



The 4th IEA

International Research Conference

Program

Workshops June 29-30

Conference July 1-3



Photographer: Johan Wingborg



International Association for the
Evaluation of Educational
Achievement



UiO • University of Oslo



UNIVERSITY OF GOTHENBURG

IRC 2010 Program overview

Workshops June 29-30

Tuesday and Wednesday 9:00-17:00 (breaks for coffee at 10:15 and 15:30 and for lunch 12:15-13:45). Basement floor.

Registration Opening hours Tuesday 8:00-16:00 and Wednesday 15:00-20:00, Entrance floor.

Welcome reception Wednesday 19:00- at Pedagogen Hus A, Entrance floor.

Conference July 1-3

Thursday July 1 Day 1	Friday July 2 Day 2	Saturday July 3 Day 3
Registration Entrance floor, opening hours 8:00-16:00		
8:30-9:00 IRC Opening Room: AK 2135 Kjell Härnqvist Auditorium (basement floor)	8:30-9:30 Keynote presentation Prof. Ina Mullis & Prof. Michael Martin. Executive Directors, TIMSS & PIRLS Int'l Study Center, Boston College. <i>Measuring Trends in TIMSS and PIRLS: Challenges, Perspectives, and Solutions</i>	8:30-9:30 Keynote presentation Prof. Jan-Eric Gustafsson University of Gothenburg <i>Causal Inference in International Comparative Research on Student Achievement: Methodological Challenges and Developments</i>
9:00-10:00 Keynote presentation Prof. Rainer Lehmann Humboldt University, Berlin <i>The Scientific Contributions by Torsten Husén and Neville Postlethwaite to The Development of International Comparative Research on Educational Achievement</i>	9:30-10:00 Coffee break	9:30-10:00 Coffee break
10:00-10:30 Coffee break	10:00-12:00 Parallel sessions 4 A. TIMSS: <i>Textbooks and Opportunities to Learn Mathematics and Science</i> B. PIRLS: <i>Instructional Contexts in Relation to Reading Achievement</i> C. ICCS: <i>International Comparisons of Civic Reasoning, Attitudes and Preparedness</i>	10:00-12:00 Parallel sessions 7 A. TIMSS/PIRLS: <i>Measuring Socioeconomic Status</i> B. PIRLS: <i>Effects of Student Motivation and Attitudes On Reading Achievement</i> C. PIRLS/TIMSS: <i>Equity and Socioeconomic Factors in Student Achievement across Countries</i>
10:30-12:30 Parallel sessions 1 A. TIMSS: <i>School Effectiveness in Mathematics/Science Achievement</i> B. PIRLS: <i>International Comparisons of Reading Literacy</i> C. CIVED: <i>Civic Engagement: Attitudes towards Nationalism, Trust and Learning</i>	12:00-13:00 Lunch	12:00-13:00 IRC Closing Room: AK 2135 Kjell Härnqvist Auditorium
12:30-13:30 Lunch	13:00-15:00 Parallel Sessions 5 A. TIMSS: <i>Long-Term Trends In Mathematics/Science Achievement</i> B. PIRLS/TIMSS: <i>Teacher Characteristics and Curricula in Relation to Student Achievement</i> C. ICCS: <i>School Influences and Item Functioning In ICCS</i>	Coffee
13:30-15:30 Parallel sessions 2 A. TIMSS: <i>Explaining Within-Country Differences in Mathematics/Science Achievement</i> B. PIRLS: <i>Measurement Issues and Item Functioning in PIRLS</i> C. SITES: <i>Comparative ICT Use in Schools</i> D. TIMSS/PIRLS: <i>Sampling Strategies</i>	15:00-15:30 Coffee break	
15:30-16:00 Coffee break	15:30-17:30 Parallel Sessions 6 A. TIMSS: <i>Effects of Student Motivation and Attitudes on Mathematics/Science Achievement</i> B. TIMSS/PIRLS: <i>Age, Schooling and Methodological Issues in Score Estimation</i> C. CIVED/ICCS: <i>Influences on Civic Education and Achievement across Countries</i>	
16:00-18:00 Parallel Sessions 3 A. TIMSS: <i>Explaining Trends in Mathematics/Science Achievement</i> B. PIRLS: <i>Examining Trends in Reading Performance</i> C. TEDS-M: <i>Aspects of Measuring Teacher Education Programs</i>		
19:00 - Gothenburg city reception City Hall, Gustaf Adolfs Torg 5	19:00 - Conference dinner Hotel Eggers, Drottningtorget 3	

Location for keynote presentations:

AK 2155 Kjell Härnqvist Auditorium (K.H. Aula)

Location for parallel sessions:

Track A: Room AK 2136

Track B: Room AK 2137

Track C: Room AK 2138

Track D: Room AK 2135



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Paper Proposal Review Committee

Constantinos Papanastasiou (Chair)	University of Cyprus	Cyprus
John Ainley	Australian Council for Educ Res	Australia
Kiril Bankov	University of Sofia	Bulgaria
Constantinos Constantinou	University of Cyprus	Cyprus
Jean Dumais	Statistics Canada	Canada
Robert Garden	Freelance math consultant	New Zealand
Jan-Eric Gustafsson	University of Gothenburg	Sweden
Sarah Howie	University of Pretoria	South Africa
Leonidas Kyriakides	University of Cyprus	Cyprus
Svein Lie	University of Oslo	Norway
Petra Lietz	Australian Council for Educ Res	Australia
Bruno Losito	University Roma Tre	Italy
Michael Martin	Boston College	United States
Phil McKenzie	Australian Council for Educ Res	Australia
Christian Monseur	University of Liege	Belgium
Ina Mullis	Boston College	United States
Tjeerd Plomp	University of Twente	Netherlands
David Robitaille	University of British Columbia	Canada
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Leslie Rutkowski	Indiana University	United States
Wolfram Schulz	Australian Council for Educ Res	Australia
Jack Schwill	Michigan State University	United States
Knut Schwippert	University of Hamburg	Germany
Hak Tam	National Taiwan Normal University	Chinese Taipei
Judith Torney-Purta	University of Maryland	United States
Kam-Shek Tse	University of Hong Kong	Hong Kong, SAR
Jouni Välijärvi	University of Jyväskylä	Finland
Jan van Damme	Catholic University Leuven	Belgium
Matthias Von Davier	Educational Testing Service	United States
Ruth Zuzovsky	University of Tel Aviv	Israel

Organizational Committee

Constantinos Papanastasiou (Chair)	University of Cyprus	Cyprus
Monica Rosén (Local chair)	University of Gothenburg	Sweden
Jan-Eric Gustafsson	University of Gothenburg	Sweden
Liv Sissel Grønmo	University of Oslo	Norway
Dirk Hastedt	IEA DPC	Germany
Barbara Malak	IEA HQ	The Netherlands

Chairs and Discussants

	PARALLEL SESSION A	PARALLEL SESSION B	PARALLEL SESSION C	PARALLELL SESSION D
1 July 1 10:30- 12:30	Chair: Tsung-Hau Jen Discussant: Jan-Eric Gustafsson Room: AK 2136	Chair: Caroline Liberg Discussant: Laurence Ogle Room: AK 2137	Chair: Wolfram Schulz Discussant: Anu Toots Room: AK 2138	
2 July 1 13:30- 15:30	Chair: Leslie Rutkowski Discussant: Michael Martin Room: AK 2136	Chair: Eugenio Gonzalez Discussant: Marie Wiberg Room: AK 2137	Chair: Carolyn Barber Discussant: Tjeerd Plomp Room: AK 2138	Chair: Petra Lietz Discussant: Ingrid Munck Room: AK 2135
3 July 1 16:00- 18:00	Chair: Kok Leong Boey Discussant: Jan van Damme Room: AK 2136	Chair: Marjeta Doupona Horvat Discussant: Petra Lietz Room: AK 2137	Chair: Barbara Malak Discussant: Liv Sissel Grønmo Room: AK 2138	
4 July 2 10:00- 12:00	Chair: Jan-Eric Gustafsson Discussant: Robert Garden Room: AK 2136	Chair: Sarah Howie Discussant: Ann Kennedy Room: AK 2137	Chair: Barbara Malak Discussant: Judith Torney-Purta Room: AK 2138	
5 July 2 13:00- 15:00	Chair: Peter Nyström Discussant: John Ainley Room: AK 2136	Chair: Ruth Zuzovsky Discussant: Kathleen Trong Room: AK 2137	Chair: Judith Torney- Purta Discussant: Bruno Losito Room: AK 2138	
6 July 2 15:30- 17:30	Chair: Ann Kennedy Discussant: Ina Mullis Room: AK 2136	Chair: Hans Wagemaker Discussant: Eugenio Gonzalez Room: AK 2137	Chair: Bruno Losito Discussant: Carolyn Barber Room: AK 2138	
7 July 3 10:00- 12:00	Chair: Michael Martin Discussant: Sarah Howie Room: AK 2136	Chair: Hanna Eklöf Discussant: Marjeta Doupona Horvat Room: AK 2137	Chair: Gabrielle Stanco Discussant: Dirk Hastedt Room: AK 2138	

PRE-CONFERENCE WORKSHOPS

Analyzing IEA International Databases 29-30 June 2010

The IEA Data Processing and Research Center (IEA DPC) will be conducting a series of pre-IRC workshops. These workshops will be given in parallel on 29-30 June 2010, as part of the pre-conference activities.

Each workshop starts at 09:00 and runs till 17:00 in four sessions, with two 15 minute coffee breaks (at 10:15 and 15:30) and a lunch break (12:15-13:45).

Workshop 1: Introduction to IEA Databases and IDB Analyzer

Room: AK 2135

Presenters: Plamen Mirazchiyski & Oliver Neuschmidt

This workshop will provide an overview of the IEA databases currently available, with particular emphasis on the most recently released databases (TIMSS 2007, PIRLS 2006, and SITES 2006). As part of the workshop, participants will also be instructed on how to use the IDB analyzer. The IDB Analyzer is an application developed by 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

- Structure of the databases
- Accessing the data
- Reviewing the documentation

Sampling and test design: Implication for analysis

- General sample and test design
- Computing sampling and measurement variance
- Estimating statistical significance of results

Using the IDB Analyzer to combine datasets

- Merging data from students, schools, teachers, and parents
- Combining data from different countries
- Modifying and recoding data for analysis

Using the IDB Analyzer to conduct analysis

- Calculating means, standard deviations, and percentages
- Calculating correlations and regression coefficients
- Calculating percentages of students meeting achievement benchmarks
- 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 laptops with SPSS installed (SPSS is required to use the IDB Analyzer). Free copies of the IDB Analyzer will be distributed at the workshop.

Workshop 2: Using HLM with Large-Scale Assessment Data

Room: AK 2138

Presenters: Daniel Caro & Leslie Rutkowski

The workshop will train participants on how to use the HLM software through analysis of socioeconomic gradients in PIRLS 2006. First, the rationale for HLM analysis will be introduced and participants will learn how to prepare datasets and import them to HLM. Second, relevant hypotheses for policy research regarding socioeconomic gradients will be evaluated, stressing theory, model specification, and interpretation of results.

An example of the type of analysis that will be presented is testing for the presence of a socioeconomic gradient. This hypothesis test evaluates whether there is a significant relationship between family socioeconomic status (SES) and academic performance within a two-level model (students in schools in a specific country). The theoretical background will be presented, various model specifications will be considered (linear and curvilinear effects), key statistics will be interpreted (i.e., slope, R-squared, curvilinear SES term), and the policy implications of each hypothesis test and resultant statistics will be discussed.

Next, increasingly complex hypotheses will be evaluated. For example, participants will test whether socioeconomic gradients vary between schools, whether the school SES has an effect above and beyond the family SES effect, whether specific variables mediate and/or moderate family SES effects and, finally, within a three-level model framework, whether socioeconomic gradients vary between countries, and if so, how.

The following topics will be covered:

- Theoretical background of multilevel models
- Data preparation and importing data to HLM
- The socioeconomic gradients framework: Theory and hypotheses set out
- Hypothesis testing: Model specification and interpretation of results
- 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 laptops with SPSS installed. The HLM student version and PIRLS 2006 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

Room: AK 2139

Presenter: Eugenio Gonzalez

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.

The following topics will be covered during the workshop:

Overview of assessment design principles

- Advantages and disadvantages of current designs of large-scale assessments
- Consequences for analysis

Overview of principles of item response theory

- Advantages and disadvantages of different models
- Limitations of IRT models

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

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.

MAIN CONFERENCE PROGRAM

1st Day, Opening and Keynote 8.30-10.00, July 1, 2010

Time	Activities
8.00-16.00	Registration Entrance Floor
08.30-09.00	IRC Opening Ceremony (AK K.H. Aula)
09.00-10.00	Keynote Presentation (AK K.H. Aula) Chair: Prof. Seamus Hegarty Professor Rainer Lehmann, Humboldt University, Berlin The scientific contributions by Torsten Husén and Neville Postlethwaite to the development of international comparative research on educational achievement. Summary Torsten Husén (1916-2009), late Professor of the University of Stockholm, and T. Neville Postlethwaite (1933-2009), late Professor of the University of Hamburg, have both contributed substantially to the development of international comparative research on educational achievement. Prof. Husén was among the founders of the IEA, also the Chair and eventually Honorary President of the Association. Prof. Postlethwaite was also Chair of the IEA. Both scholars were psychologists by training. Torsten Husén's contributions are closely related to his earlier studies on the relationships between endogenous and exogenous factors underlying cognitive development, and this led him to investigations as to the significance of the structure of educational systems, including the idea of having international comparisons of systems of education. Neville Postlethwaite was initiated to this research strand by the founders of IEA as a young researcher, stemming from the National Foundation for Educational Research in England and Wales. He soon proved himself as an able and efficient data analyst in the First International Mathematics Study (FIMS), and continued with the task of coordinating the data analyses within the Six Subjects Survey. In subsequent decades, he continuously succeeded as a prime mover and strategic mind behind the operational conduct of internationally comparative studies. In compiling, as co-editors, their multi-volume International Encyclopedia of Education (1st ed. 1985; 2nd ed. 1991 ff), Torsten Husén and Neville Postlethwaite have left a monumental heritage to the research community, far beyond the discipline of Comparative Education.
10.00-10.30	Coffee break

1st Day, Parallel Sessions 10.30-12.30, July 1, 2010

Session	Activities		
	Track A	Track B	Track C
	TIMSS School Effectiveness in Mathematics and Science Room: AK 2136	PIRLS International Comparisons of Reading Literacy Room: AK 2137	CIVED Civic Engagement: Attitudes towards Nationalism, Trust and Learning Room: AK 2138
	Chair: Tsung-Hau Jen Discussant: Jan-Eric Gustafsson	Chair: Caroline Liberg Discussant: Laurence Ogle	Chair: Wolfram Schulz Discussant: Anu Toots
1 10:30-12:30	Marie Wiberg, Ewa Andersson "School Effectiveness in Mathematics in Sweden Compared with Countries in Europe and Asia-Pacific" Dana Diaconu "Learning More Science in Single-Sex Schools? Findings from Hong Kong, SAR and New Zealand from TIMSS 1995, 1999, and 2003" Linda Sturman, Yin Lin "TIMSS 2007 secondary analysis: A method for investigating an attainment gap" Martina Meelissen, Marjolein Drent, Fabienne van der Kleij "TIMSS Contribution to Theories of Educational Effectiveness: a Systematic Review of the Literature"	Kathleen Trong "The Relative Risk-Percentage Equity Index: Measuring Equity in Reading Achievement Across PIRLS 2006 Countries" Moosung Lee, Philip Hallinger "National Contexts Influencing Principals' Interaction with Students: Macro Geographical Region, Societal Culture, and Educational System " Fabio Alivernini "A Top-Down Evaluation of Factors Related to the Largest Performance Gap in Reading literacy Across 25 Countries" Daniel Caro, Jenny Lenkeit "Extending the Socioeconomic Gradients Framework to IEA Studies – An Application to PIRLS 2006"	Judith Torney-Purta, Britt Wilkenfeld "Experience in Civic Education Classrooms Associated with Students' Achievement and Engagement in Three Post-Communist Countries" Carolyn Barber, Judith Torney-Purta, Katherine Fennelly "Adolescents' Attitudes toward Immigrants' Rights and Nationalism in 25 Countries"
12.30-13.30	Lunch		

