

PROGRAM



6th IEA International Research Conference



CONFERENCE **24–26 JUNE 2015**
WORKSHOPS **22–23 JUNE 2015**
CAPE TOWN **SOUTH AFRICA**



International Association
for the Evaluation of
Educational Achievement



Centre for Evaluation & Assessment

IEA IRC-2015 AGENDA

Protea Hotel Breakwater Lodge, Cape Town, South Africa

WORKSHOPS

Monday & Tuesday, 22–23 June 2015			
8:30–9:00, 10:30–11:00 & 15:00–15:30 Coffee & Tea; 12:30–13:30 Lunch Break			
9:00–17:00 Workshop 1 (Faculty Room) Introduction to IEA Databases and IDB Analyzer Instructor: Plamen Mirazchiyski	9:00–17:00 Workshop 2 (Executive Room) Using HLM With International Large-Scale Assessment Data Instructor: Agnes Stancel-Piątak	9:00–17:00 Workshop 3 (Boardroom 1) Assessment Designs, Item Response Theory, and Proficiency Estimates Instructor: Eugenio Gonzalez	9:00–17:00 Workshop 4 (Boardroom 2) Using the IEA International Datasets for Informing Policy and Practice Instructor: Andrés Sandoval-Hernández Note: Workshop 4 ends at 12:30 on 23 June 2015.

RECEPTION

23 June 2015 | 17:00

Room: Exhibition Hall

CONFERENCE

Wednesday, 24 June 2015	Thursday, 25 June 2015	Friday, 26 June 2015
8:00–16:00 Registration	8:30–16:00 Registration	8:30–12:00 Registration
8:30–9:00 Coffee & Tea	8:30–9:00 Coffee & Tea	8:30–9:00 Coffee & Tea
9:00–9:30 Opening Ceremony (Exhibition Hall)	9:00–10:30 Keynote 2: Silvia Montoya (Exhibition Hall)	9:00–10:30 Keynote 3: David Kaplan (Exhibition Hall)
9:30–11:00 Keynote 1: Sarah Howie (Exhibition Hall) What Do the IEA Studies Mean for Developing Countries' Education Systems and Educational Research?	Post-2015 Education Framework: A Strategic Approach to Improve and Monitor Learning Outcomes as Part of the Post-2015 Education Targets	The Bayesian Revolution and Its Implications for the Analysis of International Large-Scale Assessments
11:00–11:30 Coffee & Tea	10:30–11:00 Coffee & Tea	10:30–11:00 Coffee & Tea
11:30–12:30 Beyond Benchmarks: Vijay Reddy (Exhibition Hall)	11:00–12:30 Session 3 A: ICCS B: TIMSS Mathematics	11:00–12:30 Session 6 A: ICILS & Methodology B: PIRLS
12:30–14:00 Lunch Break	12:30–14:00 Lunch Break	12:30–14:00 Lunch Break
14:00–15:30 Session 1 A: TIMSS—Spotlight on Africa B: ICILS	14:00–15:30 Session 4 A: TIMSS/PIRLS & Policy B: TIMSS Science	14:00–15:30 Session 7 A: TIMSS/PIRLS B: Methodology
15:30–16:00 Coffee & Tea	15:30–16:00 Coffee & Tea	15:30–16:00 Coffee & Tea
16:00–17:30 Session 2 A: PIRLS/TIMSS B: Methodology	16:00–17:30 Session 5 A: ICILS & Policy B: ICCS Symposium on Tolerance	16:00–16:30 Closing Ceremony (Exhibition Hall)

PARALLEL SESSION ROOMS

A: Exhibition Hall

B: Lecture Theatre 6 (LT06)

PROGRAM



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Centre for Evaluation & Assessment

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IEA IRC-2015 PROGRAM OVERVIEW

Protea Hotel Breakwater Lodge, Cape Town, South Africa

Monday, 22 June 2015

8:30 – 9:00	Coffee & Tea			
9:00 – 17:00	Workshop 1 Introduction to IEA Databases and IDB Analyzer Instructor: Plamen Mirazchiyski Room: Faculty Room	Workshop 2 Using HLM With International Large-Scale Assessment Data Instructor: Agnes Stancel-Piątak Room: Executive Room	Workshop 3 Assessment Designs, Item Response Theory, and Proficiency Estimates Instructor: Eugenio Gonzalez Room: Boardroom 1	Workshop 4 Using the IEA International Datasets for Informing Policy and Practice Instructor: Andrés Sandoval-Hernández Room: Boardroom 2
10:30 – 11:00	Coffee & Tea			
12:30 – 13:30	Lunch Break			
15:00 – 15:30	Coffee & Tea			

Tuesday, 23 June 2015

8:30 – 9:00	Coffee & Tea			
9:00 – 17:00	Workshop 1 (cont'd) Room: Faculty Room	Workshop 2 (cont'd) Room: Executive Room	Workshop 3 (cont'd) Room: Boardroom 1	Workshop 4 (cont'd) Note: Workshop 4 ends at 12:30 on 23 June 2015. Room: Boardroom 2
10:30 – 11:00	Coffee & Tea			
12:30 – 13:30	Lunch Break			
15:00 – 15:30	Coffee & Tea			
17:00	Welcome Reception Room: Exhibition Hall			

Wednesday, 24 June 2015

8:00 – 16:00	Registration	
8:30 – 9:00	Coffee & Tea	
9:00 – 9:30	Opening Ceremony Debbie Schäfer, Minister of Education in the Western Cape Anne-Berit Kavli, IEA Chair Dirk Hastedt, IEA Executive Director Room: Exhibition Hall	
9:30 – 11:00	Keynote 1 What Do the IEA Studies Mean for Developing Countries' Education Systems and Educational Research? Invited Speaker: Sarah Howie, University of Pretoria, South Africa Chair: Anne-Berit Kavli Room: Exhibition Hall	
11:00 – 11:30	Coffee & Tea	
11:30 – 12:30	Beyond Benchmarks HSRC Presentation on TIMSS South Africa Invited Speaker: Vijay Reddy, Human Sciences Research Council (HSRC), South Africa Chair: Dirk Hastedt Room: Exhibition Hall	
12:30 – 14:00	Lunch Break	
14:00 – 15:30	Session 1A: TIMSS Spotlight on Africa Chair: Jan-Eric Gustafsson Discussant: Jana Straková Home Resources as a Measure of Socioeconomic Status in Ghana Emmanuel Adu-tutu Bofah, Markku S. Hannula School and Home Determinants of Science Achievement of South African Students Andrea Juan, Mariette Visser, Nosisi Feza Are Safer Schools Successful Schools? Evidence From TIMSS 2011 South Africa and Botswana Lolita Desiree Winnaar, Tia Linda Zuze Understanding School Effect on the Poor in South Africa From Capability and Resilient Perspectives—A Multilevel Model Analysis George Frempong, Sally Nuamah, Mariette Visser, Nosisi Feza, Lolita Winnaar Room: Exhibition Hall	Session 1B: ICILS Understanding Digital Literacy—An International Perspective Chair: Bruno Losito Discussant: Ralph Carstens The Digital Divide: The Role of Individual and School-Related ICT Factors Across Countries Plamen Mirazchiyski Analyzing the Influence of Context Factors on Students' Computer and Information Literacy Wolfram Schulz, Julian Fraillon, Eveline Gebhardt Attitudes and Achievements: Selected Gender Aspects of Computer Literacy Jana Stovickova, Andrea Galadova, Jana Ferencova The Relationship Between Students' Use of ICT for Social Communication and Their Computer and Information Literacy Meral Alkan, Sabine Meinck Room: Lecture Theatre 6 (LT06)

Wednesday, 24 June 2015

15:30 – 16:00	Coffee & Tea	
16:00 – 17:30	Session 2A: PIRLS/TIMSS Parental Engagement and Learning Achievement Chair: Monica Rosén Discussant: Josef Basl The Influence of Parental Reading Habits on Fourth Grade Students' Reading Achievement and Motivation: A Cross-National Study Using PIRLS 2011 Xia Zhao, Alexander W. Wiseman Determinants of Country Differences in Effects of Parental Education on Children's Academic Achievement Kajsa Yang Hansen, Jan-Eric Gustafsson The Unique Contribution of Parents' Basic Literacy Skills to Differences in Learner Reading Outcomes: The Case of South Africa Poppie Ntaka What About the Learners' Home Background? Investigating the Role of Learners' Home Background in South African Children's Reading Literacy Development Karen Roux, Sarah Howie Room: Exhibition Hall	Session 2B: Methodology Practical Issues in Measurement Chair: Wolfram Schulz Discussant: Eugenio Gonzalez Can School Nonresponse Questionnaires Reduce the Risk of Nonresponse Bias in IEA Studies? Sabine Meinck, Diego Cortes, Sabine Tieck Causal Mediation With Latent Variables: An Illustrative Example From PIRLS 2011 Agnes Stancel-Piątak, Daniel Caro, Parisa Aghakasiri Multidimensional Proficiency Patterns of Fourth-Grade Students in Europe: A Comparative Latent Profile Analysis of Achievement Heike Wendt, Daniel Kasper, Michael Schurig, Wilfried Bos How Do Different Assumptions on Measurement Invariance for the Scaling of Latent Background Variables Affect Results of Large-Scale Assessments? Daniel Kasper, Heike Wendt, Matthias Trendtel Room: Lecture Theatre 6 (LT06)

Thursday, 25 June 2015

8:30 – 16:00	Registration	
8:30 – 9:00	Coffee & Tea	
9:00 – 10:30	Keynote 2 Post-2015 Education Framework: A Strategic Approach to Improve and Monitor Learning Outcomes as Part of the Post-2015 Education Targets Invited Speaker: Silvia Montoya, UNESCO Institute for Statistics, Canada Chair: Hans Wagemaker Room: Exhibition Hall	
10:30 – 11:00	Coffee & Tea	
11:00 – 12:30	Session 3A: ICCS Citizenship and Education: Cognitive and Affective Factors Chair: David Greger Discussant: Falk Brese Attitudes Toward Authoritarian Government, Corruption, and Obedience to the Law Among Lower-Secondary Students in Latin America: A Comparative Analysis Wolfram Schulz, Greg Macaskill Walk the Talk! Civic Knowledge, Democratic Values, and the Role of School Climate for Open Discussion: A Moderated Mediation Approach Diego Carrasco, Robin Banerjee The Civic and Civil Dimensions of Youth Citizenship Participation in Latin America: An Empirical Test of a Conceptual Model Daniel Miranda, Juan Carlos Castillo, Andrés Sandoval-Hernández Young People's Support and Perceptions of Political Parties in 38 Countries: An International Comparison Based on ICCS 2009 Wolfram Schulz, John Ainley Room: Exhibition Hall	Session 3B: TIMSS Mathematics Investigating Knowledge in Secondary Mathematics Chair: Vijay Reddy Discussant: Oliver Neuschmidt Investigating Mathematical Theory Needed to Solve TIMSS and PISA Mathematics Test Items Arne Hole, Torgeir Onstad, Liv Sissel Grønmo, Trude Nilsen, Guri A. Nortvedt, Johan Braeken Strength and Weaknesses of South Africa's High Performing Students in Mathematics: An International Comparative Investigation of Mathematics Proficiency on the Basis of TIMSS 2011 Grade 8 Data With a Focus on the Multiplicative Conceptual Field Caroline Long, Heike Wendt Converging Patterns of Achievement in Mathematics? Evidence From 50 Years of IEA Studies Stefan Johansson, Rolf Strietholt Room: Lecture Theatre 6 (LT06)
12:30 – 14:00	Lunch Break	

Thursday, 25 June 2015

14:00 – 15:30	Session 4A: TIMSS/PIRLS & Policy Quality and Equity in Education Chair: Anne-Berit Kavli Discussant: Tom Loveless Preschool Attendance and Disadvantaged Children’s Reading Achievement: International Evidence From Matching Analyses Nina Hogrebe, Rolf Strietholt, Laura Raffaella Zieger Countries’ Striving Towards More Quality and Equity in Education: Success or Failure? Evidence From TIMSS 2003 and 2011, Grade 4 Kim Bellens, Jan Van Damme, Wim Van Den Noortgate, Sarah Gielen Factors Affecting the Transition of Fifth-Graders to the Academic Track in the Czech Republic Jana Straková, David Greger The Effect of Immigrant Segregation on School Attainment Expectations: Evidence Using the Trends in International Mathematics and Science Study Diego Cortes, Mojca Rozman Room: Exhibition Hall	Session 4B: TIMSS Science Rethinking the Science Curriculum Chair: Michael O. Martin Discussant: Jan-Eric Gustafsson A Statistical Analysis of the Characteristics of the Intended Curriculum of Japanese Primary Science and its Relationships With the Attained Curriculum Kenji Matsubara, Yasuhito Hagiwara, Yuji Saruta The Relationship Between the Statistical Changes in Common Items and the Revision of the National Curriculum in Japan: A (Constrained) Item Parameter Drift Analysis of TIMSS 2007 and TIMSS 2011 Assessments of Eighth Graders on Earth Science Yasuhito Hagiwara, Kenji Matsubara Developing Higher-Order Competencies of Science: Exploring the Role of Curricular and Implementation Factors Masoud Kabiri Room: Lecture Theatre 6 (LT06)
15:30 – 16:00	Coffee & Tea	

Thursday, 25 June 2015

16:00 – 17:30	Session 5A: ICILS & Policy School Factors, Computer and Information Literacy, and Policy Implications Chair: Silvia Montoya Discussant: Julian Fraillon School-Level Predictors for ICT Use in Schools and Students' Computer and Information Literacy—Results of ICILS 2013 Birgit Eickelmann, Julia Gerick, Wilfried Bos Leadership and Pedagogy Matters: Impact of School Level Factors on Students' CIL Achievement Nancy Law, Johnny Yuen, Zhan Wang, Ada Tse How Teachers Emphasize the Development of Students' Digital Information and Communication Skills: Looking at 21st Century Education Fazilat Siddiq, Ronny Scherer Findings From ICILS 2013: Implications for Educational Policy in the Czech Republic Based on Both National and International Perspective Josef Basl, Lucie Řezáčová Room: Exhibition Hall	Session 5B: ICCS Symposium on Tolerance Tolerance Through Education—A Follow Up of the EC JRC Seminar, “Lessons Learned for Understanding Civic and Citizenship Education” Chair: Maria Magdalena Isac Discussant: Ralph Carstens Tolerance Through Education in Europe: An Introduction Maria Magdalena Isac The Tolerance Gaps Among Youth of Different Demographic Backgrounds and the Conditions Required to Increase Appreciation for Intergroup Diversity: Evidence From ICCS 2009 Silvia Diazgranados, Andrés Sandoval-Hernández Tolerance Towards Minority Groups Amongst European Students Falk Brese Positive Intercultural Attitudes in Europe Julia Higdon A Question of Perspective? Measuring Views on Equal Rights and Opportunities Among Minority Groups in European Large-Scale Surveys Wolfram Schulz Room: Lecture Theatre 6 (LT06)
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Friday, 26 June 2015

