereby extending the measurement to assess three basic dimensions of instructional quality: classroom management, cognitive activation, and supportive climate. The present study utilizes this opportunity by investigating the factorial structure, comparability, and contribution to student achievement of the student ratings of instructional quality. To this end, TIMSS provided a large representative sample consisting of 3951 fifth-grade and 4575 ninth-grade students, who rated the instructional quality of both their mathematics and science teachers. Using multilevel confirmatory factor analysis to these data, the three-dimensional factor structure could be confirmed across all investigated groups: evidence from multilevel measurement invariance analysis supports the notion that classroom management and supportive climate are comparable across grade five and nine and across mathematics and science, whereas the comparability of cognitive activation is limited. Last, multilevel structural equation modelling was employed to investigate the relationship to student achievement. Results showed that classroom management correlates to student achievement in all groups, albeit less in grade 5. Supportive climate and cognitive activation were highly significant and positively correlated to student achievement in grade 9, but no relation was found in grade 5. The implications of these findings in improving the assessment of instructional quality are discussed.

Session 7C (Online): IEA Studies and Publications

International Civic Education and Citizenship Study and Society

Online Chair: Simona Boudova (*Czech School Inspectorate, Czech Republic*)

On-site Moderator: Lauren Musu (*IEA*)

Room: Case Method Hall

Systematic Review of Empirical Studies on International Large-Scale Assessments of Civic and Citizenship Education

Eunjung Myoung and Pey-Yan Liou (*Korea University, Korea*)

Around 20 years have passed since the International Association for the Evaluation of Educational Achievement (IEA) initiated international assessments about adolescents' civic and citizenship education. The Civic Education Study (CIVED) was implemented in 2009; the subsequent International Civic and Citizenship Education Study (ICCS) has been conducted since 2009. Ahead of the assessment of ICCS in 2022, it is time to look at what has been published applying the CIVED or ICCS data. This systematic review aims to investigate the previous academic research on IEA civic and citizenship education studies. It overviewed the research trends of the peer-reviewed journal articles that used the CIVED or ICCS data for secondary analyses. It identified four electronic databases and analyzed 130 articles from 2003 to 2021, based on a comprehensive coding scheme. The results mapped the frequency of published articles overtimes, data cycle, questionnaire, and journal discipline. All articles were also categorized into three sub-categories based on the purpose of the articles (i.e., substantive issues, methodological aspects, theoretical framework). Different research interests across countries were analyzed based on the country affiliation of the first author and the geographical focus of each article. The findings indicated the frequency of social science journal disciplines, which meant the importance of political and social aspects in civic and citizenship education. Scholars from the USA, Hong Kong, and Belgium have significantly contributed to the CIVED or ICCS related research. Based on the distinct patterns among used questionnaires and studied countries, further research needs to focus more on the understudied data (i.e., teachers' and principals' responses from teacher and school questionnaires, as well as students' performance on a civic knowledge test). More diverse countries are expected to be analyzed using the ICCS 2016 data in further research.

Lower-secondary Students' Perceptions of Climate Change as a Global Threat. Results from ICCS 2016

Wolfram Schulz and John Ainley (*Australian Council for Educational Research, Australia*)

This paper studies how lower-secondary students from over 20 countries in Asia, Europe and Latin America viewed the seriousness of climate change as a potential threat to the world's future in 2016 and how these perceptions differed across countries in comparison with the views about the seriousness of other global issues. Further, within countries it looks at associations of concerns about climate change with other variables related to student background, attitudes and school-related factors. The past years have shown a growing awareness about the need of providing young people education for sustainable development (ESD), which is included in the United Nations 2030 Agenda for Sustainable Development. Following up on the underlying question about the potential effect of schooling on environmental awareness, the study investigates the extent to which different factors influence perceptions of climate change as a global threat. Variables of interest include student characteristics and background, school-related factors as well as civic attitudes. Results based on data from ICCS 2016 show that there were considerable differences across countries in students' perceptions of climate change as a threat to the world's future. There were higher proportions among young people in wealthier countries concerned about climate change than in other countries. Furthermore, there is evidence that these perceptions within countries were positively associated with socio-economic background and civic knowledge. These findings are in line with results

from adult surveys that have shown evidence about the impact of education on people's awareness of climate change as a global problem.