1st Day, Parallel Sessions 13.30-15.30, July 1, 2010

Session	Activities			
	Track A	Track B	Track C	Track D
	TIMSS Explaining Within-Country Differences in Mathematics/Science Achievement Room: AK 2136	PIRLS Measurement Issues and Item Functioning in PIRLS Room: AK 2137	SITES Comparative ICT Use in Schools Room: AK 2138	TIMSS/PIRLS Sampling Strategies Room: AK 2135
2 13:30-15:30	Chair: Leslie Rutkowski Discussant: Michael Martin	Chair: Eugenio Gonzalez Discussant: Marie Wiberg	Chair: Carolyn Barber Discussant: Tjeerd Plomp	Chair: Petra Lietz Discussant: Ingrid Munck
	Masoud Kabiri, Elham Shavand Gharbi "Comparing High With Low Science Performance Students in Some Variables of Fourth Grader in Iran"	Pierre Foy, Michael Martin, Ina Mullis "The Limits of Measurement: Problems in Estimating Reading Achievement in PIRLS 2006 for Low-Performing Countries"	John Ainley "Levels of Influence on the Use of ICT in Teaching in Australia"	Gabrielle Stanco, Michael Martin, Ina Mullis "Examining the Components of Linking Error of Trend Estimation in PIRLS"
	Kok Leong Boey, Jaguthsing Dindyal "Singapore Grade 8 Students' Performance in Science by Gender in TIMSS 2007"	Yuwen Chang, Jennwu Wang "Examining Testlet Effects on the PIRLS 2006 Assessment"	Sarah Howie, Kim Draper "The Challenges of Implementing ICT in Poorly Resourced Schools in Developing Environments"	Tsung-Hau Jen, Hak Tam, Margaret Wu "The Design Effect of Two-stage Stratified Cluster Sampling"
	Barbara Japelj Pavesic "Where are the Best Mathematics Students Hiding in Slovenia?"	Valerie Quittre Christian Monseur "Exploring Local Item Dependency for Items Clustered around Common Reading Passage in PIRLS Data"	Alona Forkosh Baruch, Rafi Nachmias, David Mioduser "ICT in Hebrew Speaking and Arabic Speaking Schools in Israel: - Findings from SITES2006"	Dirk Hastedt "Changing Populations in TIMSS Cycles: an Alternative Approach to Report Trend"
	Ana Kozina, Mojca Rožman, Tina Vršnik Perše, Tina Rutar Leban "The School Climate as a Predictor of Achievement in TIMSS Advanced Study: Students', Teachers' and Principals' Perspective"	Antra Ozola, Andrejs Geske "Differential Item Functioning in the Aspect of Gender Differences in Reading Literacy"	Enrique Hinostroza, Mario Brun "ICT in Education Policy and Practice in Chile: Does it Correlate?"	Heiko Sibberns, Sabine Tieck "Optimizing the Sampling Design for State Comparisons in PIRLS Germany"
15.30-16.00	Coffee break			

1st Day, Parallel Sessions 16.00-18.00, July 1, 2010

Session	Activities		
	Track A	Track B	Track C
	TIMSS Explaining Trends In Mathematics/Science Achievement Room: AK 2136	PIRLS Examining Trends in Reading Performance Room: AK 2137	TEDS-M Aspects of Measuring Teacher Education Programs Room: AK 2138
3	Chair: Kok Leong Boey Discussant: Jan van Damme	Chair: Marjeta Doupona Horvat Discussant: Petra Lietz	Chair: Barbara Malak Discussant: Liv Sissel Grønmo
	Ali Reza Kiamanesh, Maryam Mohsenpour "Trends in Factors Affecting Eight Graders' Mathematics Performance by Gender in Iran (TIMSS, 1999, 2003 & 2007)" Jana Strakovà "Trends in Differentiation of Student Achievement and Learning Conditions in the Czech Compulsory Education. Findings from TIMSS" Josef Basl, Vladislav Tomasek "Why has Average Achievement in Mathematics in the Czech Republic Decreased since 1995 according to TIMSS Results?"	Monica Rosén, Rolf Strietholt "Trends in Reading Literacy from 1970 to 2006 - A Comparison of 9-10 Year Olds in Sweden, Hungary, Italy and the USA" Caroline Liberg "A Close Reading of Reading Comprehension among Swedish Students in Grade 4" Sarah Howie "The Relationship between Early Childhood Activities and Reading Achievement in Low And High Achieving Countries In PIRLS 2006" Irmela Tarelli, Tobias Stubbe "Home Literacy Environment and Reading Achievement. A Model for Determining the Relationship between Socio-Economic Status, Home Literacy Environment, and Reading Achievement"	Sigrid Blömeke, Ute Suhl, Richard Houang "Diagnosing Specific Strengths and Weaknesses of Teacher Education by Using Different Approaches to Modeling Multidimensionality" Sabine Meinck, Jean Dumais "Sampling Design for the Teacher Education and Development Study in Mathematics (TEDS-M): Challenges, Solutions, Restrictions" Johannes König, Sigrid Blömeke "Expertise of Future Teachers: On The Relationship of Mathematics Content Knowledge, Mathematics Pedagogical Content Knowledge and General Pedagogical Knowledge" Maria Canadas, Pedro Gomez, Luis Rico "Structure of Primary Teacher Education Programs in Spain"
16:00-18:00			
19:00	Gothenburg City Reception, City Hall, Gustaf Adolfs Torg 5		

2nd Day, Keynote Presentation, 8.30-9.30, July 2, 2010

Time	Activities
08:00-16:00	Registration on Entrance floor
08:30-09:30	Keynote Presentation (AK K.H. Aula) Chair: Prof. Liv Sissel Grønmo Prof. Ina Mullis & Prof. Michael Martin Executive Directors, TIMSS & PIRLS Intl Study Center, Boston College Measuring Trends in TIMSS and PIRLS: Challenges, Perspectives, and Solutions Summary Measuring trends over time in student achievement in mathematics, science, and reading are fundamental goals of IEA's TIMSS (Trends in International Mathematics and Science Study) and PIRLS (Progress in International Reading Literacy Study). Countries participating in TIMSS since its inception in 1995 have regular data tracking student achievement in mathematics and science at fourth and eighth grades through 1995, 1999, 2003, 2007, and 2011 (in progress). Similarly, PIRLS countries have trend data on fourth-grade students' reading comprehension from 2001, 2006, and 2011 (in progress). Recognizing the methodological challenges of measuring trends in student achievement in a constantly changing educational environment, TIMSS and PIRLS are designed to evolve gradually from assessment cycle to cycle, adapting to global changes in educational policy, curriculum standards, and methodological advances. Keeping the present as the point of reference while linking back to previous assessments, each TIMSS or PIRLS assessment cycle reviews and revises the assessment framework, introduces new assessment items to keep current, and includes items from previous cycles to maintain the measurement link. To enable participating countries monitor changes over time in the achievement of their student populations, TIMSS and PIRLS use item response theory (IRT) methods to report achievement on scales that preserve the same metric from assessment cycle to assessment cycle. ...
09:30-10:00	Coffee break

2nd Day, Parallel Sessions 10.00-12.00, July 2, 2010

Session			
	Track A	Track B	Track C
4 10:00 -12:00	TIMSS Textbooks and Opportunities to Learn Mathematics and Science Room: AK 2136	PIRLS Instructional Contexts in Relation to Reading Achievement Room: AK 2137	ICCS International Comparisons of Civic Reasoning, Attitudes and Preparedness Room: AK 2138
	Chair: Jan-Eric Gustafsson Discussant: Robert Garden	Chair: Sarah Howie Discussant: Ann Kennedy	Chair: Barbara Malak Discussant: Judith Torney-Purta
	Ida Friestad Pedersen, Liv Sissel Grønmo "Norwegian Upper Secondary School Students: Competence in Solving Algebraic Inequalities"	Wai Ming Cheung, Joseph Wai-lp Lam, Elizabeth Ka-Yee Loh, Shek Kam Tse "Pedagogical Correlates of the Fourth Grade Students and the Coaching of Teachers in Hong Kong"	Wolfram Schulz, Eva van de Gaer, John Ainley "Preparedness for Active Citizenship among Lower Secondary Students in International Comparison"
	Andrejs Geske, Rita Geske "Content of textbooks: One of the Factors Affecting Fourth-Grader Science Achievement"	Ruth Zuzovsky "Instructional Variables Involved in Problems Associated with Diglossia in Arabic Speaking Schools in Israel: PIRLS 2006 Findings"	Anu Toots, Tõnu Idnurm "Does the Context Matter? Attitudes towards Multiculturalism amongst Russian Students in Estonia, Latvia and Russian Federation"
	Peter Nyström, Annika Kjellsson Lind "Text-Book Based Analysis of TIMSS Advanced"	Elisabeth Frank, Monica Rosén "On the Importance of a Safe School and Classroom Climate for Student Achievement in Reading Literacy"	
	Yasin Afana, Petra Lietz "The Relationship between School Resources and Mathematics Achievement at Grade 8: A Comparison of Israeli and Palestinian Schools in TIMSS 2007"	Fabio Alivernini, Fabio Lucidi, Sara Manganelli, Bruno Losito "The Interplay between School, Teacher, Family and Student Factors and Their Relationships to Reading Literacy in Italy"	
12:00-13:00	Lunch		

2nd Day, Parallel Sessions 13.00-15.00, July 2, 2010

Session	Activities		
	Track A	Track B	Track C
	TIMSS Long-Term Trends in Mathematics/Science Achievement	PIRLS/TIMSS Teacher Characteristics and Curricula in Relation to Student Achievement	ICCS School Influences and Item Functioning in ICCS
	Room: AK 2136	Room: AK 2137	Room: AK 2138
	Chair: Peter Nyström Discussant: John Ainley	Chair: Ruth Zuzovsky Discussant: Kathleen Trong	Chair: Judith Torney-Purta Discussant: Bruno Losito
5 13:00-15:00	Jan-Eric Gustafsson "Knowledge and Skills in Swedish Comprehensive School During 40 Years: A Reassessment of the Evidence Based on the IEA Studies" Maciej Jakubowski, Artur Pokropek "Reading Achievement Growth across Countries" Liv Sissel Grønmo, Jan-Eric Gustafsson, "Student Achievement in Mathematics in Norway and Sweden 1995 – 2008" Ruth Zuzovsky, David Steinberg, Zipi Libman "Achievement Data in IEA Studies and Simpson's Paradox"	Anne Milek, Tobias Stubbe, Ulrich Trautwein Oliver Luedtke, Kai Maaz "Reference Group Effects on Teachers' School Track Recommendations: Results from PIRLS 2006 Germany" Alka Arora "Relationship Among Curriculum Coverage, Teacher Preparedness, and Student Achievement in TIMSS Advanced 2008" Peter Nyström, Annika Kjellsson Lind "Alignment between TIMSS Advanced and Swedish National Curriculum and National Tests"	Saskia De Groof, Mark Elchardus, Dimokritos Kavadias, Eva Franck "The Influence of Schools on the Attitudes towards Immigrants. The Relative Strength of Teaching Politics versus Experiencing Democracy" Harm Naayer, Maria-Magdalena Isac "European Citizenship in Dutch Secondary Education. A Comparison between Different Types of Schools" Ireta Cekse, Andrejs Geske, Andris Kangro "The Influence of Education Reforms in Latvia on the Quality of Civic Education and Democracy in the Teaching/Learning Process" Julian Fraillon, Wolfram Schulz, John Ainley "Regional Differential Item Function in the International Civics and Citizenship Education Study"
15:00-15:30	Coffee break		

2nd Day, Parallel Sessions 15.30-17.30, July 2, 2010

Session	Activities		
	Track A	Track B	Track C
	TIMSS Effects of Student Motivation and Attitudes on Mathematics/Science Achievement	TIMSS/PIRLS Age, Schooling and Methodological Issues in Score Estimation	CIVED/ICCS Influences on Civic Education and Achievement across Countries
	Room: AK 2136	Room: AK 2137	Room: AK 2138
	Chair: Ann Kennedy Discussant: Ina Mullis	Chair: Hans Wagemaker Discussant: Eugenio Gonzalez	Chair: Bruno Losito Discussant: Carolyn Barber
6 15:30-17:30	Hanna Eklöf "Student Motivation and Effort in the TIMSS Advanced 2008 Field Study" David Miller, Christina Scheller "A Cross-National Analysis of the Educational Expectations of Eighth-Grade Boys and Girls" Maria Åström "Comparison of Student Positive Attitudes towards Science (PATS) with Students' Results in Australia, England, Norway and Sweden" Noor Azina Ismail, Halimah Awang "Analyzing the Relationship Between Self-Confidence in Mathematics and Students' Characteristics Using Multinomial Logistic Regression"	Ralf Carstens, Dirk Hastedt "The Effect of not Using Plausible Values when They should be: An illustration Using TIMSS 2007 Grade 8 Mathematics Data" Leslie Rutkowski "The Impact of Missing Data on Subgroup Estimation" Monica Rosén, Rolf Strietholt "On the Degree of Comparability – Differences in Age and Schooling in a Trend Study" Christina Cliffordson, Jan-Eric Gustafsson "Effects of Schooling and Age on Performance in Mathematics and Science: A Between-Grade Regression Discontinuity Design with Instrumental Variables Applied to Swedish TIMSS 1995 Data"	Wolfram Schulz, Julian Fraillon, John Ainley, Eva van de Gaer "Explaining Differences in Civic Knowledge across 38 Countries" Gary Homana, Robert Croninger, Judith Torney-Purta "Adolescent Civic Engagement in Australia and the United States: The Role of Communities of Practice" Ting Zhang, Judith Torney-Purta "Assessing Student's Cognitive Content and Process Skills in IEA CIVED: A Cross-Country Analysis"
19:00	Conference dinner, Hotel Eggers, Drottningtorget 3		

3rd Day, Keynote Presentation 8.30-9.30, July 3, 2010

Time	Activities
8.00-16.00	Registration on Entrance floor
08.30-09.30	Keynote Presentation (AK K.H. Aula) Chair: Prof. Constantinos Papanastasiou Prof. Jan-Eric Gustafsson, University of Gothenburg Causal Inference in International Comparative Research on Student Achievement: Methodological Challenges and Developments Summary Comparative research on student achievement in different educational systems has during the last couple of decades made great progress in developing and implementing assessments of knowledge and skills in different domains. Through employing advanced measurement and sampling techniques, surveys make it possible to make confident statements both about differences in level of achievement between educational systems and about trend over time within educational systems. However, comparatively less progress has been made in developing theories and models which can explain the outcomes. Thus, in spite of the fact that one aim of the international studies has been to identify cause and effect relations, it frequently has proven difficult to make credible inferences about causality. One possible reason for this is that the data necessary for such inferences is lacking. Another possible reason is that the cross-sectional survey designs typically employed do not protect against different kinds of threats to valid causal inference. The main aim of the presentation is to identify the nature of these threats, and to discuss ways to protect against them. First, some examples of problematic inferences are presented. Alternative designs and analytical methods, and their strengths and weaknesses, are then discussed. Among these are methods that rely on change observed over time in aggregated trend data. Another approach relies on multilevel techniques to analyze relations between units at different levels of observation and aggregation. Yet another approach is estimation by instrumental variables, which frequently is employed in economic research but has so far only rarely been used within the field of education. It is concluded that more appropriate data and more sophisticated analytical techniques will support development of credible causal inference about determinants of student achievement.
09.30-10.00	Coffee break

3rd Day, Parallel Sessions 10.00-12.00, July 3, 2010

Session	Activities		
7 10:00-12:00	Track A	Track B	Track C
	TIMSS/PIRLS Measuring Socioeconomic Status	PIRLS Effects of Student Motivation and Attitudes on Reading Achievement	PIRLS/TIMSS Equity and Socioeconomic Factors in Student Achievement across Countries
	Room: AK 2136	Room: AK 2137	Room: AK 2138
	Chair: Michael Martin Discussant: Sarah Howie	Chair: Hanna Eklöf Discussant: Marjeta Doupona Horvat	Chair: Gabrielle Stanco Discussant: Dirk Hastedt
	Åse Hansson, Jan-Eric Gustafsson "Measurement Invariance of Socioeconomic Status across Migrational Background"	Ann Kennedy, Kathleen Trong "Influence of the Home Literacy Environment on Reading Motivation and Reading Comprehension"	Andrea Netten "Cultural and Linguistic Diversity in Reading Literacy Achievement: A Multilevel Approach"
	Tobias Stubbe, Magdalena Buddeberg "Poverty and School Achievement. An Additional Indicator for Socio-Economic Status in School Achievement Studies"	Elliot Lawes "The Varying Relationship Between New Zealand Students' Attitude to Reading and Reading Literacy Achievement"	Ieva Johansone "Achievement Equity by Urbanization in Latvia's Primary Education- Analysis of PIRLS 2006 and TIMSS 2007 Data"
	Falk Brese, Plamen Mirazchiyski "Measuring Students' Family Background in Large-scale Education Studies"	Surette van Staden, Sarah Howie "Reading between the Lines: Contributing Factors that Affect Grade 5 Learner Reading Performance as Measured Across South Africa's 11 Languages"	Kajsa Yang Hansen, Ingrid Munck "Exploring the Measurement Profiles of Socioeconomic Background and their Differences in Reading Achievement: A Two-level Latent Class Analysis"
	Corinna Preuschoff, Michael Martin Ina Mullis "Exploring Ways to Enhance Reporting TIMSS and PIRLS Background Data by Developing an Indicator of Effective School Environments for Learning to Read"	Laurence Ogle "Academic Work Ethics and Student Outcomes: Findings in A Global Perspective"	Fabio Alivernini, Laura Palmerio, Emanuela Vinci, Ines Di Leo "An Analysis of Factors Affecting Pupils' Science Achievement in Italy"
12:00-12:30	IRC Closing AK Auditorium		
12:30-13:00	Coffee		