8:30 – 12:00	Registration	
8:30 – 9:00	Coffee & Tea	
9:00 – 10:30	Keynote 3 The Bayesian Revolution and Its Implications for the Analysis of International Large-Scale Assessments Invited Speaker: David Kaplan, University of Wisconsin–Madison, United States Chair: Michael O. Martin Room: Exhibition Hall	
10:30 – 11:00	Coffee & Tea	
11:00 – 12:30	Session 6A: ICILS & Methodology Conceptualization of Research and Practice Chair: Bruno Losito Discussant: Birgit Eickelmann Teaching About Information and Communication Technologies John Ainley, Tim Friedman, Eveline Gebhardt, Greg Macaskill Constructing a Described Achievement Scale for the International Computer and Information Literacy Study Julian Fraillon, Eveline Gebhardt, Wolfram Schulz Equating the National Australian and International Computer and Information Literacy Tests and Examining Growth From Year 6 to Year 8 and Year 10 Eveline Gebhardt, Julian Fraillon Using Process Data to Assist Interpretation of Student Computer and Information Literacy Ralph Carstens, Julian Fraillon, Frank Goldhammer Room: Exhibition Hall	Session 6B: PIRLS Contextualizing Reading Achievement—Evidence From PIRLS Chair: Sarah Howie Discussant: Sabine Meinck Balancing Act: A Semi-Parametric Approach for Determining the Local Treatment Effect of School Type With an Application to South Africa Debra Shepherd Home Environment, Motivational Characteristics in Reading, Reading Activities, and Gender: How Do These Factors Interact and Affect Reading Literacy of Primary School Students in Austria? Christina Wallner-Paschon Causal Effects of Computer Availability at Home on Grade 4 Reading Achievement Estimated From Country-Level Longitudinal Data Jan-Eric Gustafsson, Monica Rosén Room: Lecture Theatre 6 (LT06)
12:30 – 14:00	Lunch Break	

Friday, 26 June 2015

14:00 – 15:30	Session 7A: TIMSS/PIRLS Effective Schools—Evidence From IEA Studies Chair: Ina V.S. Mullis Discussant: Michael O. Martin Differential Predictors of 4th Grade Reading and Mathematics Achievement Andrea Netten, Martina Meelissen, Annemiek Punter, Mienke Droop, Ludo Verhoeven Differential Effectiveness in Relation to Gender: An Analysis in the Gulf States Based on Creemers' Comprehensive Model of Educational Effectiveness Oliver Neuschmidt, Parisa Aghakasiri The Relation Between Instructional Quality and Educational Outcomes for Low Versus High Levels of Emphasis on Academic Success Trude Nilsen, Ronny Scherer Effective Primary Schools for Girls in Germany? Another Look at TIMSS/PIRLS 2011 Daniel Scott Smith, Heike Wendt, Daniel Kasper Room: Exhibition Hall	Session 7B: Methodology Expanding Methodological Possibilities Through International and Within-Country Comparisons Chair: David Kaplan Discussant: Plamen Mirazchiyski School-Level Factors and Student Performance in the IEA Studies: An Example From TIMSS Bruno Losito, Elisa Caponera From School Variation to Areal Variation Jouni Vetterranta, Heidi Harju-Luukkainen Professional Community Across Countries Catalina Lomos Room: Lecture Theatre 6 (LT06)
15:30 – 16:00	Coffee & Tea	
16:00 – 16:30	Closing Ceremony Sarah Howie, University of Pretoria, South Africa Paulína Koršňáková, IEA Secretariat, the Netherlands Josef Basl, Czech School Inspectorate, Czech Republic David Greger, Charles University in Prague, Czech Republic Jana Straková, Charles University in Prague, Czech Republic Room: Exhibition Hall	

COMMITTEES

Scientific Committee

John Ainley, Australian Council for Educational Research, Australia
Sigrid Blömeke, University of Oslo, Norway
Wilfried Bos, TU Dortmund University, Germany
Henry Braun, Boston College, United States
Amita Chudgar, Michigan State University, United States
Julian Fraillon, Australian Council for Educational Research, Australia
Eugenio Gonzalez, Educational Testing Service, United States
Martin Goy, TU Dortmund University, Germany
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Norman Verhelst, Eurometrics, the Netherlands
Hans Wagemaker, IEA, New Zealand

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Stefan de Jager, University of Pretoria, South Africa
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Sarah Howie (Local Chair), University of Pretoria, South Africa
Paulína Koršňáková (Chair), IEA Secretariat, the Netherlands

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Rosalie Loots, University of Pretoria, South Africa
Thembisile Matlou, University of Pretoria, South Africa
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Nangamso Mtsatse, University of Pretoria, South Africa
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Mishack Tshele, University of Pretoria, South Africa
Sandra van Niekerk, University of Pretoria, South Africa
Dana Vizkova, IEA Secretariat, the Netherlands
Alana Yu, IEA Secretariat, the Netherlands
Catherine Zwaneveld, IEA Secretariat, the Netherlands

PRE-CONFERENCE WORKSHOPS

WORKSHOP 1

Introduction to IEA Databases and IDB Analyzer

Plamen Mirazchiyski, IEA Data Processing and Research Center, Germany

22–23 June 2015 | 9:00–17:00

Room: Faculty Room

This workshop will provide an overview of the IEA databases currently available, with particular emphasis on the most recently released databases (TIMSS 2011, PIRLS 2011, ICCS 2009, and TEDS-M). As part of the workshop, participants will also be instructed on how to use the IEA IDB Analyzer. The IDB Analyzer is an application developed by the IEA DPC to facilitate access to and analysis of the large-scale assessment databases available from IEA. The IDB Analyzer creates SPSS code that can be used with SPSS to conduct statistical analyses, taking into account the complex sample structure of the databases.

The following topics will be covered during the workshop:

- *Overview of IEA databases:*
 - o Structure of the databases;
 - o Accessing the data; and
 - o Reviewing the documentation.
- *Sampling and test design—implications for analysis:*
 - o General sample and test design;
 - o Computing sampling and measurement variance; and
 - o Estimating statistical significance of results.
- *Using the IDB Analyzer to combine datasets:*
 - o Merging data from students, schools, teachers, and parents;
 - o Combining data from different countries; and
 - o Modifying and recoding data for analysis.
- *Using the IDB Analyzer to conduct analysis:*
 - o Calculating means, standard deviations, and percentages;
 - o Calculating correlations and regression coefficients;
 - o Calculating percentages of students meeting achievement benchmarks; and
 - o Calculating differences between groups.

This workshop is aimed at individuals who have only limited or superficial familiarity with IEA databases and analysis procedures, and who want to become familiar with them. Participants are expected to bring their own laptop PC with Windows and SPSS installed (Windows and SPSS are required to use the IDB Analyzer). Free copies of the IDB Analyzer will be distributed at the workshop.

WORKSHOP 2

Using HLM With International Large-Scale Assessment Data

Agnes Stancel-Piątak, IEA Data Processing and Research Center, Germany

22–23 June 2015 | 9:00–17:00

Room: Executive Room

This workshop will introduce participants to the basic theory and application of multilevel or hierarchical linear modeling (HLM), focusing especially on those features that are particular to large-scale assessment data in general and the IEA studies in particular (e.g., how to address correctly the

sampling design by using sampling weights, handling plausible values, etc.). The first part of the workshop will consist of a methodological introduction to HLM and its main assumptions. In the second part, participants will learn how to prepare datasets for analysis with hierarchical linear models, and how to specify different models using the software HLM (Raudenbush & Bryk, 2011) ad-hoc. Using IEA data, participants will fit and interpret the results of two-level and three-level models for testing hypotheses for policy research.

The following topics will be covered:

- *Theoretical background of multilevel models;*
- *Data preparation and importing data to HLM;*
- *Model specification, hypothesis testing, and interpretation of results; and*
- *Two- and three-level HLM analysis.*

Participants will learn to specify, estimate, and interpret results of two- and three-level models within the HLM software environment, as well as to formulate and test hypotheses with implications for research and policy. This workshop is aimed at individuals with a working knowledge of IEA databases and a solid knowledge of intermediate statistics. Participants will be required to bring their own PC-compatible laptops with SPSS installed. The HLM student version and PIRLS 2011 data will be made available and used during the workshop. The workshop will comprise lectures mixed with hands-on training.

WORKSHOP 3

Assessment Designs, Item Response Theory, and Proficiency Estimates

Eugenio Gonzalez, Educational Testing Service, United States

22–23 June 2015 | 9:00–17:00

Room: Boardroom 1

This workshop will provide an overview of the principles surrounding the design of large-scale assessments, the item response theory models used to calibrate items, and the methodology used to assign proficiency estimates, also known as plausible values. Presentations will be mostly theoretical, with ample time given for discussion. Time at the end of the workshop will be spent running example analyses with software used in IEA studies.

The following topics will be covered during the workshop:

- *Overview of assessment design principles:*
 - Advantages and disadvantages of current designs of large-scale assessments; and
 - Consequences for analysis.
- *Overview of principles of item response theory:*
 - Advantages and disadvantages of different models;
 - Limitations of IRT models; and
 - Using Parscale to compute item parameters and proficiency estimates.
- *Overview of principles of population modeling and proficiency estimation:*
 - Review of procedures and techniques for carrying out conditioning;
 - Multiple imputations in large-scale assessments;
 - Plausible values and why they are useful; and
 - Using DESI to compute proficiency estimates and plausible values.

The general daily schedule will consist of presentations and limited hands-on practical assignments. Participants are expected to bring their own laptop PC with statistical software installed (SAS or SPSS). The trial version of the software used will be distributed at the workshop.

WORKSHOP 4

Using the IEA International Datasets for Informing Policy and Practice

Andrés Sandoval-Hernández, IEA Data Processing and Research Center, Germany

22 June 2015 | 9:00–17:00

23 June 2015 | 9:00–12:30

Room: Boardroom 2

The main objective of this workshop is to exchange knowledge and understanding about how IEA datasets are being or should be used to inform policy and practice. The workshop will provide a forum for participants to share experiences about the difficulties and challenges of using IEA datasets to inform policy and practice, and how such difficulties can be overcome. In so doing, the workshop will discuss the rationale and assumptions underlying the statistical analysis of data and the interpretation of the results. The discussion will also cover the kinds of policy and practice recommendations that can and should be drawn.

Key questions include:

- What can IEA studies tell us about education systems—and *what can't the data reveal*?
- What are the most appropriate methods to tease policy and practice recommendations out of IEA studies?
- What considerations have to be taken into account when interpreting the results and formulating recommendations?

The workshop will include several presentations on good examples of how IEA studies have been used to inform policy and practice, as well as small group discussion sessions, with the final objective of preparing a consensus document containing consolidated answers to our guiding questions. This workshop is aimed at staff members from national, regional, or local ministries of education and agencies for the evaluation of education, researchers, post-graduate students, and other individuals with interest in the intersection between educational research and educational policy and practice.

KEYNOTE LECTURES

KEYNOTE 1

What Do the IEA Studies Mean for Developing Countries' Education Systems and Educational Research?

Sarah Howie, Centre for Evaluation and Assessment, University of Pretoria, South Africa

24 June 2015 | 9:30–11:00

Room: Exhibition Hall

Chair: Anne-Berit Kavli, IEA Chair

Abstract: There has been a substantial increase in the number of African countries involved in IEA studies and national and international assessments of educational achievement, especially since the 1990s (Howie, 2013; Howie, 2012). In the past decade many developing countries have carried out national assessments and more have participated in international comparative studies, previously dominated by industrialized countries.

International studies measuring educational achievement have a number of purposes (Howie & Plomp, 2005; Plomp, Howie, & McGaw, 2003). Internationally, these studies are of interest to ministries of education and international agencies such as the World Bank, UNESCO, and OECD. Much of this interest lies in comparing levels of national achievement and examining differences among countries in order to identify major determinants of national achievement, with particular interest in malleable factors. The findings of many IEA studies have had an impact on policy and practice across a number of countries.

Aside from the five purposes of international comparative studies (i.e., mirror, monitoring, decision-making, research, and enlightenment) previously reported in Plomp, Howie, and McGaw (2003) and Howie and Plomp (2005), there are some additional benefits of participating in this type of study that pertain more to developing or less developed countries (Plomp, Howie, & McGaw, 2003) including those in Africa. These additional benefits may be divided into four areas (Howie, 2000), namely the *development of research capacity* in developing countries, collecting *baseline data* in certain subject areas where previously there was a vacuum, *heightened awareness of what other countries* around the world are doing, and *highlighting priorities* for policymakers in particular.

In this paper I reflect on IEA's presence in and impact on a number of developing countries' education systems and educational research. In particular, I will focus on Africa's participation in IEA studies, and thereafter I will discuss some of the major findings emerging from these studies in developing countries and in the host country of the IRC-2015, South Africa, and the ramifications of these.

Profile of Sarah Howie: Sarah Howie is a professor in the Faculty of Education and Director of the Centre for Evaluation and Assessment in Education and Training at the University of Pretoria. She supervises 27 students at the masters and doctoral level in the field of evaluation and assessment research. Her scientific field of interest and areas of work include monitoring, evaluation and assessment, international comparative research, and learner achievement. She is a national research coordinator for PIRLS 2016, and was a national research coordinator for PIRLS 2011, PIRLS 2006, SITES, and TIMSS 1999.

Prof. Howie has worked as a consultant for UNESCO, the World Bank, Nuffic (Dutch NGO), CROSS (Dutch Government), SANPAD, and the Spencer Foundation, in Albania, Russia, Mozambique, Mauritius, Thailand, Ethiopia, and South Africa. Internationally, amongst others, she has recently been a member of the UNESCO–Brookings Institute Learning Metrics Task Force for Post-Primary

(in preparation for Education for All 2015) and the Questionnaire Development Group for PIRLS 2016 and PIRLS 2011. In South Africa, she is a member of the 2013 Ministerial Committee to investigate the Standard of the National Senior Certificate; the national quality assurance body, Umalusi's Assessment and Standards Committee; and the Academy of Science for South Africa, amongst others.

Prof. Howie's research has been recognized nationally as well as internationally. She sits on the editorial committees for the international journals, *Studies in Educational Evaluation*, *Educational Research and Evaluation*, and *IERI Research Journal*. Her research has won recognition in a number of awards nationally and she is a nationally rated researcher by the National Research Foundation.

KEYNOTE 2

Post-2015 Education Framework: A Strategic Approach to Improve and Monitor Learning Outcomes as Part of the Post-2015 Education Targets

Silvia Montoya, UNESCO Institute for Statistics, Canada

25 June 2015 | 9:00–10:30

Room: Exhibition Hall

Chair: Hans Wagemaker, IEA

Abstract: As part of the Sustainable Development Goal 4, the international community pledges to “ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.” The Draft Framework for Action for Education 2030 stresses the need to improve the systems and practices used to assess learning in order to provide the data needed by policymakers to improve the quality of education and the learning outcomes of all children and youth.

A growing number of countries are conducting large-scale learning assessments by either developing their own systems or joining wider initiatives. However, these assessments are based on different methodological approaches and therefore do not provide internationally comparable data that can be used for global monitoring.

It is not feasible to expect countries to precisely measure the outcomes of every child in every possible area of learning using the same methodologies in order to produce internationally comparable data. So instead of striving towards the ‘perfect fit,’ the international education community may be better served by focusing on indicators that are ‘fit for purpose’ to monitor progress globally. Presently, there are two broad options:

- Use indicators based on nationally-defined standards for a limited number of domains: e.g., xx% of students in a given country met the nationally-defined minimum standard for numeracy skills at the end of Grade x.
- Use indicators derived from an empirically validated universal scale of learning.

The first option appears to be straightforward but will not lead to internationally comparable results.

The development of a universal learning scale will require significant amounts of time, resources, and consultation. But it will lay the foundations for high-quality and comparable data that governments can use to improve the learning outcomes of their children and youth while benchmarking their progress.

Many will agree on the logic of a universal learning scale but few can even envisage the technical

and cultural issues with major policy implications that need to be resolved. In order to handle this challenge, it is essential to reinforce efforts to foster a culture of evidence-based policymaking by making innovative use of assessment data.

Profile of Silvia Montoya: Silvia Montoya became Director of the UNESCO Institute for Statistics (UIS) in 2015. She has extensive experience in a wide range of national and international initiatives to improve the quality, management, and use of education statistics, with a specific focus on learning assessment.

Prior to joining the UIS, Dr. Montoya was Director-General of Assessment and Evaluation of Education Quality at the Ministry of Education, Buenos Aires, Argentina. She was appointed as the first Executive Director of the Unidad de Evaluación Integral de la Calidad Educativa in 2015. Among her many responsibilities, she oversaw the creation of the first comprehensive education quality index produced in Argentina. During the course of her career at the Ministry of Education of Argentina, which dates back to the late 1990s, she introduced a series of institutional changes and capacity-building initiatives to strengthen independence and objectivity in the production of education statistics and measurement of learning outcomes.