The Influence of Religious Attachment on Civic Engagement Among Lower-Secondary Students

Wolfram Schulz and John Ainley (Australian Council for Educational Research, Australia)

This paper analyses affiliation and engagement with religion as well as attitudes toward its influence on society among lower-secondary students in countries using data from the first two cycles of ICCS in 2009 and 2016. It looks at changes over time as well as on associations between indicators of religious attachment among young people with indicators of civic engagement. The rich databases provided by ICCS offer an excellent opportunity to investigate the links between religious affiliation and beliefs among young people as motivating factors driving individual engagement in society. The relationship between religious attachment and civic engagement is a phenomenon which has frequently been highlighted in other studies. This paper provides evidence about more recent changes in religious affiliation and attitudes toward the importance of religion for society between 2009 and 2016. Further, the paper explores how these variables relate to expected participation in the future while also considering the context of the general status of religion in each participating country. Regression models are used to look at the effects of three variables on different forms of expected civic engagement: religious affiliation, religious activities, and views about the influence of religion on society. Other relevant factors (student background, student attitudes and civic knowledge) are included as control variables in these model. While findings show a decline in religious attachment, engagement, and positive attitudes toward the influence of religion in society and a negative association of these variables with student civic knowledge, there is also an indication that students with higher levels of religious attachment and higher level of endorsement for its role in society tend to have relatively higher expectations of participating in some forms of future engagement in adult life.

Citizenship Education in Latvia: Education Content and Monitoring at a Policymaking Level

Ireta Cekse (University of Latvia, Latvia)

This report particularly uses content from the chapter "Improving Civic and Citizenship Education in Latvia" in *Influences of the IEA Civic and Citizenship Education Studies: Practice, Policy, and Research Across Countries and Regions* (Čekse, 2021). The report characterizes citizenship education in Latvia and focuses on a large reform to school education carried out in Latvia since 1991: ICCS results' implementation in policymaking documents and education curricula. The aim of the report is to show changes in Latvia's citizenship education since 1991 and highlight places where ICCS results are used as a representative indicator of the level of civic education in Latvia. The investigation also seeks possibilities for improvement in policymaker documents and citizenship education content.

Session 7D (Online Exhibition Booth): Australian Council for Educational Research (ACER)*An Exclusive Exchange about the Work of ACER***Online Exhibitor:** Alan Egbert**Room:** Online

ACER's online exhibition booth welcomes all IEA IRC attendees. This planned session will provide an opportunity to learn about ACER and its work in the region and experience an interesting exchange.

SUBSCRIBE

to



IEA Updates, IEA's online quarterly newsletter, highlights recent activities and developments from the past few months.

iea.nl/subscribe

#IEAUpdates





EVENING RECEPTION

MONDAY, 15 NOVEMBER
19:00–21:00 (GST)

The reception will be held at the International Research Conference (IRC) venue:

Address: Mohammed Bin Rashid University of Medicine and Health Sciences
Building 14, Dubai Healthcare City,
P.O. Box 505055, Dubai, UAE

SOCIAL DINNER

WEDNESDAY, 17 NOVEMBER
19:00–21:00 (GST)

The social dinner will be held at restaurant Anna:

Address: the Dubai Mall (first floor), Zayed Road, Dubai (next to Burj Khalifa)

Buses will be available to take guests to the event. The buses will leave at 18:30 pm from the front entrance of the venue and return to the venue after the dinner, at approximately 21:00 pm.

TOUR OF EXPO 2020

THURSDAY, 18 NOVEMBER
15:30–20:00 (GST)

Address: Dubai South District (near Al Maktoum International Airport)