SESSIONS AND ABSTRACTS

Track A TIMSS - Session 1, School Effectiveness in Mathematics/Science Achievement

1 July

10:30-12:30

Room: AK 2136

Chair: Tsung-Hau Jen

Discussant: Jan-Eric Gustafsson

School-Effectiveness in Mathematics in Sweden Compared with Countries in Europe and Asia-Pacific

Marie Wiberg, Department of Statistics, Umeå University, Sweden,

Ewa Andersson, Department of Applied Educational Sciences, Umeå University, Sweden,

There is an increased focus on educational quality and learning outcomes in Sweden, especially since international comparative studies like TIMSS has put the limelight on declining study results in core subject like mathematics. School-effectiveness is therefore an urgent issue. The aim of this study is to identify factors that contribute to the explanation why some schools is effective but others are less effective in terms of the students' academic achievement in mathematics on TIMSS. This is conducted by examining Sweden in contrast with school-effectiveness in some high achieving countries in Europe and Asia-Pacific. The framework of multilevel analysis was used, since it is important to separate the effect of school-level variables from the effect of home environment and to take care of the sampling design used in TIMSS 2007. The results show that different educational system identifies different school level factors when controlling for home background. Noteworthy is that very few school level factors were significant in the full models. The single most important factor for school- effectiveness appears to be student behavior in school. Offering enrichment or remedial in mathematic seem to have different effects in different countries. Professional development opportunities for the teachers and the use of different incentives do not seem to have any effect in any of the countries, except in Chinese-Taipei. Disappointingly, we were unable to detect any significant school level factors in Sweden. A possible reason for this is that we excluded variables that have been altered in any of the countries, since we do believe that such changes might be a threat to the validity. Hence, it is possible that important questions in the Swedish context were excluded.

Keywords: multilevel analysis, home background, principals questionnaire, School-Effectiveness, country comparisons



Learning More Science in Single-Sex Schools? Findings from Hong Kong, SAR and New Zealand from TIMSS 1995, 1999, and 2003

Dana Diaconu, Rice University, Houston, Texas, USA

This study used Trends in Mathematics and Science Study (TIMSS) datasets from 1995, 1999, and 2003 at the eighth grade for two countries to explore whether there were any

patterns in the differences in science performance between students educated in single-sex schools and those in coeducational schools, and if these differences were consistent over the three points in time. The observed achievement differences between the two types of schooling were modeled in terms of student and school characteristics identified in the single-sex education literature. By drawing on the information from countries where same-sex education has been in place for a long time, this study can generate scientifically-based evidence with respect to the merits of single-sex education as compared to coeducation.

Keywords: single-sex education; hierarchical linear models; science achievement; attitudes toward science; school choice



TIMSS 2007 Secondary Analysis: A Method for Investigating an Attainment Gap

Linda Sturman, NFER, National Foundation for Educational Research, United Kingdom
Yin Lin, NFER, National Foundation for Educational Research, United Kingdom

This paper describes a method of analysis used to explore the TIMSS 2007 achievement gap in eighth grade mathematics between a high-scoring country and the group of Asian Pacific Rim countries which outscored it. A multi-level modelling approach was used to identify key factors significantly associated with attainment in these countries, with the aim of characterising how high attainment differs from the highest attainment. The analysis used attainment data and background variable data from the TIMSS 2007 international database. Factor analysis was conducted on the background variables and the resulting factors and other relevant background variables were used to create parallel multi-level models. These investigated attainment in the target country (England) and the five comparator countries (Chinese Taipei, Republic of Korea, Singapore, Hong Kong SAR and Japan). This paper outlines the methodology used in the analysis, and shows the outcomes across the six countries. It discusses some of the advantages, challenges and issues associated with this type of analysis, and indicates how the outcomes can be used to attempt to explain an achievement gap, thus helping to inform policy and practice and, potentially, to raise achievement.

Keywords: TIMSS; mathematics; achievement; multi-level modelling; high attainment.



TIMSS Contribution to Theories of Educational Effectiveness: A Systematic Review of the Literature

Martina Meelissen, University of Twente, the Netherlands
Marjolein Drent, University of Twente, the Netherlands
Fabienne van der Kleij, University of Twente, the Netherlands

The interest of policy makers from all over the world in participating in IEA studies such as TIMSS and PIRLS, has been growing rapidly during the last 15 years. Because these studies are collecting data on school, classroom and student level, and the data is easy accessible and well documented, these studies offer researchers in the field of education

Keywords: TIMSS; systematic review; secondary analyses; educational effectiveness

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Track A TIMSS - Session 2

Explaining Within-Country Differences in Mathematics/Science Achievement

1 July
13:00-15:00
Room: AK 2136

Chair: Leslie Rutkowski
Discussant: Michael Martin

Comparing High With Low Science Performance Students in Some Variables of Fourth Graders in Iran

Masoud Kabiri, Research Institute for Education, Tehran, Iran
Elham Shavand Gharbi, Allameh University Tababaei, Tehran, Iran

Student achievement is affected by many factors in educational context. In order to compare students with high and low science performance in fourth grade of TIMSS 2007 in Iran, some variables were explored from students' level background questionnaire. A number of 449 students (197 high performance students and 252 low performance students) was selected based on cut-off point of ± 1.5 standard deviation of national science Rasch score. Ten variables were extracted including classroom activity, science attitude, perception of school climate, using computer, science self-confidence, home possibilities, spending out of school time in general activities, spending out of school time in ICT related activities, perception of being safety in school and type of school. Data was analyzed by logistic regression. The results revealed that five variables including type of school, using computer, science attitude, science self-confidence, and home possibilities could differentiate effectively between high and low science performance students of fourth grade in Iran. The findings emphasized the role of family supporting and attitudinal variables in student achievement.

Keywords: science achievement; type of school; home possibilities; using computer; science self-concept.



Singapore Grade 8 Students' Performance in Science by Gender in TIMSS 2007

Boey Kok Leong , Nanyang Technological University, Singapore
Jaguthsing Dindyal, Nanyang Technological University, Singapore

The international databases for TIMSS 2003 and TIMSS 2007 were used to analyze gender-related data for Singapore in science at grade 8 level. In this analysis, we looked into the overall performance in science of the students and their performance by gender within content domains and cognitive domains at grade 8. Furthermore, we looked into how the teacher's gender impacted on the students' performance using SAS. Students' self-confidence was also examined from a gender perspective. This brief overview of the

gender-related data about performance in science of students from Singapore demonstrates that female students in Singapore are doing fairly well when compared to their male counterparts. Although the overall data might not show any significant differences, there exist some differences when the content and cognitive domains are examined more closely. Regarding different teacher-student groupings, some groupings like *male teacher-male student* seemed to be less effective.

Keywords: TIMSS 2003; TIMSS 2007; gender; science



Where are the Best Mathematics Students Hiding in Slovenia?

Barbara Japelj Pavesic, Educational Research Institute, Ljubljana, Slovenia

In TIMSS Advanced study mathematical knowledge of students was compared among countries with large differences in the proportion of students learning advanced mathematics to the whole age cohort in the country, called coverage index. In Slovenia, all future university students were defined as advanced mathematics students, and therefore coverage index is very high, 40 %, which is from 2 to 20 times larger than in other countries. Slovene TIMSS Advanced achievement was slightly lower than international average. We present results of comparisons of TIMSS achievement of smaller groups of students in Slovenia which are comparable to populations of advanced mathematics students in other participating countries regarding their coverage indices. The clustering analysis was used to find such groups and define their characteristics based on student background and learning environment. Their TIMSS achievement is very high so they could be candidates for more advanced mathematics program in gymnasias. Characteristics of successful students grouped by similarities in learning environment provide ideas for teaching strategies linked to highest achievement of students.

Keywords: advanced mathematics; coverage index; clustering; student background; learning environments



The School Climate as a Predictor of Achievement in TIMSS Advanced Study: Students', Teachers' and Principals' Perspective

Ana Kozina, Educational Research Institute, Slovenia

Mojca Rožman, Educational Research Institute, Slovenia

Tina Vršnik Perše, Educational Research Institute, Slovenia

Tina Rutar Leban, Educational Research Institute, Slovenia

The school climate has proven to have a strong impact on the student achievement. The present study deals with a discrepancy between a principals' and teachers' perception of a school climate in Slovenia TIMSS Advanced data. The goal of the present study is to establish why principals and teachers perceive the school climate differently, which are the specific school climate characteristics that are evaluated differently by them and whose evaluation of the school climate is a better predictor of student achievement. The results of discriminant analyses show significant differences between teachers' and principals' evaluations of the school climate. The characteristics that significantly differentiate

Keywords: school climate; achievement; students; teachers; principals

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Track D TIMSS/PIRLS - Session 2

Sampling strategies

1 July

13:30-15:30

Room: AK 2135

Chair: Chair: Petra Lietz

Discussant: Ingrid Munck

Examining the Components of Linking Error of Trend Estimation in PIRLS

Gabrielle Stanco, Boston College, USA

Michael Martin, Boston College, USA

Ina Mullis, Boston College, USA

This study explores the issue of linking error in estimating trends, or changes in achievement over time. TIMSS and PIRLS, as well as other large-scale assessments, measure trends through linking successive assessments. As part of documenting the changes in student achievement from each assessment cycle to the next, the results are reported together with their standard errors. Typically, the standard errors incorporate a component due to sampling variance and a smaller component resulting from the use of plausible values and conditioning (imputation variance). More recently, there has been research investigating the variance resulting from updating the item pool from assessment to assessment. This research examines the variance components in linking the 2001 and 2006 PIRLS assessments focusing on the variance due to changes in the items from one assessment to the next. Since many items were in common between the two PIRLS assessments, this represents a relatively small change, and the associated variance is expected to be correspondingly small.

Keywords: linking error; trend estimation; international



The Design Effect of Two-Stage Stratified Cluster Sampling

Tsung-Hau Jen, National Taiwan Normal University, Chinese Taipei

Hak Tam, National Taiwan Normal University, Chinese Taipei

Margaret Wu, ARC, The University of Melbourne, Australia

In this study, a mathematical formula was provided to estimate the lower boundary of the error variance for the population mean. In order to verify the validity of the formula, we used the formula to estimate the error variances of science achievement for 8th graders in seven TIMSS 2007 participating countries and compared the results with those estimated by using the jackknife replication technique as discussed in the international report. The preliminary results indicated that the standard errors estimated by using the formula provided in this study are very close to those that were estimated by using the jackknife replications technique. Detailed derivation of the formula and future direction of study will be presented in the full paper.

Keywords: design effect; sampling design; two-stage stratified cluster sampling; error variance estimation



Changing Populations in TIMSS Cycles – An Alternative Approach to Reporting Trends

Dirk Hastedt, IEA Data Processing and Research Center, Germany

The IEA Trends in Mathematics and Science Studies (TIMSS) have taken place every four years beginning in 1995. Currently, data is available from 1995, 1999, 2004, and 2007. One of the intentions of TIMSS is to investigate the development over time of mathematics and science achievement in the participating countries. In the international reports, the mean achievement of countries is compared between cycles. The data allows this kind of comparison because it is based on representative samples. A critical point, however, is that these direct comparisons neglect changes in the targeted populations between the cycles. For example, the total and type of enrolment of students in the education systems changed in several countries to a considerable extent from one cycle to the next. One reason for these changes is often the goal to provide “education for all”, in keeping with commitments to the respective demand formulated by UNESCO (2009). Consequently, more children now enter the education systems in these countries, many from population groups that were not enrolled in school in the past. Usually, these students come from disadvantaged backgrounds. For these education systems, no change in observed mean achievement among students between two cycles, or even a small drop, might in fact point to an increase in mean achievement of the total age cohort. This paper reviews trend results from TIMSS, examining changes in the populations of specific participating education systems. Alternative reporting strategies are suggested that consider such changes.

Key words: TIMSS; trends; changes in populations; percentages of students in school systems



Optimizing the Sampling Design for State comparisons in PIRLS Germany.

Heiko Sibbers, IEA Data Processing and Research Center, Germany

Sabine Tieck, IEA Data Processing and Research Center, Germany

The Progress in Reading Literacy Study (PIRLS) is designed to allow country comparisons with respect to student reading achievement and contextual information related to it. Federal systems like Canada, Australia and Germany are also interested in making similar comparisons amongst their regions, provinces and states. In order to make these comparisons reliably, the German ministries of education endorsed an oversampling for the administration of the PIRLS 2006 assessment to allow reliable comparisons amongst the sixteen German states. Since no prior information regarding variances between and within schools within the states was available when the sample was selected, the samples for each state consisted of equal numbers of schools. This resulted in very different sampling errors across states. This information obtained in the PIRLS 2006 assessment can be utilized for future assessment cycles; samples can be optimized in a way that sampling error is

optimized for the purposes of state comparisons and reporting of the overall German estimates. This study will present how information from a prior assessment can be used to optimize the sample design in future assessments, and how data highly correlated with reading achievement can also be used to estimate within and between school variance in order to optimize sample designs.

Keywords: sampling; survey methodology; optimizing samples, PIRLS 2006

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Track A TIMSS - Session 3

Explaining trends in mathematics/science achievement

1 July

16:00-18:00

Room: AK 2136

Chair: Kok Leong Boey

Discussant: Jan van Damme

Trends in Factors Affecting Eight Graders Mathematics Performance by Gender in Iran (TIMSS, 1999, 2003 & 2007)

Ali Reza Kiamanesh, Islamic Azad University, Science Research Branch, Tehran, Iran

Maryam Mohsenpour, University of Tehran, Iran

In the present study, the changes observed in the mathematics achievement of Iranian eighth graders across three consecutive TIMSS studies were investigated by gender. The data obtained from Iranian eighth graders in TIMSS 1999, 2003 and 2007 were analyzed. A number of 5301 (2096 girls and 3205 boys), 4942 (2059 girl and 2883 boys), and 3881 (1786 girls and 2195 boys) Iranian students participated in TIMSS 1999, 2003 and 2007, respectively.

Using the data from the Student Questionnaire and factor analysis, four factors were extracted for each of the studies. Due to the fact that the items in the Student Questionnaire in the three different studies were not the same, the indicators for some of these factors in the three different studies were not identical. The factors were identified as attitudes towards math, socio-economic status, mathematics self-concept, and school climate. The criterion variable was defined using five mathematics plausible values. The key methodologies used in this study were the effect sizes and the Linear Structural Model. Diverse fit statistics were used to assess the goodness of fit, and the model fit was acceptable for all the models. The data from each study were analyzed for boys and girls, separately. Trends in influential factors for the boy and girl participants in these three studies and the direct and indirect effects of the factors on mathematics achievement were also analyzed and discussed.

Key words: trend, mathematics achievement, eighth graders, factors



Trends in Differentiation of Student Achievement and Learning Conditions in the Czech Compulsory Education. Findings from TIMSS.

Jana Straková, Institute of Sociology, Academy of Sciences of the Czech Republic and Institute for Information on Education, Czech Republic

Many studies show that one of the most important factors related to delivering equity in education is the design of education system, its differentiation, and the age at the time of the first selection. In a system in which early self-selection is constrained by the choice

structure there is less educational inequality than in a system where consequential decisions about the educational career are taken at a very young age. On that account, grouping according to student performance has been one of the most controversial issues in education for more than 80 years. Its effects, particularly on student achievement, have been extensively studied over that time period, mainly in United States and Great Britain. In the Czech Republic tracking is very extensive and starts from very young age. In all international comparative studies of student achievement the Czech Republic exhibits a relatively strong relationship between student achievement and family background. National analyses show high differences between achievement and social composition of students in individual tracks. In last decade the differentiation of Czech education system at the primary and lower secondary level has been escalating. The data from the IEA TIMSS study show that the growing differentiation of educational pathways leads to the growing differentiation of student achievement and learning experience of students in various schools and tracks. The analysis, using the hierarchical linear modeling approach, is carried out on data from TIMSS 1995, TIMSS 1999 and TIMSS 2007.