Dr. Montoya has also coordinated Argentina's participation in several international assessment programs, including the Latin American Program of Educational Quality of the Organization of Ibero-American States (OEI); IEA's International Computer and Information Literacy Study, International Civic and Citizenship Education Study, Trends in International Mathematics and Science Study, and Progress in International Reading Literacy Study; and the Programme for the International Assessment of Adult Competencies.

Dr. Montoya is also a professor and researcher at the Catholic University of Argentina. She holds a master's degree and Ph.D. in policy analysis from the Pardee RAND Graduate School, and a master's degree in public administration from the Kennedy School of Government at Harvard University.

Dr. Montoya is the author of many publications on education, vocational training, and labor market issues. She has extensive experience as a researcher and consultant for major national and global organizations.

KEYNOTE 3

The Bayesian Revolution and Its Implications for the Analysis of International Large-Scale Assessments

David Kaplan, Department of Educational Psychology, University of Wisconsin–Madison, United States

26 June 2015 | 9:00–10:30

Room: Exhibition Hall

Chair: Michael O. Martin, Boston College, United States

Abstract: The purpose of this address is to introduce the audience to the basic ideas of Bayesian inference and its implications for the design and analysis of international large-scale assessments (ILSAs). Features of Bayesian inference already play a prominent role in the construction of ILSAs—in particular when producing the plausible values for mathematics and reading literacy assessments such as TIMSS and PIRLS. However, the Bayesian perspective can provide additional value for the analysis of data arising from ILSAs. This talk overviews the paradigm of Bayesian inference and shows, through a simple example, the results of a Bayesian analysis using data from PIRLS. Focus of attention is on the Bayesian approach to developing models with good predictive properties. The talk

closes with how the Bayesian perspective is uniquely suited to support evolutionary knowledge development in the context of international large-scale assessments.

Profile of David Kaplan: David Kaplan is the Patricia Busk Professor of Quantitative Methods in the Department of Educational Psychology at the University of Wisconsin–Madison. He holds affiliate appointments in the University of Wisconsin’s Department of Population Health Sciences and the Center for Demography and Ecology, and is also an honorary research fellow in the Department of Education at the University of Oxford. Dr. Kaplan’s program of research focuses on the development of Bayesian statistical methods for education research. His work on these topics is directed toward applications to quasi-experimental and large-scale cross-sectional and longitudinal survey designs.

Dr. Kaplan is actively involved in the OECD Programme for International Student Assessment (PISA) where he served on its Technical Advisory Group from 2005 to 2009 and its Questionnaire Expert Group since 2004. He was Chair of the Questionnaire Expert Group for PISA 2015 and remains a member of the Questionnaire Expert Group for PISA 2018. He also sits on the Design and Analysis Committee and the Questionnaire Standing Committee for the National Assessment of Educational Progress (NAEP).

Dr. Kaplan is an elected member of the National Academy of Education, a recipient of the Humboldt Research Award, a fellow of the American Psychological Association (Division 5), and was a Jeanne Griffith Fellow at the National Center for Education Statistics. He received his Ph.D. in education from UCLA in 1987.

SESSION ABSTRACTS

BEYOND BENCHMARKS

HSRC Presentation on TIMSS South Africa

Vijay Reddy, Human Sciences Research Council (HSRC), South Africa

24 June 2015 | 11:30–12:30

Room: Exhibition Hall

Chair: Dirk Hastedt, IEA Executive Director

The Human Sciences Research Council (HSRC) in South Africa has participated in TIMSS since 1995.

The purpose of this presentation is to discuss the TIMSS SA activities and our latest publication based on TIMSS data, *Beyond Benchmarks: What Do Twenty Years of TIMSS Data Tell Us About South African Education?* This report provides a measured assessment of what has been achieved in South African education over the past 20 years based on the evidence provided by TIMSS, to redefine what ‘good’ progress means in the light of South Africa’s developmental pathway, and to recommend what evidence-based interventions can be considered as the next realistic steps in South Africa’s educational development.

In addition, in April 2015, the HSRC launched a website (www.timss-sa.org.za) to consolidate TIMSS SA data and to provide information about TIMSS-related activities. The website will provide an opportunity for researchers to showcase analysis of TIMSS data, with the aim of encouraging debate and deepening our understanding of how to improve schooling in South Africa. The website will also include a series of evidence-based policy briefs that are based on extended analysis of the TIMSS data. The first policy brief is titled, “Have we reached gender equity in mathematics education?” The analysis of the TIMSS data generates new insights into the gender in education debate.

This presentation will also focus on how we have used TIMSS data to inform the local debates.

SESSION 1A: TIMSS

Spotlight on Africa

24 June 2015 | 14:00–15:30

Room: Exhibition Hall

Chair: Jan-Eric Gustafsson, University of Gothenburg, Sweden

Discussant: Jana Straková, Charles University in Prague, Czech Republic

Home Resources as a Measure of Socioeconomic Status in Ghana

Emmanuel Adu-tutu Bofah and Markku S. Hannula

University of Helsinki, Finland

This paper is about profiling socioeconomic status (hereinafter SES) of students in the context of the TIMSS 2011 study. Latent class analysis was used to profile students into respective SES classes based on students' responses to 11 home resources. The results showed a clear three distinct student socioeconomic profiles, namely: High, Middle, and Low SES. Moreover, discriminate analysis was used to explore the degree to which groups are accurately classified. Gender comparison on these classes suggested a stable classification and support for measurement invariance for the latent class indicators. Multinomial logit latent-class regression models were used to predict class membership from auxiliary covariates and social environmental agents. With students in the high socioeconomic class as the reference group, it was found that parental education, gender, parental involvement with the child's education, achievement, students' educational aspiration, and speaking English at home were significant predictors of students' SES. Implications for future policy are discussed.

School and Home Determinants of Science Achievement of South African Students

Andrea Juan¹, Mariette Visser¹, and Nosisi Feza²

¹Human Sciences Research Council, South Africa; ²University of South Africa, South Africa

Environmental determinants of educational achievement go beyond the school to include the home environment. These environments provide tangible and intangible resources to students that can influence science achievement. South Africa provides a context where inequalities in socioeconomic statuses are vast, thus the environments from whence students can draw resources are variable. This paper investigates both school and home environments to determine what resources are currently influencing student performance as well as how strong those resources are. Multiple regression analyses were conducted on data from 11,969 ninth grade South African students who participated in the 2011 Trends in International Mathematics and Science Study. The findings reveal that both school and home environments play significant roles in students' science performance with speaking the language of the test at home, the number of home assets, and the condition of the school buildings exhibiting the strongest associations.

Are Safer Schools Successful Schools? Evidence From TIMSS 2011 South Africa and Botswana

Lolita Desiree Winnaar and Tia Linda Zuze

Human Sciences Research Council, South Africa

Education quality has received a great deal of attention among policymakers in the developing world partly because of relatively poor performance by developing countries that have participated in

international studies like the Trends in International Mathematics and Science Study (TIMSS) and Progress in International Reading Literacy Study (PIRLS). Much of the focus of school effectiveness research in sub-Saharan Africa has been on factors in the school that represent governance and management, resource availability, and the quality of human resources. Although the importance of these areas is well established, what is less clear is what role school climate plays on the effectiveness of African schools. In many African countries, the spread of mass schooling policies has meant that public schools have become increasingly diverse and understanding which aspects of school climate matter most is increasingly important. This study uses data from South Africa and Botswana for the 2011 cycle of TIMSS to investigate how four broad areas of a school climate as perceived by learners, educators, and principals relate to learner mathematics performance. The study shows that learners who performed well were generally found in schools where the school climate was perceived to be positive. The findings demonstrate the need for policymakers to develop interventions to improve school climate across African schools. To determine the extent of the problem, it is recommended that national school climate surveys be undertaken periodically.

Understanding School Effect on the Poor in South Africa From Capability and Resilient Perspectives—A Multilevel Model Analysis

George Frempong¹, Sally Nuamah², Mariette Visser¹, Nosisi Feza³, and Lolita Winnaar¹

¹Human Sciences Research Council, South Africa; ²Northwestern University, United States;

³University of South Africa, South Africa

One of the major challenges of the provision of quality education for all is the understanding of how schools should work to facilitate the successful schooling of learners from poor households. Often these learners reside in home environments with limited educational development opportunities and attend schools with inadequate resources. Despite these constraints, a number of schools are able to make a difference helping these learners to succeed against all odds. We refer to these learners as resilient and ask the question, “How do these schools function to ensure success for these poor learners?” We employed capability and resilient perspectives and data from the 2011 TIMSS data from South Africa to address this question. Our profiling of the most successful schools serving the poorest communities in South Africa indicates that the learners in these schools succeed in mathematics largely through the mathematics learning identity that their schools help them to develop. The learners in these schools value, like, and are confident learning mathematics. We argue that these characteristics serve as protective factors that allow these poor learners to overcome their risk factors and convert their limited basket of resources into successful functioning.

SESSION 1B: ICILS

Understanding Digital Literacy—An International Perspective

24 June 2015 | 14:00–15:30

Room: Lecture Theatre 6 (LT06)

Chair: Bruno Losito, Roma Tre University, Italy

Discussant: Ralph Carstens, IEA Data Processing and Research Center, Germany

The Digital Divide: The Role of Individual and School-Related ICT Factors Across Countries

Plamen Mirazchiyski

IEA Data Processing and Research Center, Germany

Computer technologies permeate every aspect of modern society, enabling us to perform tasks faster and more efficiently. The availability of the technology and access to it, however, do not guarantee its effective or efficient use without possessing the necessary competencies. Computer and Information Literacy (CIL) is the key in using technologies efficiently in the modern society, also an important prerequisite for success on the labor market. However, differences between individuals in CIL exist and they are rooted in different characteristics. This study uses Grade 8 students' data from the IEA's International Computer and Information Literacy Study (ICILS) 2013 to explore the "digital divide" based on gender, school location, and socioeconomic status (SES). The study results show that CIL gaps are found in almost all countries in all the three domains. Gender gaps are mitigated by student self-efficacy in basic and advanced skills and expected further education in most countries. School location gaps are mitigated only by student SES in just three countries. The gaps based on SES do not disappear after controlling for school characteristics. In general, school and school ICT characteristics do not seem to be related with the gaps based on gender, location, and SES. In addition, there are school SES compositional effects in two thirds of the countries. These findings indicate that the implementation of ICT at school may be ineffective. The actual divide may be between home and school based on more basic personal characteristics like SES, for example: the use of computers at home differs largely between students from high and low SES families.

Analyzing the Influence of Context Factors on Students' Computer and Information Literacy

Wolfram Schulz, Julian Fraillon, and Eveline Gebhardt

Australian Council for Educational Research, Australia

The IEA International Computer and Information Literacy Study (ICILS 2013) investigated the ways in which young people in 20 countries develop Computer and Information Literacy (CIL) to support their capacity to participate in the digital age. This paper will investigate the factors which explain variation in CIL across a range of education systems. The analyses will differentiate between factors related to student characteristics, home background (including ICT resources), students' experience with and use of ICT, school characteristics, and the learning context for ICT at school. The data used in the analyses were collected from students, teachers, school principals, and school IT coordinators. Multilevel modelling will be applied to compare different models with and without controlling for the socioeconomic context of students' homes and schools. While socioeconomic background and home ICT resources as well as ICT experience were consistent predictors of CIL at the student level, there is also some evidence about the influence of school factors related to ICT education on variation in

CIL. The findings also suggest considerable variation across countries with regard to the influence of school context factors.

Attitudes and Achievements: Selected Gender Aspects of Computer Literacy

Jana Stovickova, Andrea Galadova, and Jana Ferencova
NUCEM, Slovak Republic

The article focuses on attitudes towards computers and technology as well as on self-confidence in this area in relation to the achieved ICILS (International Computer and Information Literacy Study) score. The findings reflect mainly Czech and Slovak data.

Some aspects of self-confidence differ greatly between girls and boys. One example: Students expressed their level of agreement with the statement, “I know more about computers than most people my age.” For the purpose of this article the students who agree or strongly agree with the statement are called “*Experts*” and the other students just “*Learners*.” In Slovakia boys are predominantly Experts. Their achieved scores however only partially confirm their self-assessment: The female Learners achieved higher average scores than male Experts within both countries. It seems that female Learners have a tendency to underestimate their own skills. One reason could be that more emphasis is given to the surrounding environment as a benchmark.

Another question mapped students’ interest in technology. Many female students consider it “just a computer, not technology”—even those who achieved high CIL scores. The analysis of girls’ answers in connection to their performance reveals an inverse connection: Lack of interest in technology is often accompanied by better results in computer literacy. Is it a “road to success” in the IT area? Definitely not: Further analysis uncovered a more probable reason for lower performance of the girls with positive attitudes towards technology. Their parents have lower average occupational status than the parents of the other girls. And here begins another story: the influence of family background, one of the most documented topics in educational studies.

ICILS data confirms that girls are performing better in computer and information literacy. To succeed in making computer science study more attractive to them will require a deeper understanding of their thoughts and attitudes.

The Relationship Between Students’ Use of ICT for Social Communication and Their Computer and Information Literacy

Meral Alkan¹ and Sabine Meinck²

¹Ministry of National Education, Turkey; ²IEA Data Processing and Research Center, Germany

This study investigates the relationship between students’ use of information and communication technology (ICT) for social communication and their computer and information literacy (CIL) scores. It also examines whether gender and socioeconomic background moderates this relationship. We utilized student data from IEA’s International Computer and Information Literacy Study (ICILS) to build multivariate regression models for answering the research questions, and accounted for the complex sample structure of the data by using weights for all statistical analyses, employing jackknife repeated replication for variance estimation.

Students who frequently use the internet for messaging and participation in social networks (i.e., at least once a week) scored on average 44 points higher than those who use ICT for the same purpose only less than once a week or never. The direction of this effect was the same in all 21 participating educational systems, the difference ranging from 19 to 75 points (always statistically significant). We continued the analysis by testing whether the relationship is moderated by gender, as girls use more

often ICT for social communication and have higher CIL scores on average. After controlling for the gender effect, the CIL scores between the two examined groups decreased only by 2 points on average. Even after including students' socioeconomic background into the model, the difference in CIL between the two groups of interest declined only little—to 32 points on average across all countries. The difference remained statistically significant in all countries but one.

The results suggest a strong relationship between being competent in the use of computer and information technologies and the frequency of use of electronic devices for social communication; hence, respective skills needed at schools and later on at the workplace are reflected in their use outside of school and for socializing.

SESSION 2A: PIRLS/TIMSS

Parental Engagement and Learning Achievement

24 June 2015 | 16:00–17:30

Room: Exhibition Hall

Chair: Monica Rosén, University of Gothenburg, Sweden

Discussant: Josef Basl, Czech School Inspectorate, Czech Republic

The Influence of Parental Reading Habits on Fourth Grade Students' Reading Achievement and Motivation: A Cross-National Study Using PIRLS 2011

Xia Zhao and Alexander W. Wiseman

Lehigh University, United States

The purpose of this research is to analyze the influence of parental reading habits on students' reading achievement and motivation, and also to examine whether national student achievement performance affects student reading motivation. Data comes from PIRLS (Progress in International Reading Literacy Study) 2011, which represents 40 participating countries at the fourth grade level. The analytical methods used are bivariate regression analysis and hierarchical linear modeling (HLM). Results indicate that parental reading habits, including parent reading time and reading motivation, are positively associated with students' reading achievement. However, only parental reading motivation is significantly related to student reading motivation. Student reading achievement is positively associated with student reading motivation at the individual level, but national student achievement is negatively associated with student reading motivation.