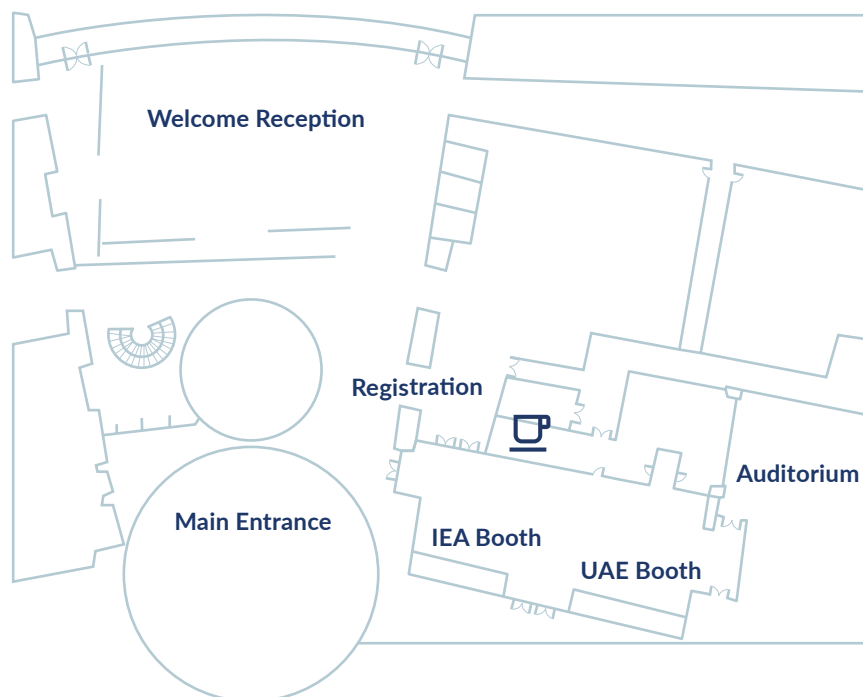
Buses will be available to take guests to the event. The buses will leave at 15:30 pm from the front entrance of the conference venue. All guests will be brought back to the conference venue at the end of the tour, at 20:00 pm.

All visitors to the Expo must be able to provide proof of at least one dose of any of the COVID vaccinations recognized by any Expo 2020 participation country or the World Health Organization. If you are unable to show proof of vaccination, a negative PCR test certificate, taken no more than 72 hours prior to arrival at the Expo, can be shown at the entrance. If you require a PCR test, please inform the IRC organization at the reception desk on Tuesday, 16th of November.

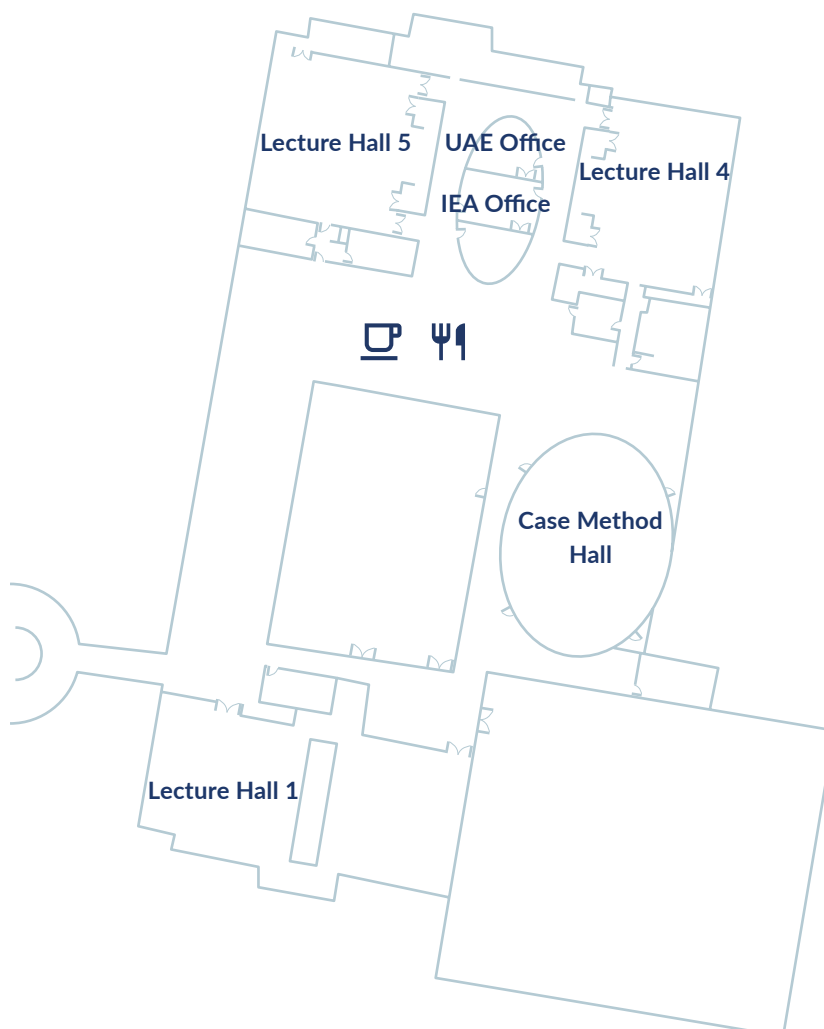


Mohammed Bin Rashid University of Medicine and Health Sciences

GROUND FLOOR



1ST FLOOR



Free copies of the *IEA Insider 2021* are available at IEA's on-site IRC booth.