Keywords: educational inequalities; student achievement; socio-economic background; tracking; learning conditions



Why has Average Achievement in Mathematics in the Czech Republic Decreased since 1995 according to TIMSS Results?

Josef Basl, Institute for Information on Education, Czech Republic

Vladislav Tomasek, Institute for Information on Education, Czech Republic

In TIMSS 1995, students from the Czech Republic showed very good achievement in both fields tested. During the following cycles, however, a significant decrease in average achievement occurred. This text aims at identifying causes that are likely to have contributed to the decrease in students' average achievement in mathematics ascertained for the Czech Republic on the basis of the international TIMSS survey. The purpose of this paper is to give an outline of factors which may have influenced the decline in average achievement in mathematics among Czech eighth-grade students since 1995. Our work has been based on a presumption that besides factors that can be expressed by standard variables (school type, gender, etc.), the achievement has also been influenced by less easily operationalizable factors which, in addition, reflect a certain development over time.

On the whole, it can be stated that while the influence of school type and the "I like math" variable on mathematics achievement does not decline in the course of individual TIMSS cycles, the impact of parents' education did decrease. This finding unfortunately confirms the fact that various types of schools and various schools in the Czech Republic show a relatively high degree of homogeneity in terms of students' socioeconomic background. In terms of average achievement, scores of boys and girls have converged significantly, which has also been confirmed by our models. As for the less easily operationalizable aspects, we focused on the analysis of the changes to the mathematics curriculum of basic education between 1995 and 1999. We found out that the decline in Czech students' rate of success in trend items from 1995 to 1999 can, to a certain extent, be explained by the shift of the curriculum. Attention was also given to the reduction in the amount of time allocated to the

teaching of mathematics. Although we cannot assume a direct dependence relation between average achievement and the amount of time allocated, there undoubtedly are certain indirect impacts.

Keywords: achievement; mathematics; TIMSS; Czech Republic

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Track A TIMSS - Session 4

Textbooks and opportunities to learn mathematics and science

2 July

10:00-12:00

Room: AK 2136

Chair: Jan-Eric Gustafsson

Discussant: Robert Garden

Norwegian Upper Secondary School Students: Competence in Solving Algebraic Inequalities

Ida Friestad Pedersen, University of Oslo, Norway

Liv Sissel Grønmo, University of Oslo – ILS, Norway

While being a part of algebra, the topic of inequalities also pervades other areas like analysis and numerical methods. Inequalities hence play an important role in mathematics, and the topic is included in the intended curriculum of all the participating countries in TIMSS Advanced, as well as in the NCTM Standards. Nevertheless, although the learning and teaching of algebraic inequalities has received more attention over the recent years, relatively little research has been conducted on this important topic. Our research will focus on Norwegian students' performance on selected TIMSS Advanced tasks that require the students to work with inequalities.

Keywords: mathematics; algebraic inequalities; TIMSS Advanced; upper secondary school



Content of Textbooks: One of the Factors Affecting Fourth-Grader Science Achievement

Andrejs Geske, University of Latvia, Latvia

Rita Geske, University of Latvia, Latvia

This study analyzes science textbooks for primary school in Latvia, Kazakhstan, Russia, the Ukraine and the USA. It applies TIMSS research framework in order to assess the textbook effect on student achievements. The study observed that TIMSS science exercises for fourth-graders contained substantially larger amount of physical science topics than it is given in test descriptions. It definitely gives advantages for those students having textbooks with proportionally higher amount of topics on these subjects. The study proved that Latvian textbooks available to students and teachers during the research of 2007 were considerably better than those available in 1995. The differences were in content, presentation of subject, expected student activities, and visual layout. The study concludes that the changes in textbooks are one of the causes for increased achievements of Latvian students. By performing thorough analysis of textbooks, one can establish their effect on student average achievements in sciences in several TIMSS participating countries and explain differences and changes in achievements with this effect. One can conclude that textbooks are definitely one of the factors affecting student achievements.

Keywords: sciences at primary school; textbooks; TIMSS research



Text-Book Based Analysis of TIMSS Advanced

Peter Nyström, Department of educational measurement, Umeå University, Sweden

Annika Kjellsson Lind, DPM, Umeå University, Sweden

As a national option, teachers were asked to report which textbooks they used in teaching mathematics and physics to the students participating in TIMSS Advanced. The proposed paper will report a study using an analysis of textbooks as a representative of the implemented curriculum in Sweden. Student achievement will be analysed on the basis of the more detailed information about what students have had opportunity to learn. This methodology makes it possible to deepen the analysis of data from TIMSS Advanced based on information about what has happened in the classroom.

Keywords: TIMSS Advanced; student achievement; implemented curriculum; cognitive domains



The Relationship between School Resources and Mathematics Achievement at Grade 8: A Comparison of Israeli and Palestinian Schools In TIMSS 2007

Yasin Afana, IEA – Data Processing and Research Center, Hamburg, Germany

Petra Lietz, Australian Council for Educational Research (ACER), Australia

The relationship between school resources such as textbooks, libraries, computers, laboratories, teacher qualifications and number of pupils per teacher as input on the one hand and student achievement as output on the other hand has been shown to be important (e.g., Hanushek 1986, 2003; Krueger 2003). In this paper, comparative analyses of school resources and their relationship with student achievement are undertaken for Israeli and Palestinian Authority (PA) schools for a number of reasons. First, results of the TIMSS studies gave rise to discussions about differences in performance between students in Hebrew and Arab speaking schools in Israel and how these could be reduced (Human Rights Watch, 2003; Zuzovsky, 2006). In response, the Ministry of Education in Israel developed a 5-year plan specifically aimed at improving the conditions of education in the Arab schools. Second, the Palestinian Authority participated for the first time in TIMSS in 2003 and again in 2007. This enables comparative analyses of school resources and their relationship with achievement of Arab students who are educated by the PA. More specifically, descriptive, cross tabulation, simple regression and hierarchical linear model analyses are used in this paper to examine differences in school resources, particularly computer resources, other instructional resources as well as physical infrastructure and their relationships with mathematics achievement of Grade 8 students in Palestinian schools, Israeli Arab schools and Israeli Hebrew schools.

Results show indeed some differences in the availability of school resources between the three groups of schools. However, only shortages regarding computer hardware, software and support are found to have a significant effect on mathematics achievement once the

socio-economic level of schools and students' home background status have been taken into account. In addition, these effects are found for the Arab-speaking schools in Israel and PA but not for the Hebrew-speaking schools in Israel.

Key words: School resources, mathematics achievement, HLM

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Track A TIMSS - Session 5

Long-Term Trends in Mathematics/Science Achievement

2 July

13:00-15:00

Room: AK 2136

Chair: Peter Nyström

Discussant: John Ainley

Knowledge and Skills in Swedish Comprehensive School During 40 Years: A Reassessment of the Evidence Based on the IEA Studies

Jan-Eric Gustafsson, University of Gothenburg, Sweden

The IEA studies have been the major source of information about the level of achievement in the Swedish comprehensive school, which was implemented in the early 1960s. However, in the paper it is argued that the officially reported pattern of achievement is partially misleading, in that the level of achievement is underestimated in the studies conducted prior to 1995, while in the later studies achievement is somewhat overestimated. This is because schooling influences achievement more strongly than age, and in the early IEA studies age-based population definitions were used which caused the Swedish students with a comparatively high school start age to have fewer years of schooling than students in most other countries. A mathematical model is developed to adjust for the effects of this. The results from application of this model shows that the level of achievement of Swedish students was at a high international level in science and reading in the early 1990s, while after 1995 achievement has declined to a level close to the international mean.

Keywords: age effect; schooling effect; achievement trend



Reading Achievement Growth across Countries

Maciej Jakubowski, Faculty of Economic Sciences, Warsaw University, OECD, Poland

Artur Pokropek, Institute of Philosophy and Sociology of the Polish Academy of the Sciences, Poland

The purpose of this study is to provide evidence on the achievement growth across countries participating in international surveys of student achievement. The paper compares achievement in primary and secondary schools adjusting for differences across surveys of student achievement. In this regard, PIRLS, TIMSS and PISA surveys are used and their results are compared country by country. The study proposes adjustments which makes results of these studies more comparable. Differences in the measurement frameworks are not addressed and student scores are assumed to be comparable, however, adjustments reflecting different sampling schemes, diverse final populations, and discrepancies in the distribution of background characteristics are discussed and implemented. This way, more reliable comparisons of the effectiveness of school systems could be made. These comparisons are based on within country differences across grades and cohorts, which makes them more trustworthy than simple cross-country comparisons

affected by between countries differences. The evidence provided in the paper allows policy makers to draw conclusions on differences across countries in student achievement growth. This evidence could be extremely helpful in assessing how student progress in different school systems and how this depends on school system characteristics. Moreover, the study provides evidence on the comparability of difference surveys and proposes some adjustments that would make similar future studies more reliable and straightforward.

Keywords: PIRLS; TIMSS; PISA; achievement growth; effectiveness



Student Achievement in Mathematics in Norway and Sweden 1995 – 2008

Liv Sissel Grønmo, University of Oslo – ILS, Norway

Jan-Eric Gustafsson, University of Gothenburg, Sweden

Norway and Sweden have a lot in common when it comes to education, such as organization of school, methods for teaching and content in school subjects. From the mid 1990s, the level of achievement in mathematics has decreased both in Norway and Sweden at all levels in school, from primary to the end of upper secondary school. This paper discusses factors that might have contributed to this negative trend. A main problem in any comparison of student achievement between countries is related to definitions of the populations in terms of students' age and years of schooling. These factors may have a significant impact on the results and thereby on conclusions drawn from comparisons. The paper presents reanalyses of data from several TIMSS studies adjusting for these factors, and use these as a basis for a discussion about trends in Norway and Sweden.

Keywords: mathematics; trends; TIMSS; age effect; schooling effect



Achievement Data in IEA studies and Simpson's Paradox

Ruth Zuzovsky, Tel Aviv University and Kibbutzim College of Education, Technology and the Arts, Israel

Zipi Libman, Kibbutzim College of Education, Technology and the Arts, Israel

David Steinberg, Department of Statistics and Operations Research, Tel Aviv University, Israel

This paper is meant to highlight the occurrence of Simpson's Paradox when using aggregated data obtained from two IEA studies in Israel, while ignoring the effect of a powerful intervening variable in the Israeli context – the ethnicity factor. It will demonstrate faulty conclusions on the absence of relationships between a contextual variable and achievement, while such relationships do exist or conclusions on the existence of such relationships – while in reality they do not exist. Our intention in writing this paper is to draw the attention of our fellow researchers to similar faulty inferences they might come across when analyzing their local database within the scope of IEA studies.

Keywords: achievement data; Simpson's Paradox

Track A TIMSS - Session 6

Effects of Student Motivation and Attitudes on Mathematics/Science Achievement

2 July
15:30-17:30
Room: AK 2136

Chair: Ann Kennedy
Discussant: Ina Mullis

Student Motivation and Effort in the Swedish TIMSS Advanced Field Study

Hanna Eklöf, Department of Applied Educational Science, Umeå University, Sweden

The purpose of the present study was twofold. Firstly, the study aimed to test a 9-item test-taking motivation scale that could be used in large-scale, low-stakes assessment contexts. The scale was assumed to measure motivation, invested effort and perceived importance in the assessment situation. Secondly, the study aimed to describe student reported effort, motivation to do their best and perceived importance of the TIMSS Advanced field-test. The scale was administered to a Swedish sample ($n = 163$) participating in the TIMSS Advanced 2008 field-test. Confirmatory factor analysis supported a two-factor solution as hypothesized, but the importance factor was unreliable and a one-factor solution with an effort factor only provided a better fit to data. Based on these results, a number of countries participating in the TIMSS Advanced 2008 Main Study chose to include the effort scale in their student questionnaires. Results further showed that the pupils in the present sample perceived the TIMSS field-test as less important and that they reported a low level of motivation to do their best on the test. Furthermore, many students omitted several items in the test booklet. It is concluded that the results from the Swedish TIMSS Advanced field-test might be biased by a lack of motivation and effort among students. Preliminary findings from the subsequent Swedish TIMSS Advanced 2008 Main Study also reveal a modest level of motivation and effort among the students, and a significant relation between reported level of effort and achievement on the test.

Keywords: test-taking motivation; effort, low-stakes assessment; validity



A Cross-National Analysis of the Educational Expectations of Eighth-Grade Boys and Girls

David Miller, American Institutes for Research, USA
Christina Scheller, Tel Aviv University, Israel

This cross-national analysis explores students' educational expectations using data from the 33 countries that participated at grade 8 in the two most recent administrations of TIMSS (2003 and 2007). This paper examines differences between the educational expectations of males and females, changes over time in eighth-graders' educational expectations, and the relationship between students' educational expectations and their mathematics and science achievement. Eighth-graders who expected to finish at least a

first university degree scored about 84 points higher in both mathematics and science than their peers who expected to finish no higher than secondary school. In most countries, a greater percentage of girls than boys expected to finish at least a first university degree. Multivariate analyses showed that students' sex was a significant predictor of their educational expectations, even when controlling for SES and mathematics/science achievement.

Keywords: educational expectations; gender differences; mathematics achievement; science achievement; adolescence



Comparison of student Positive Attitudes Towards Science (PATS) with Students' Results in Australia, England, Norway and Sweden.

Maria Åström, Umeå University, Sweden

This study investigates the relationship between student achievement in science and students positive attitude towards science according to the results collected in TIMSS 2007. Four countries with some similarities and differences in the school system and science education were selected. The students' results have a strong correlation to the index PATS in all four countries, but there are some differences between Sweden in particular to the other three countries. In Sweden the students have answered questions particularly to Biology, Chemistry, Physics and Geography and the other countries questions to science as one subject. The conclusions made from the study is that the differences in students' results for Swedish students with high PATS compared to the countries mean is approximate half a standard deviation in TIMSS points. Differences in students' results for the other countries students with high PATS compared to the countries mean are approximate half of the same measure of Swedish students. Some tentative explanations for this difference are discussed in this paper, with focus of countries difference of curriculum structure, assessment habits and school culture.

Keywords: science curriculum; assessments; attitudes to science; student achievements



Analyzing the Relationship Between Self-Confidence in Mathematics and Students' Characteristics Using Multinomial Logistic Regression

Noor Azina Ismail, University of Malaya, Malaysia

Halimah Awang, University of Malaya, Malaysia

This study investigates the relationship between self-confidence and achievement among Malaysian students using multinomial logistic regression and the data are from TIMSS 2007. Although, in general, Malaysian students had low self-confidence in learning mathematics, their performance in mathematics at the international level is higher as compared to some countries with high level of self-confidence. This study also found that, besides mathematics achievement, there are four other factors that separate the level of self-confidence among Malaysian students. These factors are gender of students, students' aspiration, use of computer for school work, having teachers who want students to do their best.

Keywords: self-confidence; students' characteristics; multinomial logistic regression; attitude; achievement

Track A TIMSS/PIRLS - Session 7

Measuring socioeconomic status

3 July
10:00-12:00
Room: AK 2136

Chair: Michael Martin
Discussant: Sarah Howie

Measurement Invariance of Socioeconomic Status across Migrational Background

Åse Hansson, University of Gothenburg, Sweden
Jan-Eric Gustafsson, University of Gothenburg, Sweden

Socioeconomic status (SES) is often measured in educational research where students' family background frequently is used as a control variable. This is, for example, desirable when relations between academic outcomes and students' migrational background are investigated, because of the correlation between SES and migrational background that is typically observed. However, when measuring SES, the indicators used must have the same meaning and structure for different migrational groups. The aim of this study is to examine the measurement invariance of the SES construct across diverse student groups, using data from Trends in International Mathematics and Science Study, TIMSS, 2003. The findings reject the hypothesis of equivalent measurement structure of SES across subpopulations with Swedish and non-Swedish background. In this paper an alternative model for description and analysis of SES is proposed, in which indicators are modified according to students' migrational background.