Determinants of Country Differences in Effects of Parental Education on Children's Academic Achievement

Kajsa Yang Hansen and Jan-Eric Gustafsson

University of Gothenburg, Sweden

The amount of relationship between parental education and school achievement varies considerably across countries, and the main aim of the paper is to identify determinants and mechanisms which can explain this variation. To identify possible determinants, several theories aiming to account for the relationship between parental education and achievement are reviewed. For the 37 countries participating in PIRLS & TIMSS 2011 a previous study has estimated total, direct, and indirect effects of parental education on reading, mathematics, and science achievement in Grade 4, and these estimates form the empirical data of the current study. In a first step of analysis the total, direct, and indirect effects are described for the 37 countries, focusing on countries with a high and low level in these three respects. In the second step of analysis, two indicators of characteristics of the educational system, the Gini index as a measure of degree of economic inequality and the HDI as a measure of general societal development, were related to the estimated coefficients. The results show that the Gini index was negatively correlated with the indirect effect of parental education on reading achievement and to a lesser extent on mathematics achievement.

The Unique Contribution of Parents' Basic Literacy Skills to Differences in Learner Reading Outcomes: The Case of South Africa

Poppie Ntaka

University of Stellenbosch, South Africa

The strong legacy of apartheid education left the vast majority of the adult population illiterate. This issue of illiteracy is likely to persist given that South Africa's dualistic schooling system still reflects educational inequalities that are systematically linked to the apartheid education system. This paper seeks to shed light on the importance of literacy by investigating the relationship between parents' basic literacy skills and learner reading outcomes, through the use of the prePIRLS 2011 dataset and by employing education production function techniques. The regression model results confirm that parental literacy is important for learner reading outcomes, but that learners from poorer backgrounds are at a greater disadvantage because they are more likely to have illiterate parents, which in turn reflects negatively on their reading scores.

What About the Learners' Home Background? Investigating the Role of Learners' Home Background in South African Children's Reading Literacy Development

Karen Roux and Sarah Howie

University of Pretoria, South Africa

The early home literacy environment serves as a foundation for the development and acquisition of a child's literacy skills (Topping, Dekhinet, & Zeedyk, 2011). Literacy is seen as an essential skill to participate in today's society and, as such, parents should from an early age provide their child with formal literacy and reading literacy skills. This paper summarizes some of the findings of a study aiming to investigate the effect of the home environment and parental attributes on South African Grade 5 learner reading literacy performance. The study analyzed data from the Progress in International Reading Literacy Study (PIRLS) 2006 learner achievement and parent contextual instruments. The parent contextual data was gathered through the Learning-to-Read questionnaire as parents may be seen as the child's first teacher (Bonci, 2011) of literacy and language and are therefore viewed as an essential aid in the learner's development (Weigel, Martin, & Bennet, 2005).

This study's conceptual framework was informed by Myrberg and Rosén's (2008) model for the direct and indirect influences of parental education on students' reading achievement. The factors identified from the home environment and parental attributes are explored in relation to the PIRLS 2006 South African Grade 5 learner achievement. The regression analysis revealed that both the home environment and parental attributes affect learner reading literacy significantly. This exploration is expected to provide some insight into the poor performance of learner reading literacy performance in South Africa.

SESSION 2B: METHODOLOGY

Practical Issues in Measurement

24 June 2015 | 16:00–17:30

Room: Lecture Theatre 6 (LT06)

Chair: Wolfram Schulz, Australian Council for Educational Research, Australia

Discussant: Eugenio Gonzalez, Educational Testing Service, United States

Can School Nonresponse Questionnaires Reduce the Risk of Nonresponse Bias in IEA Studies?

Sabine Meinck, Diego Cortes, and Sabine Tieck

IEA Data Processing and Research Center, Germany

Survey's participation rate can have a direct impact on the validity of the data collected; therefore the International Association for the Evaluation of Educational Achievement (IEA) has set very high standards for minimum survey participation rates. Nonresponse in IEA studies varies between studies and cycles. Participation of schools is at a higher risk relative to individuals; school students are more likely to cooperate than adults (i.e., university students or school teachers). Across all student evaluations conducted by the IEA during the last decade, between 7% and 33% of participating countries failed to meet the minimum participation rates at the school level. Quantifying the bias introduced by nonresponse is practically impossible with the currently implemented design.

During the last decade social researchers have introduced and developed the concept of nonresponse questionnaires. These are shortened instruments applied to nonrespondents, containing only items with the highest predictive value of the survey's main outcome variable(s). We suggest in this paper a method to develop such questionnaires for nonresponding schools in IEA studies. For these means, we investigated school characteristics that are associated with students' average achievement scores using correlational and multivariate regression analysis in three recent IEA studies. We developed regression models that explain with only 11 school questionnaire variables or less up to 77% of the variance of the school mean achievement score. On average across all countries, the R^2 of these models was 0.24 (PIRLS), 0.34 (TIMSS Grade 4), and 0.36 (TIMSS Grade 8), using 6 to 11 variables. We suggest that data from such questionnaires can help to evaluate bias risks in an effective way. Further, we argue that (i) an examination of the current IEA adjudication system should be contemplated and (ii) a change in the approach of computing nonresponse adjustment factors to a system where school's participation propensity determines the adjustment factors should be considered.

Causal Mediation With Latent Variables: An Illustrative Example From PIRLS 2011

Agnes Stancel-Piątak¹, Daniel Caro², and Parisa Aghakasiri¹

¹IEA Data Processing and Research Center, Germany; ²University of Oxford, United Kingdom

It is of prominent interest, in educational research, to evaluate how learning processes are conditioned on individual characteristics of students and their families, as well as on other environmental influences. More specifically, the research questions focus on the existence of causal effects on one hand, and the conditions under which those effects occur on the other. In Large-Scale Assessments (LSA) both types of questions pose specific challenges related to the (mostly) cross-sectional study design. Using retrospective data, causal mediation analysis enables causal inference under certain conditions. The combination of structural equation modeling with causal mediation techniques

provides a possible framework for investigating learning processes in schools. Although the latent framework has been used and applied in many studies to explore learning processes in schools, the developments of causal mediation modeling were unfortunately repeatedly disregarded in those studies.

This contribution provides a conceptual link between causal mediation models and the graph-based structural equation framework, and discusses the advantages and limitations of this method in applications with LSA data. After an overview of the method, an empirical implementation is presented. The application includes modeling of direct and indirect causal effects of the family's cultural capital (indicated by parent's highest education) on student achievement mediated by a latent variable related to learning processes (Early Literacy Activities). A moderating effect of the family's economic capital (indicated by parental occupation) is tested. This paper addresses issues related to specific characteristics of Large-Scale Assessment data using PIRLS 2011 (*Progress in International Reading Literacy Study*) data.

Multidimensional Proficiency Patterns of Fourth-Grade Students in Europe: A Comparative Latent Profile Analysis of Achievement

Heike Wendt, Daniel Kasper, Michael Schurig, and Wilfried Bos
TU Dortmund University, Germany

In 2011 the Progress in International Reading Literacy Study (PIRLS) and the Trends in International Mathematics and Science Study (TIMSS) were conducted at fourth grade in different participating countries with a shared representative sample. In order to derive proficiency patterns across the reading (PIRLS), mathematics and science (TIMSS) competence domains, latent profile analyses (LPA) of students' plausible values were conducted. For this, the grade four students sample from 17 countries were combined and analyzed. As a result of these international LPA, seven groups of learners were identified. The profiles were approximately equidistant and parallel. The international reference model was then applied with constraints to all 17 countries separately, so that substantial comparisons between countries became possible. Here the differences on behalf of peculiar, content specific strengths and weaknesses and profile volumes are discussed. To further describe and compare the national profiles a classification system of the heterogeneity of specific strengths and weaknesses is introduced and applied to all countries' profile patterns. For all countries we find that achievement across domains can be rather explained by a general level of achievement than subject-specific strength or weaknesses of learners. However, subject-specific strengths and weaknesses can be identified but are—with the exception of Malta and Northern Ireland—for most of the countries rather rare and differ substantially by and for half of the sample also within countries.

How Do Different Assumptions on Measurement Invariance for the Scaling of Latent Background Variables Affect Results of Large-Scale Assessments?

Daniel Kasper¹, Heike Wendt¹, and Matthias Trendtel²
¹TU Dortmund University, Germany; ²BIFIE, Austria

Martin et al. (2013) analyzed for 37 countries the relationship between achievement of fourth grade students and the so-called home resources for learning (HRL) index. For deriving the HRL-index, five polytomous indicators were scaled using a two parameter item response model (2-PL) assuming measurement invariance of item parameters across the participating countries. To get an idea of the effect size attributable to different degrees of measurement invariance, the HRL-index were rescaled for 37 countries ($n = 166,709$ students) using (a) two different measurement models (1-PL and 2-PL) with (b) two different degrees of measurement invariance (constant discrimination parameter for all

countries and country-specific discrimination parameter) resulting in four different models. The different HRL-indices were introduced as predictors in a generalized linear mixed model with mathematics achievement as the dependent variable. As outcomes, (1) the different fit-values of the measurement models, (2) the estimated discrimination parameters, and (3) the estimated regression coefficients were compared across countries and scaling models. Overall, the less restrictive model fits the data best. The results support the use of country-specific measurement models for scaling latent background variables.

SESSION 3A: ICCS

Citizenship and Education: Cognitive and Affective Factors

25 June 2015 | 11:00–12:30

Room: Exhibition Hall

Chair: David Greger, Charles University in Prague, Czech Republic

Discussant: Falk Brese, IEA Data Processing and Research Center, Germany

Attitudes Toward Authoritarian Government, Corruption, and Obedience to the Law Among Lower-Secondary Students in Latin America: A Comparative Analysis

Wolfram Schulz and Greg Macaskill

Australian Council for Educational Research, Australia

This paper includes analyses of the extent to which student attitudes toward corruption, authoritarian forms of government, and disobedience to the law are influenced by different factors at the student and school level across six Latin American countries (Chile, Colombia, Dominican Republic, Guatemala, Mexico, and Paraguay). Data from the international and regional assessments will be used in the analyses. Each attitude was measured with data collected with a regional questionnaire which addressed common regional aspects viewed as relevant for the Latin American region. Variables related to student characteristics, home background, and school context as well as civic knowledge measured by the ICCS 2009 student test will be used to explain variation in student attitudes. The results will be based on multi-level analysis where different explanatory models are compared across the six countries in the region. The results show that gender and socioeconomic background as well as open classroom climate and students' civic knowledge are negative predictors of student positive attitudes toward corruption, authoritarianism, and disobedience to the law. Interestingly, students' active involvement in community activities appears to be associated with higher levels of acceptance of corruption and authoritarian government. The findings suggest that the more knowledgeable students are about civic society, the less likely they are to accept corrupt practices, authoritarian forms of government, and breaking the law.

Walk the Talk! Civic Knowledge, Democratic Values, and the Role of School Climate for Open Discussion: A Moderated Mediation Approach

Diego Carrasco^{1,2} and Robin Banerjee¹

¹University of Sussex, United Kingdom; ²Pontificia Universidad Católica de Chile, Chile

The aim of this study was to estimate the association between civic education and democratic values, the mediating factors involved in this effect, and the role of school climate as a moderator. We evaluated moderated mediation model, in which civic knowledge indirectly explains democratic values, via authoritarianism. Furthermore, we specified open classroom discussion as a moderator. Results from the Latin American and Asian samples of the ICCS 2009 study partially supported the model. For all tested samples, civic knowledge was positively associated with democratic values, indirectly via inverse relations with authoritarianism. We find supporting evidence of a moderated indirect effect, whereby the indirect effect was larger when students were exposed to more political discussion in the classroom. This is the case, for 7 out of 11 country samples, mainly in samples with a lower mean of civic knowledge, or a higher mean of authoritarianism at the country level. These models fit better for democratic values of gender equality and permissibility of corruption than for the measures of ethnic rights support and freedom of speech support.

The Civic and Civil Dimensions of Youth Citizenship Participation in Latin America: An Empirical Test of a Conceptual Model

Daniel Miranda¹, Juan Carlos Castillo¹, and Andrés Sandoval-Hernández²

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The citizenship education of youth is an issue that has been extensively investigated. However, the variety of existing definitions, conceptual models, suggests that different theoretical perspectives and measurement approaches have been applied to this concept. First, this paper discusses the reductionism of political socialization to the civic education concept. For doing that, we use two dimensions: the *civic dimension*, which refers to the relationships with formal institutions and the political system, such as voting and party membership; and the *civil dimension*, which refers to the relationships with the community and informal or civil associations. We argue that both sides of the phenomenon make the notion of citizenship a more appropriate concept to encompass the dimensions of youth citizenship participation at school level. Second, in order to advance the empirical implications of this conceptual distinction, we estimate a measurement model that includes both the civic and the civil dimensions of citizenship. For doing that, we use a multi-group confirmatory factor analysis technique with the purpose of evaluating the fit of the theoretical model to a representative sample of 8th grade students in six Latin American countries that participated in the International Civic and Citizenship Education Study (Schulz, 2010). Finally, in order to evaluate to what extent the constructs proposed by our theoretical model (i.e., civil and civic participation) are reflected equally across countries, we tested for measurement invariance.

Young People's Support and Perceptions of Political Parties in 38 Countries: An International Comparison Based on ICCS 2009

Wolfram Schulz and John Ainley

Australian Council for Educational Research, Australia

Over the past decades it has been claimed that young people have become less engaged in political parties and that youth sections of political parties are declining. However, there is little comparative international evidence about the extent to which students in junior secondary school form preferences for political parties and intend to align with parties as adults. The International Civic and Citizenship Education Study (ICCS 2009) focused on the civic knowledge and attitudes to aspects of citizenship (attitudes, values, behaviors, and intended behaviors) in 38 countries. It generated information from large representative samples of students in their eighth year of schooling. The ICCS survey gathered data from students about their attachment to a particular party and its strength to measure their support for political parties. In addition the survey measured students' views about the importance of joining a political party as an aspect of citizenship, their trust in political parties, and their expectation to join a political party in the future. This paper reports on the variation among countries in their support and perceptions of political parties as well as the extent to which students expect to join a political party. It reviews to what extent these results correspond to indicators at the national level and also investigates the relationship between different indicators of students' commitment to a political party as well as their association with context factors (such as gender, SES, or parental interest).

SESSION 3B: TIMSS MATHEMATICS

Investigating Knowledge in Secondary Mathematics

25 June 2015 | 11:00–12:30

Room: Lecture Theatre 6 (LT06)

Chair: Vijay Reddy, Human Sciences Research Council, South Africa

Discussant: Oliver Neuschmidt, IEA Data Processing and Research Center, Germany

Investigating Mathematical Theory Needed to Solve TIMSS and PISA Mathematics Test Items

Arne Hole, Torgeir Onstad, Liv Sissel Grønmo, Trude Nilsen, Guri A. Nortvedt, and Johan Braeken
University of Oslo, Norway

In modern society it is important that a relatively high percentage of the population pursue studies where fundamental knowledge of mathematical theory is needed. Therefore, it is important to investigate to what extent school mathematics builds up understanding of such theory. In particular, it is interesting to study the extent to which mathematical tests at different levels actually measure knowledge of mathematical theory. In this paper we investigate this for TIMSS Grade 8 and PISA mathematics items. To measure the involvement of mathematical theory, we use two dichotomies on the set of test items. The first one dichotomizes items into the following two categories: (i) items where knowledge of some mathematical theorem is useful, and (ii) items where it is not. Our analysis shows that relatively few items fall into category (i) in both PISA and TIMSS. The second dichotomy measures the use of formulas. The categories defined by this are (i) items where some formula is involved either in the item text or in the expected student solution, and (ii) items where it is not. Once again, we find that the majority of items in TIMSS and PISA fall into category (ii). The results are more pronounced for PISA than for TIMSS, on both dichotomies.