An online reader-friendly version of the annual newsletter is also available at IEA's online exhibition booth!



THANK YOU



IEA and the Ministry of Education (UAE) would like to thank all participants for joining in the 9th IEA International Research Conference (IRC). The IRC was founded in 2004 to foster collaboration and knowledge sharing of findings related to IEA studies. The IEA IRC provides an international forum for all those working with IEA study findings and data to exchange views on critical educational research issues in a comparative and global context.

We hope you have found this year's IRC informative and valuable. We would like to welcome you to please join us for the next IRC in Moscow, 2023.

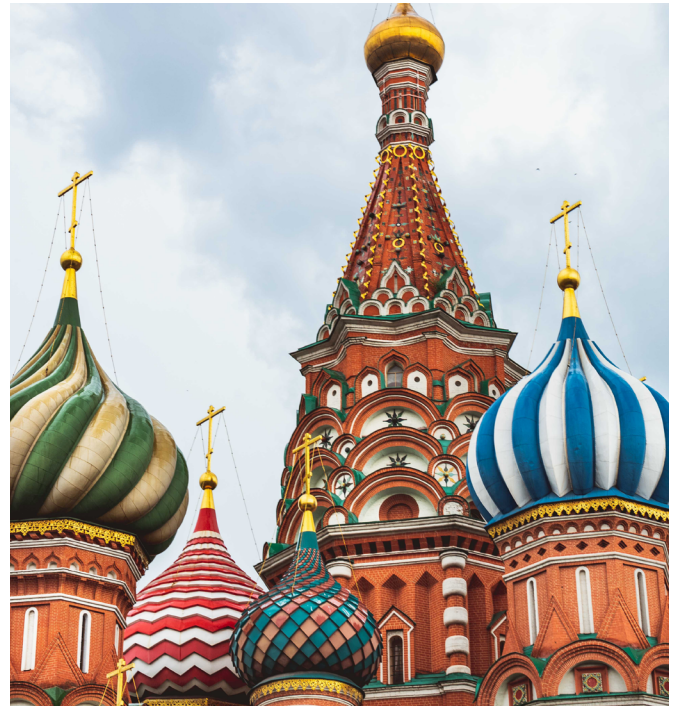
ABOUT THE 10TH IRC

A WELCOME FROM THE MINISTRY OF EDUCATION OF THE RUSSIAN FEDERATION

A dynamically evolving education system is crucial for sustainable development. Giving every student modern high-quality education and equal opportunities is the main goal that we strive to achieve for Russia.

The **Education National Project** is expanding students' access to advanced technologies, making sure they use modern educational equipment while maintaining great traditions of the national school system. The educational standards are based on clear transparent values which aim to foster the environment that best helps students develop harmonious and impactful personalities. This further supports them to start living on their own in an ever-changing world.

As part of the global professional exchange, Russia has a long history of membership in IEA. This includes participation in TIMSS and PIRLS. With great pleasure we invite participants of the educational community to share their innovative practices and ideas at the IEA's 10th International Research Conference hosted and supported by Russia in 2023.



28 - 30 June 2023, Moscow

The 10th IEA International Research Conference will be hosted by the Ministry of Education from the Russian Federation.

(Pre-conference workshops will be held from the 26 - 27 June 2023)



CONTACT

+31 623 366 076 for IEA conference organizers

+ 971 800 342 for Dubai Health Authority

 @iea_education

 IEA

 IEAResearchInEducation

 irc@iea.nl

 [www.iea.nl/news-events/irc/
9th-international-research-conference](http://www.iea.nl/news-events/irc/9th-international-research-conference)

IEA, Keizersgracht 311,
1016 EE Amsterdam, The Netherlands
+31 20 625 3625