Keywords: socioeconomic status; migrational background; measurement invariance



Poverty and School Achievement. An Additional Indicator for Socio-Economic Status in School Achievement Studies

Tobias Stubbe, Institute for School Development Research, Germany
Magdalena Buddeberg, Institute for School Development Research, Germany

International large-scale achievement studies of student achievement employ different indicators to operationalize the socio-economic status (SES) of students. All the different SES variables correlate significantly to students' school achievement in all countries. 'Poverty' as a theoretical construct in sociology has not up to now been included in international questionnaires for such studies, but it now has been included in the German extension of the TIMSS 2007 home questionnaire. This paper deals with the question whether students from families at risk of poverty perform worse in school than students whose families are not at a risk of poverty. Our analyses of data from TIMSS 2007 Germany show a significant relationship between families' risk of poverty and students' achievement in mathematics or science. To extract the additional effect of poverty relating

to social disparity other indicators for the SES of the families were controlled. Our analyses show that in high-SES families the risk of poverty has a greater effect on students' achievement than in low-SES families. We conclude that for in-depth analyses it is beneficial to use a combination of different indicators (e.g., highest level of education, occupational status, social resources, and risk of poverty) in order to consider various aspects of SES when analyzing social disparities in an educational context.

Keywords: academic achievement; occupational status; poverty; social deprivation



Measuring Students' Family Background in Large-scale Education Studies

Falk Brese, IEA – Dataprocessing and Research Center, Germany

Plamen Mirazchiyski, IEA – Dataprocessing and Research Center, Germany

The results of various education studies have shown that the family background of students, often measured in terms of social status of parents or legal guardians, is correlated to the achievement of students in school. This paper focuses on the measurement of students' family background within large-scale education studies. The operationalization of family background varies between different education studies. The intent of this paper is to provide a summary and evaluation of the different ways and concepts of measuring students' family background. It will focus on IEA's PIRLS 2006 and TIMSS 2007 as well as on OECD PISA 2006 data. In addition to summarizing the different approaches of measuring family background, the paper attempts to evaluate the approaches with regard to a set of criteria, i.e. the amount of missing data, the reliability of scales, and the association of the indicators and measures of family background with students' achievement. The different approaches of measuring family background in large-scale education studies will be evaluated and compared. The paper will try to identify best practice and to provide suggestions on how to improve measuring family background for future large-scale education studies.

Keywords: IEA; OECD; family background; socio-economic status



Exploring Ways to Enhance Reporting TIMSS and PIRLS Background Data by Developing an Indicator of Effective School Environments for Learning to Read

Corinna Preuschoff, TIMSS & PIRLS International Study Center, Boston College, USA

Michael O. Martin, TIMSS & PIRLS International Study Center, Boston College, USA

Ina V.S. Mullis, TIMSS & PIRLS International Study Center, Boston College, USA

As an extension of the effort devoted to expanding and updating the questionnaires for TIMSS and PIRLS 2011, this research uses data from PIRLS 2006 to explore a new reporting strategy for contextual questionnaire data for the 2011 international reports. This research delves into the possibility of capitalizing on the extensive student, parent, teacher, and school information in the *PIRLS 2006 International Database* to develop a robust international indicator of *Effective School Environments for Learning to Read*. Briefly, the *PIRLS 2011 Contextual Framework* describes the attributes of effective schools; these

Keywords: international indicators; Rasch scaling; effective school environments

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Track B PIRLS - Session 1

International comparisons of reading literacy

1 July
10:30-12:30
Room: AK 2137

Chair: Caroline Liberg
Discussant: Laurence Ogle

The Relative Risk-Percentage Equity Index: Measuring Equity in Reading Achievement Across PIRLS 2006 Countries

Kathleen Trong, TIMSS & PIRLS International Study Center, Boston College, USA

This research used data from PIRLS 2006 to explore an approach to measuring equity in reading achievement internationally at the fourth grade. Relative risk ratios were selected as a measurement approach and were used to create a composite measure, the Relative Risk-Percentage (RRP) Equity Index, to compare equity in reading achievement across countries. This index was used to present the likelihood of scoring below the PIRLS 2006 Low International Benchmark for student groups that were traditionally at risk for low reading achievement compared to other students. The ‘at risk’ student groups that were the focus of this study included those with low parental education, who spoke a language other than the language of instruction, who attended urban or rural schools, and who were boys. To complement the RRP Equity Index results, the relative likelihood of students scoring within the lower 20 percent of their country’s reading achievement distribution was also presented. Overall, having parents with less than secondary education and not speaking the language of the test before starting school were associated with inequity in reading achievement in the largest number of PIRLS 2006 countries.

Keywords: equity; relative risk; literacy; PIRLS; reading achievement



National Contexts Influencing Principals’ Interaction with Students: Macro Geographical Region, Societal Culture and Educational System

Moosung Lee, The Joseph Lau Luen Hung Charitable Trust Asia Pacific Centre for Leadership and Change, Hong Kong Institute of Education, Hong Kong
Philip Hallinger, The Joseph Lau Luen Hung Charitable Trust Asia Pacific Centre for Leadership and Change, Hong Kong Institute of Education, Hong Kong

This paper examines principals’ time use for interaction with individual students. Specifically, this paper attempts to illuminate how three national-level contexts (i.e. macro geographical region, societal culture, and educational system) influence principals’ time allocation for interaction with students when key organizational-level contexts are controlled for. For the current research, the Progress in International Reading Literacy Study (PIRLS) 2006 was used. The current research includes 5,297 principals from 34 societies. A two-level hierarchical linear model (HLM) was utilized (Raudenbush & Bryk,

2002). There were three major findings. First, a substantive portion of variance in principals' time allocation for interaction with students was explained by macro geographical regions. US principals, interestingly, tended to spend more time for interaction with students than any other regions' principals. Second, national cultures influenced the relational context (i.e. interaction time) between principals and students. The more hierarchical societies are, the less time principals spend for students. Third, principals in highly standardized schooling systems in terms of having national exam, national textbooks, and national curriculum were likely to spend more time for interaction with students than their counterparts in less standardized schooling systems. Implications for research are briefly discussed.

Keywords: national contexts; school principals; interaction with students; time use



A Top-Down Evaluation of Factors Related to the Largest Performance Gap in Reading Literacy across 25 Countries

Fabio Alivernini, National Institute for the Educational Evaluation of Instruction and Training, INVALSI, Italy

The aim of the present secondary study, based on data from 25 countries, is to identify the pattern of variables (at country, school and student levels), which are typical of students performing below the Low International Benchmark compared to students performing at the Advanced Performance Benchmark, in PIRLS 2006. The dependent variable of the analysis is a dichotomous variable, the values of which represent the two different performance groups of students. The independent variables are two sets of OECD educational indicators, variables from PIRLS 2006 Reading Curriculum Questionnaire data, variables and indices based on data obtained from questionnaires for teachers, schools, parents and students. The analysis is based on classification and regression trees (CART), which is a full hierarchical non-parametric method suited to detecting and interpreting complex reciprocal influences between a large number of independent variables. Results show that pupils' performance is predicted by an interaction between country level variables such as the changes in teachers' salaries at the top of the salary scale, school context variables (e.g. percentages of students from economically affluent home) and home educational resources and variables at student level (e.g. students' reading self-concept).

Keywords: reading literacy; classification trees; PIRLS 2006; OECD indicators; contextual factors.



Extending the Socioeconomic Gradients Framework to IEA Studies – An Application to PIRLS 2006

Daniel Caro, IEA Data Processing and Research Center, Germany
Jenny Lenkeit, Universität Hamburg, Germany

Extensive research has clearly established a positive relationship between family socioeconomic status (SES) and academic achievement (Sirin, 2005; White, 1982). This

relationship is referred to in the literature as a *socioeconomic gradient* because it is gradual and increases across the range of SES. Willms (2002, 2003) has developed a framework for studying socioeconomic gradients which has been applied in several national and international assessment studies of student achievement. The present article seeks to extend the socioeconomic gradient framework to IEA studies. It uses PIRLS 2006 data to evaluate ten hypotheses about socioeconomic gradients in reading performance as an illustration of the potential benefits of adopting this framework. Hypotheses are evaluated with two-level and three-level hierarchical linear models (HLM). The results help to understand how achievement disparities related to family background are configured at the within- and between-country level.

Keywords: socioeconomic status (SES); hierarchical linear models (HLM); PIRLS 2006

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Track B PIRLS - Session 2

Measurement Issues and Item Functioning in PIRLS

1 July

13:30-15:30

Room: AK 2137

Chair: Eugenio Gonzalez

Discussant: Marie Wiberg

The Limits of Measurement: Problems in Estimating Reading Achievement in PIRLS 2006 for Low-Performing Countries

Pierre Foy, TIMSS & PIRLS International Study Center, Boston College, USA

Michael Martin, TIMSS & PIRLS International Study Center, Boston College, USA

Ina Mullis, TIMSS & PIRLS International Study Center, Boston College, USA

This research demonstrates the degree to which the quality of the measurement based on complex IRT methodology erodes when the assessment items are too difficult for many of the students. In particular, item percent correct and IRT methods are used to examine the PIRLS 2006 results for the reading comprehension process scale encompassing the higher-order Integrate and Evaluate items found to be difficult by many students. As the percentage of students without any or with minimal correct responses becomes very high in a country, problems arise and the IRT results can lead to less reliable estimates of student achievement in the population as a whole.

Keywords: Item Percent Correct; Item Response Theory; Large-scale International Assessment; processes of reading comprehension; student achievement



Examining Testlet Effects on the PIRLS 2006 Assessment

Yuwen Chang, National Taipei University of Education, Chinese Taipei

Jennwu Wang, Fo-Guang University, Taiwan

We fit 10 PIRLS testlets with standard item response and testlet response theory model. The variances of testlet effects are examined and compared. Item parameters and ability parameters estimated from the two different models are compared. The results indicate that variances of testlet effects range from .168 to .489. Item parameters as well as ability parameter estimated from two approaches correlated highly. When local dependence is ignored errors of estimation in the difficulty parameter and cutoff parameter are negligible. However, estimates of both discriminate parameter and guessing parameter are biased. The standard error of ability parameter is underestimated when the local independence is incorrectly assumed.

Keywords: testlet response theory; graded response model; PIRLS; SCORIGHT

Exploring Local Item Dependency for Items Clustered around Common Reading Passage in PIRLS Data

Valerie Quittre, University of Liege, Belgium

Christian Monseur, University of Liege, Belgium

Since the IEA 1991 Reading Literacy Study (Elley, 1994; Wolf, 1995), cognitive data of international assessments are usually scaled according to IRT models. One of the cornerstones of IRT models is the assumption of Local Item Independence (LII). In PIRLS assessment, as well as in other international assessments in reading literacy such as PISA (Organisation for Economic Cooperation and Development - OECD), testing material is hierarchically structured, i.e. several items are related to a common passage. Monseur & al (submitted) noted that *“this test format may be viewed as the most appropriated to assess a complex process such as reading comprehension. In real life situation, students have to use different cognitive processes to understand various components of a same text”*. This embedded structure might therefore violate the assumption of LII. As stated by Embretson and Reise (2000, p. 188), *“Practically, local independence is violated when item responses are linked”*. As noted by Balazs and De Boeck (2006, p. 2) *“ignoring Local Item Dependence can have serious consequences for the goodness of fit of a model, for the parameter estimates and for confidence intervals.”* This study was aimed at detecting passage-related local item dependencies in PIRLS 2006 cognitive data and estimating its relationship with the country performance.

Keywords: local item dependency; IRT; PIRLS



Differential Item Functioning in the Aspect of Gender Differences in Reading Literacy

Antra Ozola, University of Latvia, Latvia

Andrejs Geske, University of Latvia, Latvia

The purpose of the study is to analyze the IEA PIRLS 2006 set of items in order to check if a differential item functioning (DIF) can be noticed. The groups of comparison are based on gender since PIRLS 2006 study has showed that Latvia has the 6th largest gender gap in reading literacy scores. So the DIF analysis is expected to show if an instrument could be one of the reasons of the gender gap in achievement. Items easiest and hardest for each sex are found as well as items with the biggest and smallest DIF values to check if an item format gives any advantages or disadvantages to any of the gender groups of Latvian students. The results show that the set of PIRLS 2006 items does not have any gender bias on Latvian students since there are items with no DIF at all and there is almost equal number of items with DIF in favor of each of the sexes. The length of the item stem does not have any correlation with the item difficulty or differential item functioning between sexes. There is no difference in DIF when the items of literary and informative texts are compared and the same is true for multiple choice and constructed response items. The main conclusion is that the achievement gap between boys and girls in Latvia is caused by the differences in their skills/abilities and not by a differential item functioning.

Keywords: secondary analysis; differential item functioning; PIRLS; reading literacy; gender differences

Track B PIRLS - Session 3

Examining Trends in Reading Performance

1 July

16:00-18:00

Room: AK 2137

Chair: Marjeta Doupona Horvat

Discussant: Petra Lietz

Trends in Reading Literacy from 1970 to 2006 - A Comparison of 9-10 Year Olds in Sweden, Hungary, Italy and the USA

Monica Rosén, University of Gothenburg, Sweden

Rolf Strietholt, Dortmund University of Technology, IFS, Germany

The main purpose of the study is to estimate reading achievement for the youngest IEA population, i.e. 9-10 year-olds on a common reading literacy scale that stretches over five IEA studies of reading achievement. The studies are the 1970 Reading Comprehension study, the 1991 Reading Literacy study and its repeat in 2001, the first PIRLS in 2001 and the latest PIRLS in 2006. Selected from the IEA databases are the four countries that participated in all of these reading studies, that is Sweden, Hungary, Italy and the USA. All available bridges between the reading tests were used, including some national extensions in the Swedish data from 1991 and 2001. A two parameter IRT-model were used to estimate and establish a common scale for all the reading tests. However, due to the reported multidimensionality in the RL91-test two scales were computed, one that included the so called document-items and one without. Mean achievement were computed for grade 3 and/or 4 in each country depending on the countries choice of sample in each study. Preliminary results indicate that the level of reading literacy has increased since 1970 in all countries but Sweden regardless of grade. The discussion of the results focus upon two aspects of comparability that both have implications for the interpretation. The first is specific to this study and concerns the construct validity of the common scale. The other is more general and concerns the difficulty to obtain comparable groups, which is a necessity for valid comparisons of results.

Keywords: 35-year trend; reading literacy; 9-10 year olds; IRT-matrix design;



A Close Reading of Reading Comprehension among Swedish Students in Grade 4

Caroline Liberg, Uppsala University, Sweden

A slight decrease in Swedish students' reading ability has recently been shown in national as well as international reading tests, e.g. PIRLS 2006. It is thus of great importance to refine the knowledge of what type of reading comprehension Swedish students at the four different levels of the international benchmarks are able to carry out. This is therefore the overall purpose of this study. Another purpose is to create a theoretical framework and a method for keeping track within a qualitative perspective of changes in students' reading

comprehension by e.g. studying trends in PIRLS. Reading comprehension is in this study discussed in terms of ‘text movability’. This is a notion inspired by the work of several researchers, e.g. Langer (1995) and her identification of four different ways of moving in a text in order to build an envisionment or a mental textworld. The results show that it is quite common that many students, even those at the low international benchmark, manage to get one point in a complex constructed response question. But very few manage to get two or three points, even though the only extra load in some questions is to find the answers at two or more different locations in the text. This would be of great interest to compare in an international context. Another result is that some of the Swedish students especially at the low and intermediate international benchmark have a broader repertoire of reading ability than expected.

Keywords: PIRLS; secondary analysis; reading comprehension; item characteristics; international benchmarks



The Relationship between early Childhood Activities and Reading Achievement in low and high Achieving Countries in PIRLS 2006

Sarah Howie, University of Pretoria, South Africa

South Africa participated in the Progress in International Reading Study (PIRLS) for the first time in the PIRLS 2006. In South Africa, pupils were assessed in two grades and the children were assessed in all of the official 11 languages. The South African Grade 5 results in the PIRLS2006 were the lowest in the study despite the fact that these were South African Grade 5 students that were being compared with grade 4 students internationally. Grade 4 achieved approximately 30 points less than the Grade 5 pupils. The aim of this study is to explore the home contexts of high achieving European countries such as the Russian Federation and Italy and compare these factors with those of the South African context and then in relation to the respective pupils’ performance. This study will thereafter explore the extent to which children from different language groups within South Africa differ and how these relate to pupils’ achievement in reading literacy. Structural equation modelling will be applied in order to explore the direct and indirect effects of these factors on reading achievement. The initial findings based on descriptive analyses suggest substantial differences between the three countries and also within South Africa. The PIRLS 2006 South Africa data comprising about more than 16 000 grade 4 pupils from 429 schools, data from more than 4000 pupils from 232 schools and more than 3000 pupils in 150 schools from Italy have been included for analysis.