We also investigate relations between our dichotomies and item difficulty, using Rasch analysis. This is done for Norwegian TIMSS data. We find that while the restriction to category (i) in the “formula” dichotomy leads to a large and significant increase in item difficulty, the restriction to category (i) in the “theorem” dichotomy does not affect item difficulty substantially. The last result indicates that knowledge of mathematical results (theorems) was actually not crucial for solving many of the difficult items on the test.

Strength and Weaknesses of South Africa’s High Performing Students in Mathematics: An International Comparative Investigation of Mathematics Proficiency on the Basis of TIMSS 2011 Grade 8 Data With a Focus on the Multiplicative Conceptual Field

Caroline Long¹ and Heike Wendt²

¹University of Pretoria, South Africa; ²TU Dortmund University, Germany

South Africa participated in TIMSS from 1995 to 2011. Over these 15 years not much has changed. In this current secondary analysis a specific though important content subdomain, the multiplicative conceptual field, is the focus. This paper focuses on the achievement patterns of South Africa’s high performing learners in comparison to similar subsamples of learners from Australia and England whose education systems are regarded as comparable. The aim is to describe the relative strengths and weaknesses of these learners with reference to a selected subset of the TIMSS 2011 items. The focus is on a specific though important content subdomain, the multiplicative conceptual field, which is considered a crucial learning area at this phase of schooling. In particular the research outcome shows

that this subset of Grade 9 students is able to solve routine problems, but lacks proficiency when it comes to application type or reasoning problems. We conclude that the factors determining performance may be influenced by the South African specific curriculum implementation.

Converging Patterns of Achievement in Mathematics? Evidence From 50 Years of IEA Studies

Stefan Johansson¹ and Rolf Strietholt²

¹University of Gothenburg, Sweden; ²TU Dortmund University, Germany

One global force in education is the international large-scale studies. It has been claimed that countries try to copy the strategies of the best performing countries, resulting in a world curriculum and loss of creativity and innovativeness of individual countries. There is, however, limited evidence of such a homogenization in patterns of knowledge across countries. With the aid of data from seven IEA mathematics assessments (1964–2011) the current study seeks to address the issue of curricular convergence. Countries' response patterns in subdomains of mathematics were investigated, using latent profile analysis. The hypothesis investigated was that fewer latent classes represent more countries over time, i.e., students around the world know more similar mathematics content over time. The results show that it is possible to identify latent classes through the patterns of achievement in four subdomains of mathematics. A further finding is that countries tend to be similar within regions with a similar language and culture. However, our analyses provided no support for convergence of achievement across all countries.

SESSION 4A: TIMSS/PIRLS & POLICY

Quality and Equity in Education

25 June 2015 | 14:00–15:30

Room: Exhibition Hall

Chair: Anne-Berit Kavli, IEA Chair

Discussant: Tom Loveless, Brookings Institution, United States

Preschool Attendance and Disadvantaged Children's Reading Achievement: International Evidence From Matching Analyses

Nina Hogrebe¹, Rolf Strietholt², and Laura Raffaella Zieger²

¹Westfälische Wilhelms-Universität Münster, Germany; ²TU Dortmund University, Germany

While expectations are high that early childhood education is a promising approach to support disadvantaged students' reading literacy, research findings are still inconclusive. The purpose of the study is to estimate the effect of preschool participation on reading literacy at the end of primary school. We want to answer the following question: What is the average achievement of children who did not attend preschool compared to what it would have been if they had attended preschool? Using PIRLS 2011 data, we employ propensity score matching to replicate a randomized experiment on a large-scale basis to estimate this effect for nine countries. We find that children who did not attend preschool come from disadvantaged backgrounds in all countries. However, with the exception of two countries, our study shows that their reading achievement at the end of primary school is not statistically significantly lower than the performance of matched children from similar backgrounds who attended preschool. Keeping in mind some methodological limitations, we discuss the findings of our study from a policy perspective addressing the nature and quality of interventions that aim at improving reading achievement for disadvantaged children.

Countries' Striving Towards More Quality and Equity in Education: Success or Failure? Evidence From TIMSS 2003 and 2011, Grade 4

Kim Bellens¹, Jan Van Damme¹, Wim Van Den Noortgate², and Sarah Gielen²

¹KU Leuven, Belgium; ²KU Leuven Kulak, Belgium

Past decade, countries have been striving towards more quality and equity in their educational system. This study aims at investigating to what extent countries succeeded in both aims, by investigating trends in educational quality and equity amongst 17 countries. To get a full grasp on these trends, we look both at trends in average achievement as well as at trends in achievement level of the 10% best and 10% lowest performing students. Furthermore, we investigate whether there is congruency between trends in quality and trends in equity. Hierarchical multilevel modelling is conducted with data of 17 countries which participated in TIMSS 2003 and 2011, Grade 4. Results indicate an overall increase in achievement, an overall decrease in social equity and an overall increase in ethnic equity. However, differences between countries are noticed, with for some countries trends in the other direction. Finally, no systematic relationship is found between trends in quality and trends in equity.

Factors Affecting the Transition of Fifth-Graders to the Academic Track in the Czech Republic

Jana Straková and David Greger

Charles University in Prague, Czech Republic

The Czech education system is characterized by early tracking and high educational inequalities. The most controversial element of the system is the academic track, which is attended by students after the completion of primary school. The paper focuses on fifth-graders' aspirations and their success in entrance examinations. Analyses are carried out of data from the TIMSS and PIRLS studies conducted in 2011, and of data collected in a survey of fifth-graders implemented on the same sample in 2012 within the Czech Longitudinal Study in Education. The questions are answered using binary logistic regression and descriptive analyses of the data gained in the project. The analyses show that although the most important factor influencing success in entrance examinations is student performance, students' family background also has a very important impact on both aspirations and success during admission procedures. Gender, on the other hand, has not proved to have a significant effect.

The Effect of Immigrant Segregation on School Attainment Expectations: Evidence Using the Trends in International Mathematics and Science Study

Diego Cortes¹ and Mojca Rozman

¹IEA Data Processing and Research Center, Germany

In this paper the effect of immigrant students' segregation and parental education on school attainment expectations is studied using data from eighth graders in the Trends in International Mathematics and Science Study conducted in 2011. A cumulative probability model was fitted to explain variations in school attainment expectations accounting for differences between immigrant and native students. We found evidence that immigrant students with highly educated parents tend to outperform their native peers, with the same level of parental education, in terms of schooling expectations in most countries. Moreover, the effect of parental education seems to be more pronounced for non-native than for native students; the largest effect was found in students where at least one parent has a university degree or higher. Furthermore, we found that the level of segregation, measured in terms of proportion of immigrant students at school, has a low effect on schooling expectations, for both immigrant and non-immigrant students. As educational success is an evident determinant for a prosperous adaptation of young immigrants and their native peers, this study presents important evidence for public policies targeting immigrants' social inclusion.

SESSION 4B: TIMSS SCIENCE

Rethinking the Science Curriculum

25 June 2015 | 14:00–15:30

Room: Lecture Theatre 6 (LT06)

Chair: Michael O. Martin, Boston College, United States

Discussant: Jan-Eric Gustafsson, University of Gothenburg, Sweden

A Statistical Analysis of the Characteristics of the Intended Curriculum of Japanese Primary Science and its Relationships With the Attained Curriculum

Kenji Matsubara¹, Yasuhito Hagiwara¹, and Yuji Saruta²

¹National Institute for Educational Policy Research, Japan; ²Kokugakuin University, Japan

This study statistically investigates the characteristics of the intended curriculum of Japanese primary science, focusing on the learning content. As a major data source of the learning content prescribed at the national level, the study used TIMSS 2011 Grade 4 Curriculum Questionnaire data. Confirmatory factor analysis model was performed to find out to what degree a topic area was covered compared to the average of 59 TIMSS 2011 participating countries.

The study revealed that the topic areas of “Human Health” and “Changes in Environments” in the life science domain were statistically less covered in Japanese primary science compared to the international average. Then, in the discussion the study related the found characteristics of the intended curriculum to the attained curriculum, drawing the percent correct of relevant items of the science assessment. Based on the findings, the study proposes two possible recommendations concerning the revision of the Japanese primary science curriculum.

The Relationship Between the Statistical Changes in Common Items and the Revision of the National Curriculum in Japan: A (Constrained) Item Parameter Drift Analysis of TIMSS 2007 and TIMSS 2011 Assessments of Eighth Graders on Earth Science

Yasuhito Hagiwara and Kenji Matsubara

National Institute for Educational Policy Research, Japan

This study investigates the statistical changes in common items between TIMSS 2007 and TIMSS 2011 assessments taken by Japanese eighth graders on earth science, from the perspective of the revision of the national curriculum in Japan. Each common item was grouped into one of the four topic areas (“Earth’s Structure and Physical Features,” “Earth’s Processes, Cycles, and History,” “Earth’s Resources, Their Use and Conservation,” and “Earth in the Solar System and the Universe”) and this grouping was considered in association with the result of the analyses of (constrained) item parameter drift.

The result shows that the topic area of “Earth’s Processes, Cycles, and History” seems to be more favorable for students of 2010–2011 school years than for those of the 2006–2007 school years as a whole. This result is discussed in light of the changes in curricular emphasis on the relevant subject matter.

Developing Higher-Order Competencies of Science: Exploring the Role of Curricular and Implementation Factors

Masoud Kabiri

Research Institute for Education, Iran

Science higher-order thinking competencies are important for the majority of science educators, curriculum developers, and teachers. Developing these competencies require a well-intended curriculum along with good conditions of implementation. The present study has investigated the role of curricular and school factors on developing complex skills in science; they are, reasoning, predicting, explaining, and scientific inquiring. Although reasoning cognitive domains in TIMSS cover these kinds of competencies, there are not any detailed scores provided for each of the containing activities in the domains. Therefore, the cognitive diagnostic assessment framework was considered to analyze the data. To do so, science items of the grade eight in TIMSS 2011 were examined in order to involve higher-order thinking competencies. A number of 109 items were extracted which require at least one of four competencies. Next, five countries (Korea, Australia, Iran, Malaysia, and Morocco) were selected according to average score scale in the reasoning domain, and then, attribute profile students and probability of mastery on attributes were estimated by the General Diagnostic Model. Subsequently, the multilevel structure was examined based on Intra-Class Correlations (ICC) of probabilities. The results of proportion of masters of estimated scale supported the score scale average of the reasoning cognitive domain. Additionally, ICCs showed the hierarchical structure was observed in reasoning and scientific inquiring, but was not observed in predicting and explaining in most counties. This revealed that different implementation of intended curriculum affected developing reasoning and scientific inquiring, whereas the curricula were implied similar in two other competencies. On the other side, the multilevel structures in Korea were less than other studied countries.

SESSION 5A: ICILS & POLICY

School Factors, Computer and Information Literacy, and Policy Implications

25 June 2015 | 16:00–17:30

Room: Exhibition Hall

Chair: Silvia Montoya, UNESCO Institute for Statistics, Canada

Discussant: Julian Fraillon, Australian Council for Educational Research, Australia

School-Level Predictors for ICT Use in Schools and Students' Computer and Information Literacy—Results of ICILS 2013

Birgit Eickelmann¹, Julia Gerick², and Wilfried Bos²

¹University of Paderborn, Germany; ²TU Dortmund University, Germany

The increasing relevance of information and communication technologies (ICT) and the society's transition towards an information or knowledge society have led to an emergence of new challenges for schools and school systems. Thus, the need for students to develop new kinds of relevant skills like *digital literacy* or *computer and information literacy* (CIL) is constantly gaining in importance. With the IEA study ICILS 2013 (*International Computer and Information Literacy Study*; Fraillon, Ainley, Schulz, Friedman, & Gebhardt, 2014) these student competencies as well as contexts for CIL learning and learning outcomes such as school-level factors in different educational systems were investigated for the first time for secondary schools. The research presented in this paper focuses on supporting and hindering school-level factors regarding the ICT use of teaching staff and relations to students' CIL. From a methodological perspective, a multilevel approach has been chosen, taking into account data from four countries participating in ICILS 2013, namely Australia, Germany, Norway, and the Czech Republic. As to the first research question outlined in this paper, results show that the relevance of school-level determinants for using ICT at school differs between educational systems. In Germany, for example, the pedagogical IT support seems to be crucial for the use of ICT in teaching. In the Czech Republic, the self-efficacy of the teaching staff plays a key role whereas in Australia, the teaching staff's participation in professional development activities can be identified as relevant. The results of the second research question show a statistically significant correlation between the use of ICT at school and the students' CIL for Germany, whereas for Australia, Norway, and the Czech Republic no significant effects could be found. In addition to specific findings for the considered countries, the international comparison therefore equally reveals strengths and developmental potentialities for the different educational systems.

Leadership and Pedagogy Matters: Impact of School Level Factors on Students' CIL Achievement

Nancy Law, Johnny Yuen, Zhan Wang, and Ada Tse

University of Hong Kong, Hong Kong SAR

This paper reports on a study of the school level factors influencing students' CIL achievement in Hong Kong, based on a multilevel analysis of the International Computer and Information Literacy Study (ICILS 2013) data. Hong Kong is among the participating systems with the highest between school variance in students' CIL score, accounting for 49% of the total variance (Fraillon et al., 2014). Leadership factors such as principals' understanding of the role of ICT and their actual implementation strategies in schools, as well as teachers' actual adoption of ICT and pedagogical approaches used in teaching and learning have been found to differ across countries and across

schools within countries in earlier SITES studies¹. These factors are generally considered to have important impact on students' learning outcomes in the literature on ICT in education. Using data collected from the principal and teacher questionnaires, this study explores the relationship between school leadership factors, teacher ICT-using pedagogical factors, and students' CIL scores using multilevel analysis. The results show that teachers' e-Learning pedagogy factors have the strongest influence on students' CIL score, which when considered alone explains 30.5% of the between school variance. Principals' e-Learning leadership practice also had a strong influence, explaining 18% of the total between school variance when used alone as the predictive variable. Principals' e-Learning leadership practice and teacher e-Learning Pedagogy factors together explain 37.93% of the between school variance. The detail of the study is reported and its implications are discussed.

How Teachers Emphasize the Development of Students' Digital Information and Communication Skills: Looking at 21st Century Education

Fazilat Siddiq and Ronny Scherer

University of Oslo, Norway

Teachers' integration of information and communication technology (ICT) has been widely studied, given that digital competence has become crucial in 21st century education. In this context, teachers' ICT integration is mostly represented by quantitative measures describing the frequency of ICT use in classrooms without examining the degree to which digital information and communication skills are emphasized. Consequently, the present study investigates *teachers' emphasis on developing students' digital skills*, focusing on *accessing, evaluating, sharing, and communicating* digital information. The aim of our study is to validate an assessment of the construct with respect to its factor structure, relations to other constructs (e.g., teachers' ICT self-efficacy, ICT use), and the differences between gender and main subject groups. We used a representative sample of 1,072 Norwegian teachers that participated in the International Computer and Information Literacy Study (ICILS) in 2013. We show that teachers' emphasis: (a) comprises three correlated factors which are identified by exploratory structural equation modeling; (b) is positively related to teachers' ICT self-efficacy and the frequency of ICT use; and (c) differs across teachers' main subject but not across gender groups. Our results provide strong evidence on the construct validity and point out the importance of teachers' emphasis on fostering students' digital skills in 21st century classrooms.

Findings From ICILS 2013: Implications for Educational Policy in the Czech Republic Based on Both National and International Perspective

Josef Basl and Lucie Řezáčová

Czech School Inspectorate, Czech Republic

This paper tries to demonstrate how findings from ICILS 2013 can be practically used for specific suggestions of educational policy measures. We focus on findings for the Czech Republic and some of them are compared with findings for Slovakia. Both countries have some similarities in educational system.

There are two aspects we analyze within our paper. Firstly, we focus on mapping how a school can contribute to pupils' development in the field of computer and information literacy. Secondly, we elaborate what similarities and what differences the ICILS's definition of computer and information literacy has in relation with the Czech national curriculum of computer and information literacy.