Keywords: international comparative studies; reading literacy assessment; language education

Home Literacy Environment and Reading Achievement. A Model for Determining the Relationship between Socio-Economic Status, Home Literacy Environment, and Reading Achievement

Irmela Tarelli, Institute for School Development Research, Germany

Tobias Stubbe, Institute for School Development Research, Germany

Numerous studies have examined the importance of the home literacy environment (HLE) for the development of children's reading achievement and the relationship between a family's socio-economic status (SES) and the HLE. Furthermore, research has shown that there is a strong correlation between SES and children's school achievement. In this paper, we ask whether HLE can explain the relationship between SES and school achievement. In other words: to what extent does the intensity of HLE in families with diverse SES account for the higher academic achievement of students from high-SES families? Using PIRLS 2006 data for 29 countries and applying the Rasch model, we constructed an index to quantify students' HLE. In this index different variables of the PIRLS 2006 home questionnaire are considered, including certain early home literacy activities, parental attitudes, and the involvement of families in supporting their children's reading in school. We also conducted path analyses to examine the relationship between SES, HLE and reading achievement in the participating countries.

Key words: home literacy environment; reading achievement; social deprivation; Rasch measurement

NOTES

Track B PIRLS - Session 4

Instructional Contexts in Relation to Reading Achievement

2 July

10:00-12:00

Room: AK 2137

Chair: Sarah Howie

Discussant: Ann Kennedy

Pedagogical Correlates of the Fourth Grade Students and the Coaching of Teachers in Hong Kong

Wai Ming Cheung, University of Hong Kong, Hong Kong

Shek-Kam Tse, University of Hong Kong, Hong Kong

Joseph Wai-lp Lam, University of Hong Kong, Hong Kong

Elizabeth Ka-Yee Loh, University of Hong Kong, Hong Kong

The Progress in International Reading Literacy Study (PIRLS) reported that the reading literacy of fourth grade students in Hong Kong showed a remarkable improvement from 2001 to 2006 from 14th to second among 44 countries. We reported two studies which focused on identifying the underlying factors which accounted for this change, especially procedural knowledge as applied to classroom practices. The first study aimed at revealing various aspects of the teacher factor which were shown to contribute to the significant improvement among students. A total of 4,712 students and 144 teachers from 144 schools were randomly selected using probability proportional-to-size technique to receive the Reading Assessment Test and complete the Teacher's Questionnaire respectively. A number of items pertaining to teachers' instructional strategies and activities, opportunities for students to read various types of materials, practices on assessment, and professional preparation, were found to be significantly correlated with the outcome of students' reading literacy. The second study aimed to explore the relationship between coaching in Hong Kong teachers' learning community and the students' learning outcomes. Four experienced curriculum developers who provided intensive school-based curriculum support to schools and reading workshops in multiple primary schools were recruited for an in-depth focus-group interview. Results showed that coaching exerted positive changes in the professional development of teachers by providing a three-tier intensive support system and facilitated teachers to go deep into evidence-based practices. This study expands the knowledge base on the role of coaching in improving language teachers' teaching practices in reading.

Keywords: PIRLS; teaching reading; reading instruction; literacy coaching; teachers' professional development

Instructional Variables Involved in Problems Associated with Diglossia in Arabic Speaking Schools in Israel: PIRLS 2006 Findings

Ruth Zuzovsky, Tel Aviv University and Kibbutzim College of Education, Technology of Arts, Israel

PIRLS-2006 findings establish that reading literacy attainments of 4th graders in Arabic-speaking countries are poor. This low attainment is also reflected in the findings of PIRLS 2006 in Israel when comparing Arabic-speaking 4th graders' reading literacy mean score with that of their Hebrew-speaking peers (428 vs. 528). Findings of a previous study (Zuzovsky, 2008) supported an explanation that the existence of diglossia typical of the Arabic language (two linguistic codes – written and spoken) is the main cause of the low results of Arabic-speaking students in Israel and recommended educational interventions aimed to directly treat the problems of diglossia. Following these recommendations the present study aims to identify specific instructional activities that are significant in the effort to overcome the problems associated with Arabic diglossia.

Of fourteen reading literacy activities positively associated with reading attainment, six exhibited significant interaction effect with the ethnic group variable indicating their relatively higher contribution to the achievement of students in Arabic-speaking schools. The most effective variables for Arabic-speaking students appear to be those indicating early home literacy activities that foster phonemic awareness and letter sound recognition. Among the school literacy activities, repeated listening to the sounds of written Arabic and being actively engaged in reading text and gradually in more challenging tasks, are promising school practices.

Keywords: reading achievement; Arabic diglossia; reading instruction



On the Importance of a Safe School and Classroom Climate for Student Achievement in Reading Literacy

Elisabeth Frank, Linnaeus University, Sweden

Monica Rosén, University of Gothenburg, Sweden

The main aim of this study is to investigate the effect of safe school and classroom climate on students' reading achievement at both individual and class level. In previous research there is a consensus that a safe and secure school climate is of importance for children's ability to learn, but the empirical support for this belief is weak. The current analyses are based on Swedish grade 3 data from PIRLS 2001, using variables from both the teachers', the schools', the students' and the parents' reports of the social learning environment. A series of theoretically based two-level structural equation models was fitted to the observed indicators of school and classroom climate, and acceptable fit were found for a model with two latent constructs of Safety at each level. Significant and positive relationships with reading achievement were found at both the individual level and the classroom/school level. These results indicate that security plays an important role in explaining differences in reading achievement both within and between classes. In the final analysis the possibility to make causal inferences of the found relationships were investigated by including other known explanatory factors into the model. The result indicates that the effects of the climate factors on reading achievement were influenced by both student SES

and teacher competence. At the within-level the effect was reduced, whilst at the between level the effect almost completely disappeared. Thus, positive school and classroom climate appears to a large degree to be a reflection social selection and teacher competence.

Keywords: school climate; classroom climate; reading achievement; PIRLS; two-level structural equation modeling



The Interplay between School, Teacher, Family and Student Factors and their Relationships to Reading Literacy in Italy

Fabio Alivernini, National Institute for the Educational Evaluation of Instruction and Training, INVALSI, Italy

Fabio Lucidi, Department of Social and Development Psychology, University of Rome 'La Sapienza', Italy

Sara Manganelli, National Institute for the Educational Evaluation of Instruction and Training, INVALSI, Italy

Bruno Losito, Roma Tre University, Italy

PIRLS 2006 collected data about reading literacy and about factors connected to school, family and student context for Italian fourth grade students. The aim of the present study is to examine, in Italian data, the interplay between school, teacher, family and student factors, and their relationships to reading literacy. A structural equation model comprising school, teachers, parents, and pupils variables is tested. This model as a whole accounted for 37% of variance in reading literacy in Italian fourth grade pupils. Home variables accounted for 18% of variance, students' variables for 14% and school and teacher variables for 5% of variance. An important part of home variables effect is related to the direct and indirect influence (through other variables) of educational resources, whereas the importance of economic resources seems to be very small in total. Variables connected with students seem to strongly influence the effect of home variables. Finally as concerns school and teachers variables, material resources available in schools have a very small effect on reading literacy. The most important variable in this latter context proves to be the time spent by students in reading activities at school.

Keywords: secondary analysis, reading achievement, structural equation modeling, PIRLS 2006, background indices

Track B PIRLS/TIMSS - Session 5

Teacher Characteristics and Curricula in Relation to Student Achievement

2 July
13.00-15.00
Room: AK 2137

Chair: Ruth Zuzovski
Discussant: Kathleen Trong

Reference Group Effects on Teachers' School Track Recommendations: Results from PIRLS 2006 Germany

Anne Milek, Max Planck Institute for Human Development, Berlin, Germany
Tobias Stubbe, Institute for School Development Research, Dortmund, Germany
Ulrich Trautwein, Eberhard Karls University, Tübingen, Germany
Oliver Luedtke, Eberhard Karls University, Tübingen, Germany
Kai Maaz, Max Planck Institute for Human Development, Berlin, Germany

In the German education system, the transition from elementary to secondary school represents an early form of selection with far-reaching implications for students' educational biographies. This paper examines the extent to which teachers' recommendations of a secondary track are systematically related to mean class achievement level and whether there are differences in this reference group effect across the federal states. Using the German PIRLS 2006 dataset (7,752 students from 388 fourth-grade classes), multilevel logistic regression models were used to examine the relationship between the recommendations made by elementary school teachers and mean class achievement level in each of the 16 German federal states (Länder). Findings show a negative correlation between mean class achievement and teachers' recommendations that was mediated by school grades. Cross-state differences in the size of reference group effects did not reach a statistically significant level.

Keywords: reference group effect; transition to secondary education; teachers' recommendations



Relationship among Curriculum Coverage, Teacher Preparedness, and Student Achievement in TIMSS Advanced 2008

Alka Arora, TIMSS & PIRLS International Study Center, Boston College, USA

This study was built on the long history of IEA studies considering curriculum coverage as central to students' opportunities to learn. It uses the TIMSS Advanced 2008 achievement data for advanced mathematics and the extensive information about curriculum coverage provided by participating countries to develop country-by-country profiles of the relationship between curriculum coverage and achievement at the topic level. More specifically, for each country, a topic-by-topic analysis was done for 16 advanced

mathematics topics (6 in algebra, 5 in calculus, and 5 in geometry) specified in the *TIMSS Advanced 2008 Assessment Frameworks*. The TIMSS Advanced 2008 advanced mathematics items were classified according to the 16 topics and students' achievement was summarized for each of the topic clusters using average percent correct. Achievement for each country was then related to: 1) whether the topic was included in the country's curriculum, 2) the percentage of students taught the topic according to their teachers, and 3) the teachers' reports of their level of preparedness to teach the topic. As would be anticipated, achievement was higher for topics that were included in the curriculum and then taught to students by "very well" prepared teachers.

Keywords: teacher preparedness; opportunity to learn; curriculum coverage; mathematics achievement; TIMSS Advanced



Alignment between TIMSS Advanced and Swedish National Curriculum and National Tests

Peter Nyström, Department of Educational Measurement, Umeå University, Sweden
Annika Kjellsson Lind, NMD, Umeå University

In this study Swedish syllabi and assessment criteria in mathematics and physics for upper secondary school were compared to the TIMSS Advanced assessment framework (Garden et al., 2006). Furthermore, items from the national assessment system in Sweden were compared to the items in TIMSS Advanced mathematics and physics. We conclude that the subject specific content is very similar in these two systems. However, in comparing cognitive domains and some features of the items used in the different tests some interesting differences are identified. In mathematics the Swedish curriculum has virtually nothing about the cognitive domain called knowing in TIMSS. Another example of differences is that the TIMSS tests, both in advanced mathematics and in physics, require much more calculations than the Swedish national tests. Based on the study we don't see alignment as a major threat to the validity of TIMSS Advanced. The full paper will summarise all of the important similarities and differences we have found.

Keywords: TIMSS Advanced; alignment; national curriculum; national tests

Track B TIMSS/PIRLS - Session 6

Age, Schooling, and Methodological Issues in Score Estimation

2 July

15:30-17:30

Room: AK 2137

Chair: Hans Wagemaker

Discussant: Eugenio Gonzalez

The Effect of not Using Plausible Values when they should be: An illustration Using TIMSS 2007 Grade 8 Mathematics Data

Ralf Carstens, IEA Data Processing and Research Center, Germany

Dirk Hastedt, IEA Data Processing and Research Center, Germany

Analyses using large-scale survey assessment databases such as those collected by TIMSS, PIRLS, ICCS, or PISA should use the data and the included plausible values (PV) as provided by the publishing organizations. Further, they should adhere to appropriate and intended computational procedures in the accompanying documentation to compute unbiased population estimates of student achievement that account for the administration of rotated instruments in which each student responds to a subset of items and not the entire item pool. Working with plausible values may seem overwhelming or cumbersome though and some researchers may be tempted to or actually do use analytical shortcuts or inappropriate scoring methods that lead to biased results and/or results that identify statistical significance in the comparisons of group-level statistics or regression analysis where the appropriate analytical procedure, given a survey's design, would not have.

Building on the convincing theoretical argument in favor of plausible values (PV) by von Davier, Gonzalez and Mislevy (2009), this paper seeks to illustrate the practical relevance of using the plausible values on the database file as intended in the context of the real-world, grade 8 mathematics data collected by TIMSS 2007. The paper addresses the adverse effects of incorrectly using the provided plausible values, more specifically using averages of plausible values or just one out of the five provided values, in the context of country-level and group-level comparisons. In addition, we use common IRT scoring methods and compare estimates based on these to the score estimates included in the TIMSS 2007 international reports (Mullis, Martin, & Foy, 2008).

The results show that inappropriate use of the plausible values or alternative scoring methods can entail a substantial departure from the estimates obtained from correct and intended analysis and consequently inferences to the studied populations. The findings are used to convince researchers to use the plausible values correctly and as designed, that there is no need to rely on computational shortcuts and that user friendly software to achieve this is readily available.

Keywords: plausible values; analytical shortcuts; imputation variance; scoring methods; incorrect use

The Impact of Missing Data on Subgroup Estimation

Leslie Rutkowski, Indian University, USA

TIMSS and PIRLS use a sophisticated assessment design whereby each individual student is only administered a small number of the total possible cognitive items. In particular TIMSS and PIRLS use a rotated booklet design that ensures that each cognitive item receives sufficient exposure and that each examinee receives a sufficient number of items to estimate population-level achievement in a number of domains and sub-domains. While this method of item delivery is efficient from an administration perspective, the approach poses intractable challenges for precisely estimating individual student achievement. To overcome the methodological challenges associated with multiple-matrix sampling, international LSA programs adopted plausible value methods that use marginal estimation techniques to generate population level achievement estimates (Mislevy, 1991; Mislevy, Beaton, Kaplan & Sheehan, 1992; Mislevy, Johnson & Muraki, 1992). While the plausible value methodology has been well established theoretically and empirically, a paucity of literature appears to exist regarding the effect of poor quality background data on subpopulation achievement estimates. In the current paper, we seek to examine the impact of missing background data used to estimate subpopulation achievement. First, we reason that group differences will be underestimated when background variables used to optimize subpopulation achievement differences have high rates of missing (at random) data. Second, we examine the impact of background data that are systematically missing or missing not at random. Data are simulated using TIMSS 2007 item parameters and a variety of conditions.

Keywords: TIMSS; plausible values; subgroup achievement estimation



On the Degree of Comparability in Trend Studies as a Function of Differences in Age and Schooling

Monica Rosén, University of Gothenburg, Sweden

Rolf Strietholt, Dortmund University of Technology, Germany

Linking IEA-studies on reading literacy of 9-10 year-old students via IRT-technique provides an extensive source for trend analyses from 1970 to 2006. Comparison derives from the assumption of having comparable groups in respective studies and countries. Regarding this, students' age and time of schooling play a crucial role since the sub-samples cover students that differ in terms of age, grade and test months. Therefore, the comparability can be considered as a function of differences in age and schooling. The main purpose of our analysis is highlight issues of study design that appear in trend analysis and affect the comparability. We discuss miscellaneous strategies to handle such differences and address limitations of these approaches.

Keywords: age effect; comparative study; reading literacy; schooling effect

Effects of Schooling and Age on Performance in Mathematics and Science: A Between-Grade Regression Discontinuity Design with Instrumental Variables Applied to Swedish TIMSS 1995 Data

Christina Cliffordson, University West and University of Gothenburg, Sweden

Jan-Eric Gustafsson, University of Gothenburg, Sweden

The main purpose of the study is to examine the relative effects of schooling and age on performance in mathematics and science by the use of a regression discontinuity approach augmented with an instrumental variable approach. The regression discontinuity design relies on the assumption that there is a sharp age-based decision rule for grade assignment, and a main purpose of the paper is to investigate approaches to relaxing this assumption. In a previous study it was shown that it is possible to bring together individuals born a particular year in the analysis, and to estimate the amount of bias caused by non-strict grade assignment on the within-year regression coefficients of achievement on age. Using the Swedish TIMSS 1995 data the present study demonstrates that IV-regression is a promising approach to obtain unbiased estimates of the grade and age effects when the assumption of a sharp age-based decision rule is violated.