¹ IEA Second Information Technology in Education Study 2006

There are two suggestions that can be introduced based on analyses carried out so far. It is possible to suggest a revision of the Czech national curriculum for computer and information literacy to put more emphasis on using information securely and safely. The second suggestion focuses on more effective and real tasks oriented design of further development courses and also on introducing some basic level of this kind of skills (ICT implementation within teaching) into all university study programs dealing with future teachers. Both could help teachers save time and be more ready for practical implementation.

SESSION 5B: ICCS SYMPOSIUM ON TOLERANCE

Tolerance Through Education—A Follow Up of the EC JRC Seminar, “Lessons Learned for Understanding Civic and Citizenship Education”

25 June 2015 | 16:00–17:30

Room: Lecture Theatre 6 (LT06)

Chair: Maria Magdalena Isac, European Commission, DG JRC Unit DDG.01 – Econometrics and Applied Statistics, Italy

Discussant: Ralph Carstens, IEA Data Processing and Research Center, Germany

Tolerance Through Education in Europe: An Introduction

Maria Magdalena Isac

European Commission, DG JRC Unit DDG.01 – Econometrics and Applied Statistics, Italy

Tolerance towards other groups is an essential feature of democracy (Almond & Verba, 1963). In an increasingly ethnically diverse Europe, current aims of civic and citizenship education in Europe seek to promote tolerance towards people from other cultures and immigrants while fostering social cohesion (e.g., by enhancing immigrants’ trust, attachment, and civic engagement). This paper describes how in the European context, discourses on tolerance are framed in terms of social cohesion, integration, and inclusiveness (e.g., Council of Europe, 2008; European Council, 2010) and underscores the important role assigned to education in this respect. Moreover, it illustrates with empirical examples how large-scale assessments in education (including findings from the IEA CIVED and ICCS studies) and secondary analyses based on such data contribute to the knowledge-base on determinants of tolerance including positive attitudes toward immigrants. The main theories used to inform such investigations are also reviewed and implications for further research are discussed.

The Tolerance Gaps Among Youth of Different Demographic Backgrounds and the Conditions Required to Increase Appreciation for Intergroup Diversity: Evidence From ICCS 2009

Silvia Diazgranados¹ and Andrés Sandoval-Hernández²

¹Harvard University, United States; ²IEA Data Processing and Research Center, Germany

Identifying the existence of “tolerance gaps” or significant differences in the positive attitudes that people from different backgrounds have toward diversity should be a priority for researchers, because societies whose citizens are divided in their disposition to respect and value intercultural differences can encounter serious challenges for the protection of human rights (Tibbitts, 2009). Using data from 24 nationally representative samples from 8th grade students who participated in the 2009 International Civic and Citizenship Education Study (ICCS) we identify the existence and magnitude of “tolerance gaps” toward ethnic-racial groups and immigrants among students from different demographic characteristics in Europe. Then, based on the Contact Hypothesis (Allport, 1954; Pettigrew, 1998) we use different specifications of cluster robust regression models to explore the role of environmental support, close contact, cooperation, and equal status in explaining differences in students’ levels of tolerance toward racial and ethnic immigrant groups. Finally, we discuss implications of our findings for researchers, practitioners, and policymakers.

Tolerance Towards Minority Groups Amongst European Students

Falk Brese

IEA Data Processing and Research Center, Germany

Tolerance among adolescents is a topic high on the political and social agenda nowadays. Recent research indicates an influence of involvement in social networks on the level of tolerance amongst school students. This paper will use the ‘contact hypothesis’ (proposed by Allport, 1954, extended by Cameron et al., 2007, and Côté & Erikson, 2009) as a framework to explore differences in tolerance of European students towards minority groups. The hypothesis assumes that involvement in social networks correlates with the level of tolerance, with type and nature of the contact as a conditioning variable. This hypothesis will be explored with data from 14 year-old school students from European countries participating in IEA’s International Civic and Citizenship Education Study (ICCS) 2009. Simultaneous models for high and low socioeconomic status (SES) students will be estimated to compare students with different SES, evaluating the additional hypothesis that ‘contact’ with immigrants affects high and low SES students in a differentiated way.

Positive Intercultural Attitudes in Europe

Julia Higdon

Harvard Graduate School of Education, United States

The European Union, built on democratic foundations, relies on participation that is inclusive of all groups. Among efforts to support social cohesion in the EU, investigating the development of intercultural attitudes is a crucial area of research. Examining attitudes among adolescents is useful because of their growing capacity to understand complex systems, while still being engaged in formal education systems in which interventions aimed at positive intercultural attitudes are often applied. In my dissertation, I used data from the 2009 IEA ICCS (International Civic and Citizenship Education Study) (IEA, 2009; Schultz et al., 2009), to examine determinants of intercultural attitudes among adolescents in seven countries in Europe, focusing on cultural contexts and schools. First, I established the measurement invariance of a variety of measures of intercultural attitudes, to confirm the validity of comparing means and associations across contexts, using a novel approach in the Bayesian framework. Using this method, I was able to establish measurement models where the maximum number of loadings and thresholds were constrained to be equal and subsequently small mean and variance priors were used to bring the parameters allowed to be different close to equality. Then, I examined the ways in which individual background and experiences of positive and democratic school climates were associated with intergroup attitudes in these seven national contexts. I found that positive and democratic school climates were associated with positive intercultural attitudes, as well as gender, attitudes toward gender equality, and their interaction. Interpretations of the findings and discussions are also presented.

A Question of Perspective? Measuring Views on Equal Rights and Opportunities Among Minority Groups in European Large-Scale Surveys

Wolfram Schulz

Australian Council for Educational Research, Australia

Attitudes toward diversity and acceptance of minorities have increasingly become a focus of public attention due to the transition of the European region toward a more diverse society. In recent years, many studies have gathered and presented data on perceptions of tolerance or attitudes toward equal rights for social groups across European countries. Whenever respondents are asked about their views

on diversity, tolerance and acceptance with regard to a specific social group, it is always important to take into account whether they belong to this particular group or not. However, when studying attitudes towards smaller minority groups, comparing attitudes between majority and minority often becomes problematic due to relatively small sample sizes. This paper will present European data from the IEA Civic and Citizenship Education Study (ICCS 2009) and discuss possibilities for improving the statistical power of this kind of comparisons through oversampling of minority groups in student surveys.

SESSION 6A: ICILS & METHODOLOGY

Conceptualization of Research and Practice

26 June 2015 | 11:00–12:30

Room: Exhibition Hall

Chair: Bruno Losito, Roma Tre University, Italy

Discussant: Birgit Eickelmann, University of Paderborn, Germany

Teaching About Information and Communication Technologies

John Ainley, Tim Friedman, Eveline Gebhardt, and Greg Macaskill

Australian Council for Educational Research, Australia

Many countries espouse policies that support the use of Information and Communication Technologies (ICT) in schools. ICT is used in schools to facilitate teaching and learning and to develop the cross-curricula capability referred to as Computer and Information Literacy (CIL). However, there are only limited data concerning factors associated with the pedagogical use of ICT and even fewer that concern teaching CIL. This paper is based on the 2013 IEA International Computer and Information Literacy Study (ICILS). It confirms that ICT is used extensively in teaching in lower secondary schools but that there are substantial differences among and within countries in the emphasis placed on developing CIL. Teacher emphasis on developing CIL was greatest when the teachers were confident about their expertise in using ICT, had positive views about the value of ICT in education, worked in environments where there was collaboration and planning regarding the use of ICT, and where there were relatively few resource obstacles to using ICT. Differences associated with gender and age were small and differences associated with subject area appeared to be mainly associated with concomitant differences in the characteristics of teachers.

Constructing a Described Achievement Scale for the International Computer and Information Literacy Study

Julian Fraillon, Eveline Gebhardt, and Wolfram Schulz

Australian Council for Educational Research, Australia

The International Computer and Information Literacy Study gathered data from approximately 60,000 Grade 8 (or equivalent) students across 21 countries or sub-regions of countries in 2013. The student test instrument of computer and information literacy comprised 62 tasks and items yielding 81 score points. The tasks and items were roughly evenly distributed across four test modules. Each student completed two of the four test modules in a fully balanced complete rotated design.

This paper illustrates the process and outcomes of the development of a described substantive CIL achievement scale based on data from the 62 tasks and items used in the ICILS main survey. The paper provides a detailed description of the process of constructing the substantive scale with some discussion of key decisions and the nature of the substantive categories and generalizations considered during the process. The paper also describes the substantive cognitive achievement scale itself and reflects on the achievement of female and male students against the scale.

Equating the National Australian and International Computer and Information Literacy Tests and Examining Growth From Year 6 to Year 8 and Year 10

Eveline Gebhardt and Julian Fraillon

Australian Council for Educational Research, Australia

Since 2005 Australian students in Year 6 and Year 10 have been tested to assess their ICT literacy for the National Assessment Project for Information and Communication Technology Literacy (NAP-ICTL; ACARA, 2012). The assessment is repeated every three years, to examine achievement at Year 6 and Year 10 and to evaluate change in performance over time. A unique opportunity arose with the introduction of the International Computer and Information Literacy Study (ICILS) in 2013. ICILS was based on a framework similar to that for NAP-ICTL. By having Australian students complete modules from NAP-ICTL following ICILS, it became possible to equate national and international test data. The paper describes the technical process of equating the national test to the international test. It also supports consideration of how students develop skills from the end of primary education until the end of compulsory education in Australia in this relatively new assessment domain (De Bortoli, Buckley, Underwood, O'Grady, & Gebhardt, 2014). The equating methodology was developed within an IRT framework. By placing the NAP-ICT Literacy items onto the CIL scale it was possible to compare the proficiency levels, including the constituent skills, between the two surveys. In addition, differences between the distributions of student performance in Year 6, Year 8, and Year 10 on this common scale are described in the paper. The results show a measurement scale describing development in computer and information literacy by combining the two measurement scales based on the separate surveys. The new scale contributes in understanding developmental paths of this relatively new assessment domain.

Using Process Data to Assist Interpretation of Student Computer and Information Literacy

Ralph Carstens¹, Julian Fraillon², and Frank Goldhammer³

¹IEA Data Processing and Research Center, Germany; ²Australian Council for Educational Research, Australia; ³German Institute for International Educational Research (DIPF), Germany

ICILS is the first international large-scale assessment for IEA that was administered in a fully computer-based approach. Using related theory and contemporary work on the multi-faceted nature of response processes (e.g., time on tasks), the exploratory research proposed here is the first attempt to describe, understand, and model the relationship between student computer and information literacy (CIL) and process-related paradata.

The analyses will investigate the sensitivity of parameter estimates when process data are used to condition responses and further review the associations between time on task on the one hand and the task as well as student characteristics on the other in a comparative, international perspective. The analyses are seen as a starting point with potential to influence test design, validation, item scoring, and ultimately teaching and learning in CIL and related digital literacies.

SESSION 6B: PIRLS

Contextualizing Reading Achievement—Evidence From PIRLS

26 June 2015 | 11:00–12:30

Room: Lecture Theatre 6 (LT06)

Chair: Sarah Howie, University of Pretoria, South Africa

Discussant: Sabine Meinck, IEA Data Processing and Research Center, Germany

Balancing Act: A Semi-Parametric Approach for Determining the Local Treatment Effect of School Type With an Application to South Africa

Debra Shepherd

University of Stellenbosch, South Africa

Despite the abolition of a racially segregated schooling system in 1994, schools that principally served White students under apartheid remain functional and those that served Black African students remain dysfunctional and largely incapable of producing results. The link between socioeconomic status (SES) and performance continues to define the South African schooling system. This study adds to the evidence through estimating the causal (treatment) effect of attending an English/Afrikaans testing school where the language of instruction at the school serves as a proxy for former department. A recently defined class of balancing weights are used in conjunction with non-parametric coarsened exact matching to calculate the local treatment effect for the sample of students (and schools) with optimal overlap. Using the full sample, this is estimated to be approximately 1 year of learning (50 points). This estimate is unchanged when the sample is restricted to those schools with similar distributions of inputs targeted directly by government policy. Balancing further on average school SES and other school factors that this study defines as “post-treatment” (e.g., managerial, institutional, and teacher quality) reduces the treatment effect to 10–14 points.

Home Environment, Motivational Characteristics in Reading, Reading Activities, and Gender: How Do These Factors Interact and Affect Reading Literacy of Primary School Students in Austria?

Christina Wallner-Paschon

BIFIE, Austria

The study focused on home environment characteristics, as it is known that reading achievement is more strongly affected by home environment than any other subject area. Taking into account general models of school performance (Helmke & Weinert, 1997) and results from PIRLS 2006 (Wallner-Paschon & Schneider, 2009), a model was derived for examining the importance of family, educational, and individual characteristics on reading literacy. The research is designed to investigate the influence of home environment factors (socioeconomic status, parents’ attitudes towards reading and their reading behavior, number of books at home, early reading and language activities at home, etc.) on important student characteristics with regard to reading (motivational characteristics, reading behavior and achievement). The effects of home environment factors on students’ motivational characteristics in reading, reading behavior and achievement are estimated with structural equation modelling using the Austrian data of PIRLS 2011.

The model includes also students’ gender to examine if there are already differences in the family socialization or in students’ reading motivation or behavior. Although the gender gap is still moderate at the end of primary school, the differences between girls and boys are much larger at the end of compulsory school in Austria.

Initial findings show small gender effects on early reading socialization in the family as well as on their reading motivation and reading confidence, but an effect on students' reading attitude favoring girls. Further the model shows that family resources like books at home, parents' reading attitude and behavior as well as an early language support are largely mediating the relationship between socioeconomic status and reading literacy. Another key finding is that parents' reading attitude affects mainly pupils' reading confidence and less other students' motivational characteristics or their reading comprehension. Overall, the model can explain more than 30% of the variance of reading comprehension.

Causal Effects of Computer Availability at Home on Grade 4 Reading Achievement Estimated From Country-Level Longitudinal Data

Jan-Eric Gustafsson and Monica Rosén
University of Gothenburg, Sweden

The main purpose of the study is to investigate possible effects of home computer use on the reading achievement of Grade 4 students. In previous research both negative and positive effects have been reported, but these contradictory findings are likely to be due to selection bias in the observational or quasi-observational designs that have been used. The current study takes advantage of the trend design of the 10YTS and PIRLS studies, which allows for a difference-in-differences approach to estimation which controls for within-country selection bias, time-invariant country-level omitted variables, and random errors of measurement in independent and dependent variables. The study is based on data from The IEA Ten-Year Trend Study and the PIRLS 2001 and 2006 studies. Regression estimation techniques with fixed country effects based on student level data were used. This allows estimation of main effects of home computer use, and of interaction effects with student characteristics (gender and socioeconomic status). For both data sets negative effects of home computer use on achievement were found. Results are discussed in substantive and methodological terms, focusing particularly on possible threats to valid causal inference, such as omitted variables which are not time invariant.

SESSION 7A: TIMSS/PIRLS

Effective Schools—Evidence From IEA Studies

26 June 2015 | 14:00–15:30

Room: Exhibition Hall

Chair: Ina V.S. Mullis, Boston College, United States

Discussant: Michael O. Martin, Boston College, United States

Differential Predictors of 4th Grade Reading and Mathematics Achievement

Andrea Netten¹, Martina Meelissen², Annemiek Punter², Mienke Droop³, and Ludo Verhoeven³

¹National Centre for Language Education, the Netherlands; ²University of Twente, the Netherlands;

³Radboud University Nijmegen, the Netherlands

In this study, the relationship between reading and mathematics achievement and the differential relationships of student characteristics, parental support, student engagement, school and teacher characteristics, and educational practices with these subjects were examined. Multilevel modeling analyses were conducted, using data from a combined PIRLS and TIMSS 2011 study. In line with previous research the results showed a strong relationship between reading and mathematics achievement. In the comparative model five factors were found to have an effect on both reading and mathematics achievement: the student's age when starting first grade, parental involvement, the expectations of the parents regarding the education attainment level of their child, school enjoyment, and the student's self-concept. For self-concept, however, the effect was much stronger for mathematics than for reading. The study confirmed the importance of early literacy activities at home for reading achievement, while no relation between early numeracy activities and mathematics achievement was found. Also, socioeconomic status was found to be a predictor of reading achievement, but not for mathematics achievement.

Differential Effectiveness in Relation to Gender: An Analysis in the Gulf States Based on Creemers' Comprehensive Model of Educational Effectiveness

Oliver Neuschmidt and Parisa Aghakasiri

IEA Data Processing and Research Center, Germany

The present study used data from the fifth cycle of the Trends in International Mathematics and Science Study (TIMSS) in order to investigate gender specific differences and their relation to students' mathematics achievement based on a set of effectiveness factors identified according to Creemers' well-established integrated model of school effectiveness in the Arab Gulf region.

Different specifications of multilevel models were used to investigate in the differential effectiveness of the model factors concerning gender. Our findings support the transferability of the model into the area of the Persian Gulf. While like in Western countries also in the Gulf States the home background appears to be a strong predictor for mathematics achievement differences, many other factors of the model show significant relation to mathematics achievement even after controlling for the home background. Our analyses of the differential effectiveness of Creemers' model indicators suggest further investigating in quality of teaching variables in Oman and opportunity to learn variables in the United Arab Emirates.

The Relation Between Instructional Quality and Educational Outcomes for Low Versus High Levels of Emphasis on Academic Success

Trude Nilsen and Ronny Scherer
University of Oslo, Norway

Instructional quality (INQUA) is considered to be the most important classroom variable (Creemers & Kyriakides, 2010). Research has clearly indicated that this construct affects students' achievement and motivation (Fauth et al., 2014). Moreover, current studies in educational effectiveness suggest a positive relation between INQUA and school climate (Creemers & Kyriakides, 2010; Nilsen et al., 2014). An important aspect of school climate is School Emphasis on Academic Success (SEAS) (Martin et al., 2013). SEAS reflects a clear priority of academic success referring to teachers' beliefs in their own capabilities, schools' trust in parents and students, and teachers' expectations for students' success (Hoy et al., 2006; Martin et al., 2013). A climate with high levels of SEAS, where parents, students, and teachers have high ambitions for learning and success, may strengthen the relation between the INQUA and students' educational outcomes. Against this background, the main aim of this study is to investigate the relation between INQUA and educational outcomes for low and high levels of SEAS.

On the basis of the Finnish, Norwegian, and Swedish TIMSS 2011 sample of eighth graders ($N = 13,701$), we specified multi-group multilevel structural equation models and investigated the relation between INQUA and achievement, self-concept, intrinsic and extrinsic motivation for low and high levels of SEAS. SEAS served as the grouping variable in the two-level model (Level 1: students, Level 2: classrooms). Our main finding is that the relation between INQUA and educational outcomes in all three countries is larger for high levels of SEAS. For all three countries, only high levels of SEAS resulted in a significant relation between INQUA and student achievement.

Besides supporting the importance of classroom instruction for educational outcomes (Fauth et al., 2014), our study advocates the relevance of SEAS for the relation between instructional quality and educational outcomes.

Effective Primary Schools for Girls in Germany? Another Look at TIMSS/PIRLS 2011

Daniel Scott Smith, Heike Wendt, and Daniel Kasper
TU Dortmund University, Germany

School composition remains to be an important variable in school effectiveness research and, with recent evidence suggesting a female advantage in cognitive and non-cognitive educational outcomes, understanding how it might differentially affect boys' and girls' later life chances could help efforts to achieve parity in technology-driven economies like Germany's. The primary purpose of this paper is to answer two research questions: (1) What is the relationship between economic as well as cultural capital and achievement for 4th-grade girls versus boys studying in Germany? (2) Is the relationship between school composition and student achievement different for 4th-grade girls versus boys? We fit several hierarchical linear models to the German subsample of TIMSS/PIRLS 2011, and report no differences in (1) the relationship between capital and achievement as well as (2) the relationship between school composition and achievement for boys versus girls ($p > 0.05$). But we also find that the relationship between school composition and achievement is halved in classrooms with a majority of females ($\beta = -12.6$, $p < 0.05$), though there is no evidence that the school composition has a different relationship with achievement in male-majority classrooms. This study provides evidence that is consistent with theories of cultural and educational reproduction as well as with previous

findings of gender being a significant composition variable in studies of school effectiveness. Understanding when and for whom educational disadvantage develops, or is reproduced, can go a long way in supporting more equal life chances and promoting social justice.

SESSION 7B: METHODOLOGY

Expanding Methodological Possibilities Through International and Within-Country Comparisons

26 June 2015 | 14:00–15:30

Room: Lecture Theatre 6 (LT06)

Chair: David Kaplan, University of Wisconsin–Madison, United States

Discussant: Plamen Mirazchiyski, IEA Data Processing and Research Center, Germany

School-Level Factors and Student Performance in the IEA Studies: An Example From TIMSS

Bruno Losito¹ and Elisa Caponera^{1,2}

¹Roma Tre University, Italy; ²INVALSI, Italy

IEA international comparative studies traditionally include the use of background questionnaires. Data collected through those questionnaires are central to both international reports and secondary analyses, as they allow to better contextualize student results in the cognitive tests and help identify the school and classroom factors that have a direct or indirect impact on student performance.

A systematic review of the literature on PIRLS, TIMSS, and ICCS was conducted upstream, to identify those school, teacher, and classroom factors which are potentially useful predictors of student performance. Such a review highlighted that it is exceedingly difficult to draw causal inferences, as well as to find strong associations between process-related school variables and student achievement.

The type of constructs and variables used in the questionnaire development, the way these constructs and variables are operationally defined, the self-reported nature of the collected data, and the kind of data analyses carried out all contribute to explain that difficulty.

In order to verify whether the impact of specific school and teacher characteristics varies as a function of the socioeconomic status of students at the school level, a hierarchical multilevel analysis of TIMSS 2011 data was conducted. The analysis measured what proportion of the variance was actually explained by the factors included in the model and whether the impact of the same factors varies in relation to the school socioeconomic background.

A separate analysis was conducted for each considered country and the same multi-level regression model was used first on the schools as a whole, and then treating schools with high and low socioeconomic backgrounds (based on average student SES at school level) as two distinct groups.

In most countries, results showed the influence of socioeconomic status at school level for all three groups of schools—all schools, high SES schools, and low SES schools. Furthermore, results showed that school and teacher characteristics have different impacts across countries and in relation to school socioeconomic backgrounds.

From School Variation to Areal Variation

Jouni Vettenranta¹ and Heidi Harju-Luukkainen^{2,1}

¹University of Jyväskylä, Finland; ²University of Helsinki, Finland

After decades of strong welfare state with relatively homogeneous socio-spatial development, different areas of Finland have started to differentiate. This segregation is reflected, for example, in growing gaps in students' educational outcomes. Due to this previous, quite long homogeneous socio-spatial development of educational issues in Finland, too little research has been conducted in order to identify areal inequalities and to find the underlying mechanisms that produce these. Our theoretical

framework is based on a broad perspective on the concept of social capital. In this article we take a closer look at areal differences in Finland by analyzing the TIMSS 2011 data by means of a method called Kriging. According to the results, there was areal variation in Finland both within and between the aggregated variables. We were also able to identify certain explanatory factors having different effects on student performance in different areas. The effects of these factors were also different for girls and boys.

Professional Community Across Countries

Catalina Lomos

CEPS/INSTEAD, Luxembourg

In recent years, there is more and more focus on cross-cultural research, where relationships are studied comparatively in more than one country. Regarding the latent concept of teacher professional community, the methodological question that arises is under which conditions can we compare the participation in such practices and the relationships of the latent concept of professional community with other related concepts across different countries? How equivalent does the measure need to be in order to allow valid comparisons across groups?

The present study will present the results of MGCFA on 36 countries and 58,000 teachers and discuss the implications of having or not an invariant measure of the latent concept. The concept of professional community was considered as a one-factor structure with more interdependent dimensions represented by one item each, embedded in *reflection and collaboration*, *deprivatized or shared practice*, *collaborative activity*, *shared sense of purpose*, and a *collective responsibility and focus on students*. Regarding measurement equivalence, we establish that the latent concept of professional community can be meaningfully discussed in all 36 countries. In addition, in 35 countries all the items representing the specific dimensions are strongly related with the latent concept of professional community, excluding the item of *reflective dialogue* in Switzerland, being now confident that all items are appropriate in measuring the concept as it is in this study. Regarding scalar invariance, we identify many variant intercepts in different countries, especially for the item measuring *deprivatization of practice* and *collaborative activity*, concluding that future research can validly compare teachers' participation in professional community practices only in 25 countries. Possible explanations and implications of the variant intercepts are discussed in the paper.

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Bofah, Emmanuel Adu-tutu, Session 1A
Brese, Falk, Session 5B
Caponera, Elisa, Session 7B
Carrasco, Diego, Session 3A
Carstens, Ralph, Session 6A
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Reddy, Vijay, Beyond Benchmarks
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Stancel-Piątak, Agnes, Workshop 2, Session 2B
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Wendt, Heike, Session 2B, 3B, 7A
Winnaar, Lolita Desiree, Session 1A
Zhao, Xia, Session 2A
Zieger, Laura Raffaella, Session 4A

Chairs

Greger, David, Session 3A
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Meinck, Sabine, Session 6B
Mirazchiyski, Plamen, Session 7B
Neuschmidt, Oliver, Session 3B
Straková, Jana, Session 1A

PRACTICAL INFORMATION

CONFERENCE AND WORKSHOP VENUE

Protea Hotel Breakwater Lodge

Portswood Road

V&A Waterfront

Cape Town 8001, South Africa

+27 (0)21 406 1911

www.proteahotels.com/breakwaterlodge

Internet Access at the Conference Venue

Free wireless internet connection is available. Details on the connection will be provided with your name badge.

Lunch During the Conference and Workshops

Participants are responsible for arranging their own lunch. There is a coffee shop as well as a restaurant on the premises of the conference center.

Stonebreakers Restaurant: This buffet restaurant specializes in local cuisine and serves breakfast, lunch, and dinner. Guests can enjoy drinks at the bar. Open daily.

Time-Out Café: This à la carte restaurant features panoramic mountain views and also serves light snacks and gourmet coffee.

There is a wide range of other options, from casual to fine dining, within easy walking distance at the V&A Waterfront. For more information, see: www.waterfront.co.za/eat/overview.

Transportation Information

The three hotels with group rates for conference participants (Protea Hotel Breakwater Lodge, The Commodore Hotel, and The Table Bay) are all located at the V&A Waterfront and are within walking distance of each other. The Table Bay, which is furthest from the conference venue, offers a complimentary shuttle service with stops at the V&A Waterfront within easy walking distance of the Protea Hotel Breakwater Lodge.

Public Transport: Public transport runs between the Victoria & Alfred Hotel at the Waterfront and the Cape Town railway station on Adderley Street, every 15 minutes from 6:30 to 19:00 in both directions.

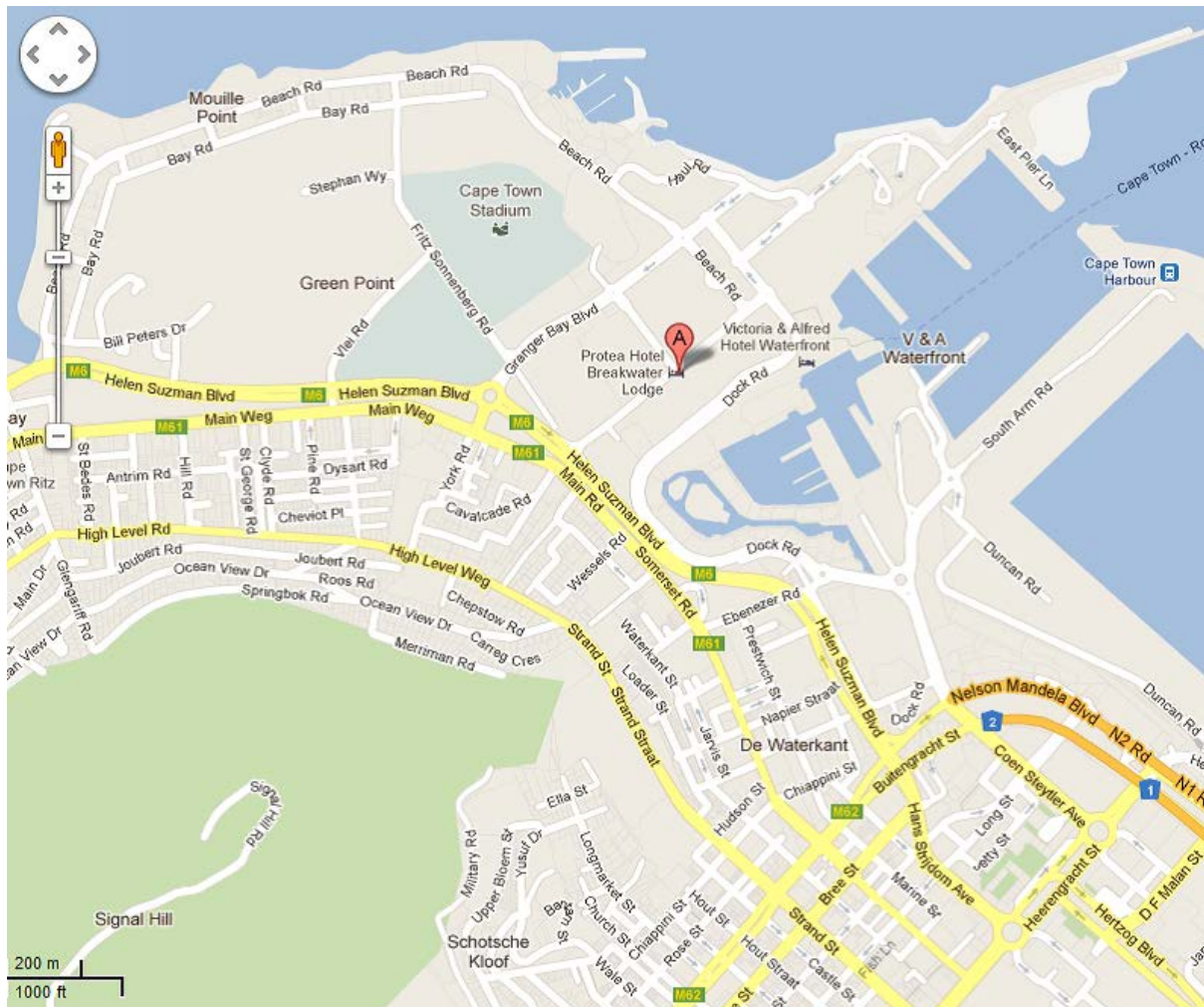
Airport Transfers: Please note that airport transfers to and from the hotels should be coordinated directly with your hotel or travel agent in advance.

City Sightseeing Bus (+27 (0)21 511 6000, www.citysightseeing.co.za): The City Sightseeing Bus caters mostly for foreigners, exploring the Southern Peninsula on the Blue Route and the City Bowl sights on the Red Route. The first bus leaves from the Aquarium at the V&A Waterfront at around 9:00 (and every 20 minutes thereafter until 17:00). Day tickets (where you can hop on and off at any of the stops along the route) cost about R150–170.