Keywords: age effect; schooling effect; regression discontinuity; instrumental variables; TIMSS

NOTES

Track B PIRLS - Session 7

Effects of Student Motivation and Attitudes on Reading Achievement

3 July
10.00-12.00
Room: AK 2137

Chair: Hanna Eklöf
Discussant: Marjeta Doupona Horvat

Influence of the Home Literacy Environment on Reading Motivation and Reading Comprehension

Ann M. Kennedy, TIMSS & PIRLS International Study Center, Boston College, USA
Kathleen Trong, TIMSS & PIRLS International Study Center, Boston College, USA

This research used PIRLS 2006 data to explore home factors that influence students' motivation to read, as well as the relationship between student motivation and reading achievement. The research employed structural equation modeling to empirically test a theoretical model of student motivation to read and home factors that may influence motivation, including parental attitudes and behaviors, early literacy activities, and the presence of children's books. In addition, the theoretical model tested the relationship between motivation and student reading achievement. Lastly, differences in the relationships among these variables were examined for boys compared to girls. This research will contribute to the body of literature on the influence that the home literacy environment can have on reading motivation and reading comprehension, and may help inform analysis and reporting strategies for future cycles of PIRLS.

Keywords: parent attitudes; motivation; reading achievement; early literacy; structural equation modeling



The Varying Relationship between New Zealand Students' Attitude to Reading and Reading Literacy Achievement

Elliot Lawes, Ministry of Education, New Zealand

Results from the 2006 Progress in International Reading Literacy Study (PIRLS) show that for New Zealand's Grade 4 students, those with a more positive attitude to reading tended to have higher reading literacy achievement (Chamberlain, 2007; Mullis, Martin, Kennedy, & Foy, 2007). However, in their analysis of PIRLS data English-speaking countries, Gnaldi, Schagen, Twist, and Morrison (2005), suggest that for Grade 4 students with low reading literacy achievement, the measure of attitude to reading requires careful interpretation due to those students' difficulty understanding the items comprising this measure. This suggests the possibility of variation, with reading literacy achievement, in the relationship between attitude to reading and reading literacy achievement. The current study uses correlation curves (Bjerve & Doksum, 1993) to investigate this variation in New Zealand's PIRLS 2006 data. It finds that, overall, the correlation between attitude to

reading and reading literacy achievement varied substantially with reading literacy achievement. However, for students with reading literacy achievement between 0.5 and 1 standard deviation below the mean, and for those with reading literacy achievement just under 0.5 standard deviations above the mean, this correlation was lower than expected. This possibly indicates behavioral phenomena, test effects or a combination of both, and certainly indicates the need for further theoretical consideration and analytical work.

Keywords: attitude to reading; reading literacy achievement; correlation curve



Reading between the Lines: Contributing Factors that Affect Grade 5 Learner Reading Performance as Measured across South Africa's 11 Languages.

Surette van Staden, Center for Evaluation and Assessment, University of Pretoria, South Africa

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

This paper reports on the results of a study which purpose was to identify and explain relationships between some major factors associated with successful reading at Grade 5 level in South African primary schools. In South Africa, grave concerns with regards to low levels of student achievement pervade research initiatives and educational debates. Despite considerable investments in educational inputs (such as policy and resources) and processes (such as curriculum provision and teacher support), outcomes (such as student achievement) remain disappointingly low. The South African population is characterized by great diversity and variation. With 11 official languages, current educational policy in South Africa advocates an additive bilingualism model and students in Grade 1 to 3 are taught in their mother tongue. Thereafter, when these students progress to Grade 4, the language of learning and teaching changes to a second language, which in most cases is English. At this key developmental stage students are also expected to advance from learning to read to a stage where they can use reading in order to learn. With this complexity of issues in mind, Hierarchical Linear Modeling (HLM) was used to determine the effect of a number of explanatory variables at student- and school level on reading achievement as outcome variable, while controlling for language using the South African PIRLS 2006 data. Utilizing Creemers' Comprehensive Model of Educational Effectiveness as theoretical point of departure, this paper will focus on the results of an overall South African model with student- and school level variables.

Keywords: secondary analysis; educational policies; reading literacy; PIRLS 2006



Academic Work Ethics and Student Outcomes: Findings in a Global Perspective

Laurence Ogle, Center for Research in Mathematics and Science Education, San Diego State University, USA

In *The Protestant Ethic and the Spirit of Capitalism*, Max Weber asked a central question: Why did capitalism develop first in Protestant rather than Catholic societies? He proposed that the Reformation *uniquely* joined a religious consciousness to a cultural ethos of hard work and achievement. This paper, drawing on data from PIRLS 2006 examines the

Keywords: work ethics; reading achievement; PIRLS 2006

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Track C CIVED - Session 1

Civic Engagement: Attitudes Towards Nationalism, Trust, and Learning

1 July
10.30-12.30
Room: AK 2138

Chair: Wolfram Schulz
Discussant: Anu Toots

Experience in Civic Education Classrooms Associated with Students' Achievement and Engagement in Three Post-Communist Countries

Judith Torney-Purta, Human Development Dept., University of Maryland, USA
Britt Wilkenfeld, Denver Public Schools, USA

The association between experience in traditional and in interactive classrooms and several civic education outcomes was examined in Estonia, Latvia and the Russian Federation using IEA CIVED data. This builds on an analysis conducted recently in the United States and allows us to extend the argument that experience in expressing one's opinion and learning to respect the opinions of others is a positive feature of civic education in countries with different histories of democracy and educational practices.

Keywords: CIVED; post-communist countries; classroom climate; traditional teaching; 21st century competencies



Adolescents' Attitudes toward Immigrants' Rights and Nationalism in 25 Countries

Carolyn Barber, University of Missouri, Kansas city, USA
Judith Torney-Purta, University of Maryland – College Park, USA
Katherine Fennelly, University of Minnesota, USA

As they mature, adolescents shape their notions of citizenship and of national identity. They have experiences that may persuade them to support the rights of other minorities or, alternatively, to believe that limiting the opportunities of others enhances the position of their own group. In spite of this, most research on adolescents' national identity and their attitudes toward out-groups has been conducted in a single country, such as the Netherlands or the United States. In the present study we analyze the association between support for immigrant rights and protective nationalism among nationally representative samples of 14-year-olds in 25 countries (tested in the IEA Civic Education Study). Adolescents in countries with greater religious diversity and more restrictive citizenship policies had lower levels of support for immigrants' rights. Showing the importance of context, attitudes of protective nationalism were associated with negative attitudes toward immigrants' rights in countries with larger proportions of foreign-born youth and in more academically oriented schools. In examining characteristics of schools that might reduce

negative attitudes, students who believed that their schools fostered trust and valued student participation had more positive attitudes toward immigrant rights.

Keywords: nationalism; immigrants; social attitudes; adolescence; school contexts

Track C SITES - Session 2

Comparative ICT use in Schools

1 July
13:30-15:30
Room: AK 2138

Chair: Carolyn Barber
Discussant: Tjeerd Plomp

Levels of Influence on the Use of ICT in Teaching in Australia

John Ainley, Australian Council for Educational Research, Australia

Information and communication technologies (ICT) have changed the environment in which students learn. This paper investigates the use of ICT in the teaching of Grade 8 mathematics and science and interprets differences in ICT use between Australia and other countries, as well as variations among jurisdictions in Australia, in relation to ICT policy initiatives at national and state level. It is based on analyses of the SITES 2006 data that investigate the influence on the use of ICT in teaching of system level factors including policies supporting the pedagogical use of ICT in, school level factors such as the ICT infrastructure and teacher level factors such as teacher confidence in using ICT and participation in ICT-oriented professional development.

Keywords: ICT; computers; teaching; mathematics; science



The Challenges of Implementing ICT in Poorly Resourced Schools in Developing Environments

Sarah Howie, University of Pretoria, South Africa
Kim Draper, University of Pretoria, South Africa

SITES 2006 was an international comparative survey on IT in education aimed at examining the extent of ICT integration in schools and classrooms, and identifying factors contributing to effective integration of ICT into learning and teaching (Law, Pelgrum & Plomp, 2008). The study administered questionnaires for school principals, ICT-coordinators and math and science teachers. SITES 2006 also administered a national context questionnaire including four clusters of system level questions, viz demographics, education system, pedagogical trends, ICT-related policies. The rationale for this questionnaire was that it is reasonable to expect that what happens in schools and classrooms reflects system-level policies. Data from this questionnaire assist in interpreting patterns at school and classroom level. This paper is one of a set of three case studies of countries that participated in SITES2006 (viz. Chile, South Africa and Australia) all addressing the general question: to what extent are national ICT- related policies implemented at the school and classroom levels and what factors enable this implementation? This paper analyses South Africa's policy of implementing ICT widely in

schools, including the poorly resourced institutions. Furthermore the paper investigates factors associated with successful ICT implementation in these poor environments. The analyses reveal that a low percentage of schools are engaging in ICT in mathematics and science classrooms at the secondary school level. Resource constraints and lack of suitable human resources are mentioned as obstacles to ICT implementation. Furthermore other problems such as the lack of basic learning and teaching materials are also given as a constraint.

Keywords: international comparative studies; ICT in education; developing countries



ICT in Hebrew Speaking and Arabic Speaking Schools in Israel: Findings from SITES2006

Alona Forkosh Baruch, Tel Aviv University, Israel

Rafi Nachmias, Tel Aviv University, Israel

David Mioduser, Tel Aviv University, Israel

Values of equity and equality among all citizens are imperative for Israeli policymakers since the establishment of the state of Israel. Hence, closing gaps between sub-populations, particularly between Hebrew-speaking and Arabic-speaking schools, persists as a priority of Israel's education system. Where ICT is concerned, this goal refers to two major aspects: infrastructure and ICT implementation de facto, in teaching and learning. A secondary analysis of SITES2006 study findings portray a rather multifaceted state of affairs, in which on some issues, e.g. vision and goals, higher positive attitudes on ICT importance in general and as a lever for paradigmatic change in particular were found in Arabic speaking schools than in Hebrew-speaking schools. This is contrary to expectations, which took into account the inequality in allocation (mainly of infrastructure) between the two sectors. In addition, a difference was found between the two sectors with regards to ICT implementation in mathematics vs. science subjects: whilst Arabic speaking mathematics teachers indicate greater ICT usage in their target class, among science teachers in the Hebrew speaking sector report confirmed greater usage and vast influence on their pedagogy. Conclusions suggest that further effort is needed to close gaps between Hebrew and Arabic speaking schools. However, there is need for collaboration and exchange of ideas, information and educational experience between staff members from both sectors, as each sector may gain from points of strength of the other sector.

Keywords: secondary analysis; ICT in school; Arab speaking sector; Hebrew speaking sector; SITES



ICT in Education Policy and Practice in Chile: Does it Correlate?

Enrique Hinostroza, La Universidad de la Frontera (UFRO), Chile

Mario Brun, La Universidad de la Frontera (UFRO), Chile

SITES 2006 was an international comparative survey on IT in education aimed at examining the extent of ICT integration in schools and classrooms, and identifying factors contributing to effective integration of ICT into learning and teaching. The study 58

administered questionnaires for school principals, ICT-coordinators and math and science teachers. SITES 2006 also administered a national context questionnaire including four clusters of system level questions, viz demographics, education system, pedagogical trends, ICT-related policies. The rationale for this questionnaire was that it is reasonable to expect what happens in schools and classrooms reflects system-level policies. Data from this questionnaire assist in interpreting patterns at school and classroom level. This paper is one of a set of three case studies of countries that participated in SITES2006 (viz. Chile, South Africa and Australia) all addressing the general question: to what extent are national ICT- related policies implemented at the school and classroom levels and what factors enable this implementation? In this framework this paper presents the main results of Chile in the SITES 2006 study regarding the presence of traditional and innovative pedagogical practices with and without ICT in schools, and analyses to what extent factors affecting the implementation of these practices that were found in the international study (i.e. infrastructure, technical and pedagogical support and ICT-related vision) are affecting –or not- the national results. Based on this, the paper also reviews how Enlaces, the Chilean ICT in Education policy implemented since the last decade, has contributed to sustain these results.

Keywords: international comparative studies; ICT in education; developing countries

NOTES

Track C TEDS-M - Session 3

Aspects of Measuring Teacher Education Programs

1 July

16:00-18:00

Room: AK 2138

Chair: Barbara Malak

Discussant: Liv Sissel Grønmo

Diagnosing Specific Strengths and Weaknesses of Teacher Education by Using Different Approaches to Modeling Multidimensionality

Sigrid Blömeke, Humboldt University of Berlin, Germany

Ute Suhl, Humboldt University of Berlin, Germany

Richard T. Houang, Michigan State University, USA

Teacher knowledge is a complex domain. Mathematics content knowledge (MCK) and mathematics pedagogical content knowledge (MPCK) overlap conceptually and they show a strong empirical correlation. Therefore, different models are plausible to represent their structure: Besides a traditional unidimensional approach, which was used in TEDS-M and in which MCK and MPCK are treated as two separate latent traits, MCK and MPCK could also be treated as one homogenous trait called “teacher knowledge”. Alternatively, a two-dimensional model could be applied. Here, we have the choice between models representing the conceptual overlap of MCK and MPCK either through “between-item multidimensionality” or “within-item multidimensionality” (Adams et al., 1997). Another important question in modeling the dimensions of teacher knowledge is whether their interplay is homogeneous across countries (measurement invariance) or whether it is necessary to treat these as multiple groups.

The purpose of this study is to inquire benefits and limits of each modeling approach (cf. Hartig & Höhler, 2008) by comparing model fit, loading patterns, proportion of variance explained and descriptive results as well as by relating these results to opportunities to learn in teacher education (OTL). The *scientific community* still struggles to define a concept of pedagogical content knowledge that separates this dimension from content knowledge and that takes cultural differences into account (Graeber & Tirosh, 2008). The study aims to contribute to this discourse from an empirical point of view. The basic hypothesis is that only more sophisticated multi-dimensional and multi-group models are able to represent teacher knowledge appropriately.

Keywords: mathematics content knowledge; pedagogical content knowledge; multidimensional IRT model; within-item multidimensionality; measurement invariance

Sampling Design for the Teacher Education and Development Study in Mathematics (TEDS-M): Challenges, Solutions, Restrictions

Sabine Meinck, IEA Data Processing and Research Center, Germany

Jean Dumais, Methodology Branch, Statistics Canada, Ottawa, Canada

The Teacher Education and Development Study in Mathematics (TEDS-M) focuses on how teachers are prepared to teach mathematics in primary and lower secondary schools in seventeen countries. This is the first large-scale assessment in teacher education using statistical sampling. The demanding study goals, combining four target populations into one survey on the one hand, and the complexity and differences of the teacher education systems in participating countries, on the other hand, posed particular challenges to design a multi-purpose international sampling plan. The four target populations of the TEDS-M study are teacher preparation institutions, future primary and lower secondary mathematics teachers, and their educators, for which reliable estimates of their main characteristics were required. The overall achieved participation rates in most countries complied with the demanding standards set by TEDS-M and therefore ensure a high validity of the data collected. Although high technical standards were maintained, certain restrictions must be put on data analysis and on the interpretation of the results. Data observed from populations with low participation rates will be annotated as such in the forthcoming international reports. Further, specific structural or political circumstances made it necessary for some countries to implement sampling or operational procedures that deviated from the international design. Cross-country comparisons must be made with caution; results always need to be embedded into adequate contextual explanations. Experiences gained throughout the implementation of this study can contribute valuably to the specification of sampling designs in further studies in higher education.

Keywords: sampling; survey methodology; teacher education; TEDS-M 2008



Expertise of Future Teachers: On the Relationship of Mathematics Content Knowledge, Mathematics Pedagogical Content Knowledge and General Pedagogical Knowledge

Johannes König, University of Cologne, Germany

Sigrid Blömeke, Humboldt University of Berlin, Germany

Teacher expertise consists of cognitive and affective-motivational components. Based on TEDS-M data, our study examines the structure of the cognitive components of future mathematics teachers in their final year of training. According to Shulman (1986) three sub-dimensions can be distinguished. In case of mathematics teachers, these are mathematics content knowledge (MCK), mathematics pedagogical content knowledge (MPCK), and general pedagogical knowledge (GPK). However, teacher expertise requires interlinking these components in order to perform successfully in class (Berliner, 2001). We ask (1) in general and (2) for subgroups whether teacher knowledge (TK) has a homogeneous structure or should better be differentiated according to the assumed three cognitive components. The German and US TEDS-M samples are used to test these hypotheses since the two countries included an additional test instrument that allowed rigorous measurement of GPK. Given the point in time – future teachers at the end of their

training without much practical experience in class –, we hypothesize (1) a multidimensional structure of TK, i.e. low intercorrelations of MCK, MPCK, and GPK as well as a significantly better model fit of a three-dimensional IRT model compared to a 1-dimensional model (specified in Mplus with the multiple-group and the complex analysis type options). We hypothesize (2) that future teachers from programs with equal weight of mathematics, mathematics pedagogy and general pedagogy will show higher intercorrelations than future teachers from programs that stressed one of the components. Our research findings will enrich discussions on teacher education, TK and teacher expertise. We are not allowed to report results until TEDS-M results are officially released.