Taxis: Sedan taxis are common in the city, charging around R12 per kilometer. The Cape Town Tourism Visitor Information Centre (+27 (0)86 132 2223, www.capetown.travel) can provide a list of recommended taxi companies. Unicab (+27 (0)21 486 1600) and Excite (+27 (0)21 448 4444) are

generally reliable options. Rikkis taxis (+27 (0)861 745547, www.rikkis.co.za) are a popular mode of transport in the city. You can make a free call to them from one of the many yellow Rikkis telephones scattered about the city. Fares are fixed-rate rather than metered, so this could be a better value if you are taking a long journey or sharing the ride with others.

V&A Waterfront and Surrounding Area, Cape Town, South Africa



Location on Map (A): Protea Hotel Breakwater Lodge

GENERAL INFORMATION

Weather

June in Cape Town is midwinter. The days are short and traditionally June is the rainiest month in Cape Town. Cape Town's winter climate is typified by chilly north-westerly winds, storms and rain that set in for days, and temperatures averaging between 8 and 18°C (46 and 64°F). Daylight hours tend to average at 10 hours per day, however the stormy weather can reduce this considerably.

Local Time

South Africa Standard Time is 2 hours ahead of Greenwich Mean Time (GMT+2).

Currency and Exchange

The local currency is the South African rand. Foreign exchange facilities are widely available and can be found at the V&A Waterfront, Cape Town International Airport, and various major shopping centers. Automated Teller Machines (ATMs) accept most international bank and credit cards. South Africa has a modern and sophisticated banking and commercial system, and most shops and hotels accept all major credit cards.

Electricity Supply and Plugs

The South African electricity supply is 220/230 volts AC 50 HZ. Most plugs are 15 amp 3-prong or 5 amp 2-prong, with round pins. If an adaptor is needed, consider bringing one with you, although they can also be purchased locally. Most hotel rooms have 110 volt outlets for electric shavers and appliances.

Telephone and Cellphone Usage

While it's possible to use an overseas mobile phone in South Africa, it is cheaper to buy a local sim card on arriving as international roaming charges are expensive. SIM cards and starter packages are available everywhere in South Africa including airports. You can also rent local cellphones at most airports and shopping malls.

Dialing Overseas From South Africa: To phone overseas from South Africa, dial 00, followed by the country code and area code (if applicable), before dialing the phone number.

South Africa's central dialing code is +27. While in South Africa and if you have international roaming service on your cell phone, it is not necessary to dial +27 as you will be automatically connected to the local numbers.

(No) Smoking

Smoking is an offence in most public buildings and is not allowed in shopping centers, restaurants, entertainment outlets, and cinemas outside of clearly demarcated areas. The conference center is a smoke-free zone, but smoking is allowed in the garden outside the venue.

Goods and Services Tax

A 14% VAT is levied on all goods and services and is normally included in the price of all items. Visitors may claim this back at the airport at the VAT counter upon producing the receipts and originally bought items for inspection.

CAPE TOWN

The Host City in Brief

Cape Town (Afrikaans: Kaapstad; Xhosa: iKapa) is the second-most populous city in South Africa after Johannesburg, and the provincial capital and primate city of the Western Cape.

As the seat of the National Parliament of South Africa, it is also the legislative capital of the country. It forms part of the City of Cape Town Metropolitan Municipality. The city is famous for its harbor and its natural setting in the Cape Floristic Region, as well as for such well-known landmarks as Table Mountain and Cape Point.

As of 2014 it is the 10th most populous city in Africa and home to 64% of the Western Cape's population. It is one of the most multicultural cities in the world, reflecting its role as a major destination for immigrants and expatriates to South Africa. The city was named the World Design Capital for 2014 by the International Council of Societies of Industrial Design. In 2014, Cape Town was named the best place in the world to visit by both *The New York Times* and *The Telegraph*.

Located on the shore of Table Bay, Cape Town was first developed by the Dutch East India Company as a victualing (supply) station for Dutch ships sailing to East Africa, India, and the Far East. Jan van Riebeck's arrival in April 1652 established the first permanent European settlement in South Africa. Cape Town quickly outgrew its original purpose as the first European outpost at the Castle of Good Hope, becoming the economic and cultural hub of the Cape Colony. Until the Witwatersrand Gold Rush and the development of Johannesburg in the 1800s, Cape Town was the largest city in South Africa.

The city has since developed into one of South Africa's and Africa's most attractive destinations for all kinds of tourism—from international tourism to “conference” tourism—and attracts international conferences with its world class venues and world famous tourist sites.

Source: Text adapted from http://en.wikipedia.org/wiki/Cape_Town.

Places of Interest

Bo-Kaap (71 Wale Street, Bo-Kaap): This neighborhood, located on a hill south-west of downtown, is the area historically inhabited by mainly Muslim descendants of slaves from Southeast Asia (hence an older term for the area is “Malay Quarter”). It's a common location for film shoots, as there are some very colorful buildings, quaint streets, and mosques, as well as views over Cape Town and some great food sold on the side of the street.

The Castle of Good Hope (Buitenkant Street, +27 (0)21 787 1260, www.castleofgoodhope.co.za): The Castle of Good Hope is South Africa's oldest surviving building. It was built between 1666 and 1679. It is popularly called “The Castle” by locals.

Kirstenbosch Botanical Gardens (Rhodes Drive, Newlands, +27 (0)21 799 8899/+27 (0)21 799 8783, www.sanbi.org/gardens/kirstenbosch): Open daily from 8:00 to 18:00 (open until 19:00 from September to March). View the hugely diverse and beautiful plants and flowers of the Cape flora in one of the most stunning botanical gardens in the world.

Robben Island (+27 (0)21 413 4200, www.robben-island.org.za): Perhaps Cape Town's most famous landmark located just off the coast of Cape Town, this was the location used during the apartheid days to hold political prisoners, including Nelson Mandela and Walter Sisulu. The tour consists of a guided

bus tour around the island before meeting a former political prisoner for a tour of the prison area. The island itself is quite scenic, with African penguins usually seen on the tour.

South African Parliament (+27 (0)21 403 2266, www.parliament.gov.za): Cape Town is the legislative seat of South Africa (the Presidential seat is in Pretoria and the Supreme Court is at Bloemfontein). A tour of this compound will acquaint you with South Africa's recent history and its political system.

Two Oceans Aquarium (V&A Waterfront, +27 (0)21 418 3823, www.aquarium.co.za): With more than 3,000 marine creatures on view—including sharks, turtles and penguins—the Two Oceans Aquarium is one of the finest aquariums in the world. Situated in Portsworld Square at the V&A Waterfront, the aquarium showcases the unique marine life of the Atlantic and Indian oceans which lie on either side of the Cape of Good Hope.

The Cape of Good Hope Nature Reserve: Part of the Table Mountain National Park that extends from Signal Hill in the north to Cape Point in the south, the Cape of Good Hope is not the southern tip of Africa despite lying at the south-west corner of the Cape Peninsula, just a little south of Cape Point on the south-east corner. Cape Agulhas, roughly 150 kilometers southeast, holds this title instead. The Cape of Good Hope, however, remains a significant headland in the sense that from here one travels more eastward than southward, and it is not hard to imagine that the rounding of the cape in 1488 was a major achievement.

The Cape of Good Hope is one of two world-renowned landmarks within the Table Mountain National Park, the other being Table Mountain. These two familiar attractions draw thousands of visitors to Cape Town. The Cape of Good Hope functioned as something of a beacon for sailors for years, and is still widely referred to as “The Cape” by sea farers.

Museums, Exhibitions, and Galleries

Bo-Kaap Museum (71 Wale Street, Bo-Kaap, +27 (0)21 481 3938, www.iziko.org.za/museums/bo-kaap-museum). Open 10:00 to 17:00 Monday to Saturday. Located in a home dating from the 1760s, the museum offers insight into the cultural life of the Muslim community of the Bo-Kaap area in Cape Town.

District Six Museum (25A Buitenkant Street, +27 (0)21 466 7200, www.districtsix.co.za). District Six is an area near downtown Cape Town which remained multiracial well into the 1960s against all attempts by the government to declare it a “white only” area. Eventually the residents were all evicted and the buildings were bulldozed. The area remains uninhabited. The museum provides information about the area, the eviction, the Group Areas Act, and the people who used to live there. The director of the museum is a former resident.

Iziko Maritime Centre (+27 (0)21 405 2880, www.iziko.org.za/museums/maritime-centre): The Iziko Maritime Centre features an overview of shipping in Cape Town. The earliest existing model of Table Bay harbor, which was completed in 1885 by prisoners and warders of Breakwater Prison, forms part of the exhibitions. Images depicting Table Bay from the 17th to 20th centuries give an idea of the development of the harbor. There is a collection of ship models and objects associated with shipping in Cape Town, in particular the era of mail ships. Large and medium-sized images support the exhibitions, with emphasis on the Union-Castle Line.

Slave Lodge (+27 (0)21 467 7229, www.iziko.org.za/museums/slave-lodge): The Slave Lodge (former Cultural History Museum) is one of the oldest buildings in Cape Town. The many names of the building over three centuries—Slave Lodge, Government Offices Building, Old Supreme Court, and SA Cultural History Museum—reflect the long and rich history of the building. In 1998 this museum was renamed the Slave Lodge. Under the umbrella theme, “From human wrongs to human rights,” exhibitions on the lower level of this museum explore the long history of slavery in South Africa. The museum’s changing, temporary exhibitions address issues around and raise awareness of human rights.

Planetarium (+27 (0)21 481 3900, www.iziko.org.za/museums/planetarium): The Planetarium, which is housed in the South African Museum building in Cape Town, is a celestial theater in the round, utilizing the complex Minolta star machine and multiple projectors to transport the audience through the wonders of the universe. Inside the domed auditorium, the night sky can be recreated, so whatever the weather outside, the Planetarium sky is always clear—an extraordinary audio-visual experience for old and young.

Acknowledgement: Places of interest information courtesy of www.tourismcapetown.co.za/home and www.capetown.gov.za/en/tourism.

IMPORTANT CONTACTS

Local Organizing Committee

The Local Organizing Committee is charged with the planning and direction of all (non-scientific) program facets of the conference, including the day-to-day logistics of the workshops as well as the conference. The University of Pretoria's Centre for Evaluation and Assessment is the Local Organizing Committee for the 6th IEA International Research Conference, and the core team can be contacted at the following contact details:

Name	Office	Email	Cellphone
Professor Sarah Howie (Chair)	+27 (0)12 420 4131	sarah.howie@up.ac.za	
Mrs. Rosalie Loots	+27 (0)12 420 4175	rosalie.loots@up.ac.za	083 263 3744
Mr. Thamsanqa Ncube	+27 (0)12 420 3997	thamsanqa.ncube@up.ac.za	078 946 1195

Emergency Hotlines

Ambulance: 10177

Netcare 911: 082 911 (private emergency services, recommended)

Mobile phone emergency number: 112

General emergency number: 107

Police emergency number: 10111

Other Useful Telephone Numbers

Flight information: +27 (0)86 727 7888

Cape Town Tourism Information: +27 (0)86 132 2223

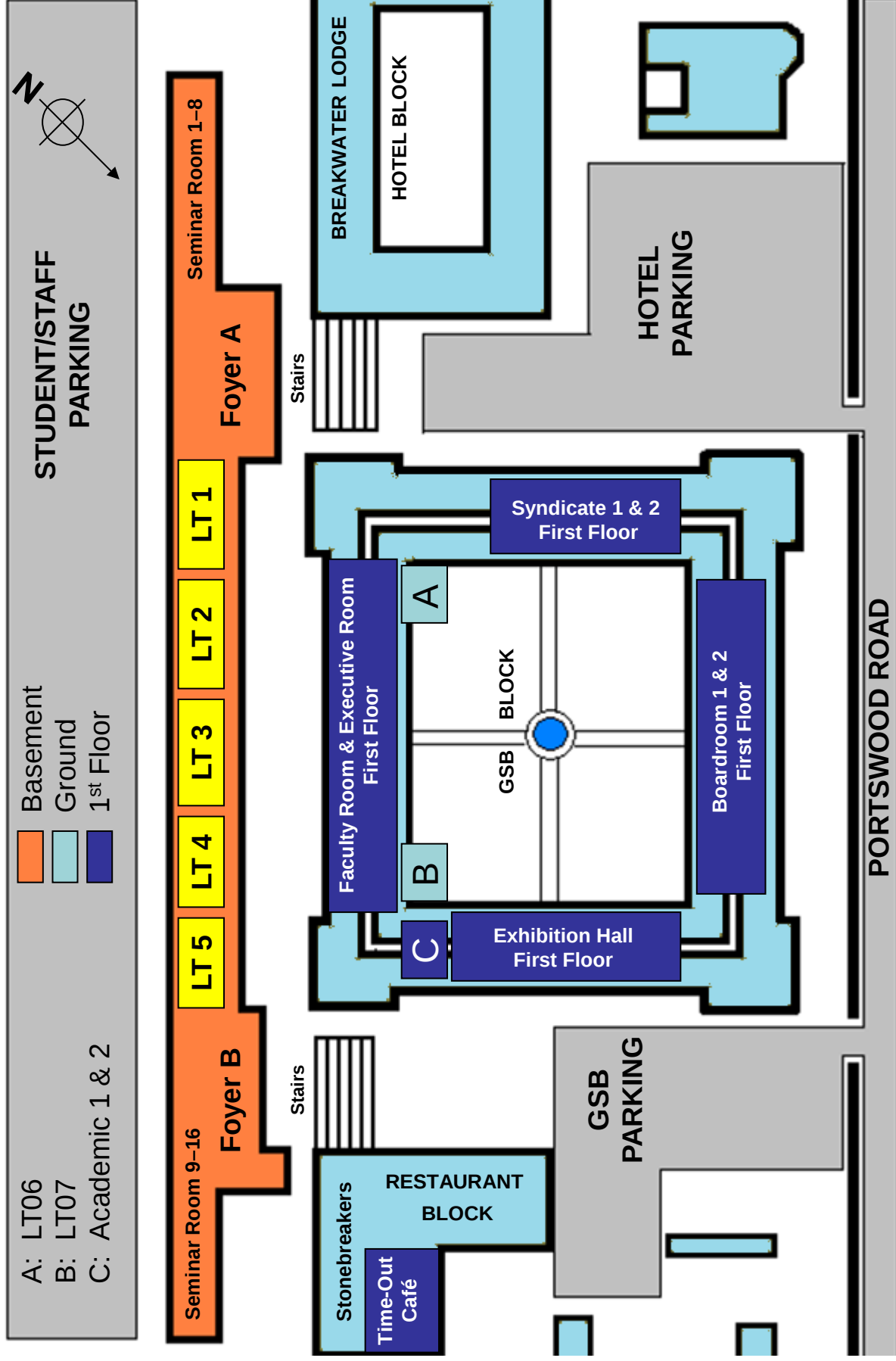
Closest Hospitals

New Somerset Hospital (public/government hospital): Cnr Beach and Lower Portswood Road, Green Point, Cape Town 8001, +27 (0)21 402 6911

Christiaan Barnard Hospital (private hospital): 181 Longmarket Street, Cape Town 8001, +27 (0)21 480 6111

BREAKWATER CAMPUS

Graduate School of Business – UCT





ABOUT IEA

The International Association for the Evaluation of Educational Achievement (IEA) is a non-governmental, non-profit cooperative of national research institutions and governmental research agencies. IEA conducts high quality, large-scale comparative studies of educational achievement and other aspects of education, providing an important resource for monitoring education quality and progress around the world.

The IEA International Research Conference (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 those working with IEA study data to exchange ideas and information on critical educational research issues in a comparative and global context.

7th IEA IRC

28–30 June 2017, Prague, Czech Republic

6th IEA IRC

24–26 June 2015, Cape Town, South Africa

5th IEA IRC

26–28 June 2013, Singapore

4th IEA IRC

1–3 July 2010, Gothenburg, Sweden

3rd IEA IRC

18–20 September 2008, Taipei, Chinese Taipei

2nd IEA IRC

9–11 November 2006, Washington D.C., United States

1st IEA IRC

11–13 May 2004, Nicosia, Cyprus



**International Association
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