Keywords: multidimensional IRT modeling; teacher education; teacher knowledge; teacher expertise;



Structure of Primary Teacher Education Programs in Spain

Maria Canadas, Universidad de Granada, Spain

Pedro Gomez, Universidad de Granada, Spain

Luis Rico, Universidad de Granada, Spain

Spain is one of the countries involved in TEDS-M 2008. In this paper we explore and describe the structure of Spanish primary mathematics teacher education programs, through syllabi analysis in the 48 sampled institutions. The results show that Spanish teacher education programs are diverse across institutions, but follow a basic structure that emphasizes the teaching of general pedagogy subjects.

Keywords: education programs; TEDS-M; primary mathematics teacher; syllabi analysis; Spain.

NOTES

Track C ICCS - Session 4

International Comparisons of Civic Reasoning, Attitudes, and Preparedness

2 July

10.00-12.00

Room: AK 2138

Chair: Barbara Malak

Discussant: Judith Torney-Purta

Preparedness for Active Citizenship among Lower Secondary Students in International Comparison

Wolfram Schulz, Australian Council for Educational Research, Australia

Eva van de Gaer, Australian Council for Educational Research, Australia

John Ainley, Australian Council for Educational Research, Australia

The IEA International Civic and Citizenship Education Study investigates the ways in which young people in lower secondary schools are prepared to undertake their roles as citizens in a wide range of countries from Europe, Latin America, and the Asian-Pacific region. A central aspect of students' preparedness to become citizens in a democracy is their disposition to actively participate in society. This paper contains an analysis of measures of students' intentions to participate as citizens in civic life and students' current participation in civic activities in their eighth year of schooling. It is based on data from approximately 140,000 students from 38 countries comprising measures of student civic knowledge, attitudes, behaviors, and background. Additional contextual data were collected using surveys of principals and teachers of the sampled schools. The paper describes extent of past, current and expected civic participation and which factors are influencing students' current involvement or motivation for future active participation.

Keywords: ICCS; civic education; comparative analysis; active citizenship



Does the Context Matter? Attitudes towards Multiculturalism amongst Russian Students in Estonia, Latvia and Russian Federation

Anu Toots, Tallinn University, Estonia

Tõnu Idnurm, Tallinn University, Estonia

Current paper uses CIVED and ICCS data to investigate how much differ attitudes of Russian 14-year old students towards multiculturalism in Latvia, Estonia and Russian Federation. One can assume that Russian students in Latvia and Estonia show higher support towards multiculturalism due their position as non-native minorities in these countries. Factor analysis revealed that different factors contribute to the multicultural attitudes of Russian students. Russians in Estonia and Latvia do not regard immigrants and ethnic minorities as two different categories in terms of supporting their rights as is the case in Russian Federation. Lower support to multiculturalism seems in all three countries

to be related to the conventional citizenship, participation in cultural associations and regarding knowledge of history as an important characteristic of good citizen.

Keywords: native and non-native students; multiculturalism; attitudes towards immigrants; ethnic minorities; patriotism

Track C ICCS - Session 5

School Influences and Item Functioning in ICCS

2 July
13.00-15.00
Room: AK 2138

Chair: Judith Torney-Purta
Discussant: Bruno Losito

The Influence of Schools on the Attitudes towards Immigrants. The Relative Strength of Teaching Politics versus Experiencing Democracy

Saskia de Groof, Free University of Brussels, Belgium
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Contemporary society is often perceived as being increasingly complex and rocked by rapid change. Hence the call for informed citizens, actively engaged in public affairs. Research does however suggest that increasing numbers of citizens feel no longer connected to their society and that intolerance and distrust are on the increase. As a consequence, many people look towards the schools and expect much from citizenship education. This paper examines the impact of different forms of citizenship education on the attitudes of 14-year olds towards immigrants. This is done using the new ICCS 2009 data and multilevel analysis. In particular, we compare the influence of “teaching politics” versus “experiencing democracy”.

Keywords: citizenship education; attitudes towards immigrants; civic knowledge; open classroom climate; multilevel analysis



European Citizenship in Dutch Secondary Education. A Comparison between Different Types of Schools

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In this study European citizenship competencies of students in Dutch secondary education are analyzed. For the analysis Main Study data from the European regional module and the Student questionnaire – as constructed for the International Civic and Citizenship Study (ICCS) – have been analyzed and compared with data from a study amongst students in the same target grade in so-called ELOS schools (Europe as a learning environment). The framework that the ELOS schools use, show a great resemblance with the Assessment framework of ICCS. The study has been carried out considering the changes made in the instruments after analysis of the Field Trial data (IEA 2008). It is assumed that secondary analysis of the two datasets provide empirical support for a specific European orientated

form of civic and citizenship education. The variation in students' European civic attitudes are explained by employing multi-level analysis with the type of school/curriculum (ELOS versus ICSS) being an important explanatory variable

Although a general test-score could not be compared, ELOS students perform significantly better on six of the cognitive items of a set of nine items from the ICCS European Module. Moreover it seems that better scores are achieved by ELOS students in each of the Dutch school tracks (from pre-vocational to pre-university). As expected, students in the 'Europe focused' ELOS schools report a (slightly) greater sense of European identity than their peers in other schools. Multilevel analysis, employed on two conceptual scales, shows that ELOS students value equal chances for European citizens more than their peers in ICSS schools. A significant school effect was found. The scale scores on attitude towards a (possible) enlargement of Europe however did not indicate such an effect. In general the results of this study provide some empirical support for the ELOS programme.

Keywords: European civic and citizenship education; secondary analysis; ICSS; ELOS



The Influence of Education Reforms in Latvia on the Quality of Civic Education and Democracy in the Teaching/Learning Process

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Andrejs Geske, University of Latvia, Latvia

Andris Kangro, University of Latvia, Latvia

The transition to a democratic state management form has been taking place in Latvia since regaining the independence. The changes have most directly affected also the education system which has been continuously improved. The transformation of paradigms is one of the aspects of education reforms. The teaching/learning methods used in the lessons have essentially changed. The aim of this study is to find out how the change of the education paradigm from teaching to learning has influenced the quality of civic education and the use of democratic study forms in the lessons. In order to achieve the given aim, the study will search for the relations between the achievement of Grade 8 students of Latvia in civic education and students' attitudes. Special attention will be paid to a democratic learning environment and the differences in students' who learn in the Latvian language and who learn in the Russian language attitudes to the freedom of word when discussing political and social political issues in the lessons. The study performed the secondary analysis of Latvia's data in IEA CIVED and IEA ICCS, using the descriptive statistic methods.

Keywords: IEA ICCS; IEA CIVED; international comparative studies; quality of civic education; CIVED; international comparative studies; education reform in Latvia; quality of civic education

Regional Differential Item Function in the International Civics and Citizenship Education Study

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This paper investigates patterns of differential item functioning (DIF) by country and geographical regions for the student civic knowledge test in the IEA Civic and Citizenship Education Study (ICCS). Data for 79 test items completed by approximately 140,000 students in more than 5,300 schools across 36 countries were analyzed. The investigations were based on one-parameter IRT (Rasch) analyses of the international civic knowledge test items, by country and overall, to establish measures of DIF. These measures were then used as data in a cluster analysis to investigate patterns of DIF across countries. Characteristics of groups of items showing DIF across geographical clusters of countries were then explored. The clustering of countries by item DIF appeared to relate primarily to language of testing but with an overlay of geo-cultural difference. There were some idiosyncrasies in the clustering, but two broad geographical country clusters – Europe and Latin America – were evident in the data. There were insufficient items showing DIF within the European country cluster to warrant further investigation. In the Latin American country cluster, DIF appeared to be most clearly associated with the target content and cognitive processes measured by items. A disproportionately high number of items that targeted ICCS content domain 1 (*civic society and systems*) and cognitive domain 1 (*knowing*) showed a pattern of DIF that caused them to appear to be relatively easier than expected within the cluster of Latin American countries. There were too few items to determine whether this pattern related to specific content topics. The results of these analyses support the need for further investigation of the relationship between language structures in items and item level DIF across countries. More specifically, it would be valuable to explore possible causes of the systematic DIF observed across countries in the Latin American cluster.

Keywords: ICCS; civic education; comparative analysis; differential item function

Track C CIVED/ICCS - Session 6

Influences on Civic Education and Achievement across Countries

3 July

15:30-17:30

Room: AK 2138

Chair: Bruno Losito

Discussant: Carolyn Barber

Explaining Differences in Civic Knowledge across 38 Countries

Wolfram Schulz, Australian Council for Educational Research, Australia

Julian Fraillon, Australian Council for Educational Research, Australia

Eva van de Gaer, Australian Council for Educational Research, Australia

John Ainley, Australian Council for Educational Research, Australia

The IEA International Civic and Citizenship Education Study studied the ways in which young people in lower secondary schools are prepared to undertake their roles as citizens in a wide range of countries in Europe, Latin America, and the Asian-Pacific region. A central aspect of the study was the assessment of student knowledge about a wide range of civic and citizenship-related issues. This paper includes analyses that use a multi-level model to explain differences in civic knowledge on the basis of student characteristics, home background and school contexts. In addition, the analyses in this paper include a consideration of factors characterizing educational systems that may explain differences among countries as well as differences in within-country effects of student- or classroom-level variables. The analyses in this paper are based on data from approximately 140,000 students from 38 countries and comprise measures of student knowledge, attitudes, behaviors, and student background. Additional contextual data were collected using surveys of principals and teachers of the sampled schools and an online national contexts survey.

Keywords: ICCS; civic education; comparative analysis; multi-level modeling



Adolescent Civic Engagement in Australia and the United States: The Role of Communities of Practice

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Gary Homana, Brandeis University, USA

Judith Torney-Purta, University of Maryland, College Park, USA

This study examines the relationship between socio-cultural dimensions of communities of practice and adolescent capacities for civic engagement in Australia and the United States using items from the 1999 Civic Education Study (Torney-Purta, Lehmann, Oswald & Schulz, 2001). Utilizing a refined notion of communities of practice, this paper analyzes the relationship of two dimensions of communities of practice—the discourse community and the participatory community and civic knowledge and expectations for informed voting. The study also examines the extent to which the various dimensions of communities of practice are related to more equitable civic outcomes, and how these

associations vary in the two countries. This analysis employs HLM, a multilevel modeling technique that allows for individual- and school-level predictors to be used simultaneously in the analysis of an outcome, and it allows for interactions between student- and school-level variables to be examined.

Keywords: communities of practice; socio-cultural; civic engagement; citizenship education; comparative international education



Assessing Student's Cognitive Content and Process Skills in IEA CIVED: A Cross-country Analysis

Ting Zhang, University of Maryland, College Park, USA

Judith Torney-Purta, University of Maryland, College Park, USA

This study used a cognitive diagnostic modelling approach to compare the civic education achievement of 14-year-olds from the IEA CIVED assessment across samples of three countries. Four cognitive attributes describing the content and skills were identified underlying the CIVED test items. Based on mastery of each attribute, students of three countries were classified into different four cognitive profiles. Differences among the countries were found in patterns of attribute achievement. Hong Kong students were strong in basic conceptual knowledge, but weak in advanced analyzing and synthesizing skills. The U.S. students were strong in the analyzing and synthesizing skills and deficient in the advanced conceptual knowledge. Evidence from the cognitive profiling supported the hypothesis that basic conceptual knowledge is prerequisite for more advanced conceptual knowledge/reasoning and for skills.

Keywords: CIVED; cognitive content and processing skills; cognitive diagnostic modelling

NOTES

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Track C PIRLS/TIMSS - Session 7

Equity and Socioeconomic Factors in Student Achievement across Countries

3 July
10:00-12:00
Room: AK 2138

Chair: Gabrielle Stanco
Discussant: Dirk Hastedt

Cultural and Linguistic Diversity in Reading Literacy Achievement: A Multilevel Approach

Andrea Netten, National Center for Language Education, Nijmegen, the Netherlands

In this study an attempt was made to identify factors that explain the variation in reading literacy achievement among fourth grade children in the Netherlands, with a focus on the differences between first and second language learners. Measures at the level of the students, the student's class, and school were used. The data of 3549 first language learners and 208 Turkish and Moroccan second language learners who participated in the IEA Progress in International Reading Literacy Study 2006 were analyzed. Multilevel analyses were conducted and showed the level of the student to account for most of the explained variance; the level of the class also accounted for a significant part; school only accounted for a very minor part of the variance. The results of multilevel modeling showed 34, 7% of the total variance in reading literacy to be explained by the entered antecedent conditions and malleable variables. Ethnicity, education of the mother and father, occupation of the mother, the amount of early literacy activities in the home, the parents attitudes towards reading, reading attitude of the student, reading self-concept, the amount of reading activities at school and the percentage second language students in a school were proven to be significant predictors of reading literacy. There were no significant interaction effects found between the subgroups of first and second language students.

Key words: second language learners; reading literacy; motivation; multilevel analyses



Achievement Equity by Urbanization in Latvia's Primary Education-Analysis of PIRLS 2006 and TIMSS 2007 Data

Ieva Johansone, TIMSS & PIRLS International Study Center, Boston College, USA

A significant problem for the Latvian education system has long been inequity in the quality of education offered to all students across the country. A significant part of the achievement variance can be explained by performance differences between urban and rural school communities. In addition to this being a persistent trend, the gap has kept increasing over time (Geske, Grinfelds, Dedze, Zhang, 2006; Johansone, Preuschoff, 2008; Johansone, 2009). This paper focuses on the equity of student achievement by urbanization

in Latvia's primary education (fourth grade). Data from two IEA studies, PIRLS 2006 and TIMSS 2007, were used. Even though Latvia's overall results in the international arena at the primary school level have always looked rather good (Latvia scored well above the international average in reading literacy, mathematics, and science), how these scores are distributed across the population is very important. Intraclass correlations and variance components alone provide little more than an indication of equity, or in this instance inequity, in student achievement, and further analyses of contextual information is necessary to explain these results. Socio-economic status was the most important determinant of student achievement, but socio-economic backgrounds of individual students could not fully explain the urbanization effect. Low achievement equity in education proves to be a problem of segregation by socio-economic status, and the urbanization effect is significant mostly because the segregation was more obvious in the rural areas of Latvia. Almost half of the originally stated urbanization effect was explained by controlling for the proportions of disadvantaged students in different schools.

Keywords: equity in education; achievement gap by urbanization; socioeconomic background; community composition effects



Exploring the Measurement Profiles of Socioeconomic Background and their differences in Reading Achievement: A Two-level Latent Class Analysis

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Ingrid Munck, University of Gothenburg, Sweden

Applying two-level latent class analysis technique, the proposed study is to explore the psychometric profiles of SES and to examine the reading achievement differences according to the latent profile belongingness. Unlike the previous view of SES simply being an observed index of all its indicators or as being a latent continuous construct, this measurement approach conceptualizes SES by forming distinct categories or typologies of it. The latent class approach takes into consideration the measurement error in the response patterns of the SES indicators, and bases the categorizations on the prior and posterior probability distributions under the conditioned maximum likelihood estimation. This analysis will firstly be applied to Swedish PIRLS 2006 data and the empirical findings will be verified by Norwegian data. SES indicators of individuals are from Student and Home Questionnaires in PIRLS 2006 and the school SES composition is measured, in addition to the individual level SES indicators, by variables from School Questionnaire.

Keywords: SES; PIRLS; latent class analysis; school composition; reading achievement

An Analysis of Factors Affecting Pupils' Science Achievement in Italy

Fabio Alivernini, National Institute for the Educational Evaluation of Instruction and Training, INVALSI, Italy

Laura Palmerio, National Institute for the Educational Evaluation of Instruction and Training, INVALSI, Italy

Emanuela Vinci, National Institute for the Educational Evaluation of Instruction and Training, INVALSI, Italy

Ines Di Leo, National Institute for the Educational Evaluation of Instruction and Training, INVALSI, Italy

Background indices in the TIMSS 2007 data are complex variables referring to educational contexts which are presumed to affect students' achievement in science subjects. The objective of this paper is to examine, for the Italian 4th grade data, the relationships between these indices both at school and at pupil level and the proficiency scores for overall achievement in science subjects. A multilevel analysis was conducted adopting a four-stage procedure and considering the home/student level nested under the school/teacher level. The results showed that pupils' performance in science subjects is significantly related to being a native student, to gender, to home educational resources, such as the number of books at home, to student self-confidence in learning science and to student perception of being safe at school.

Keywords: science achievement; multilevel regression; TIMSS 2007; fourth grade; background indices

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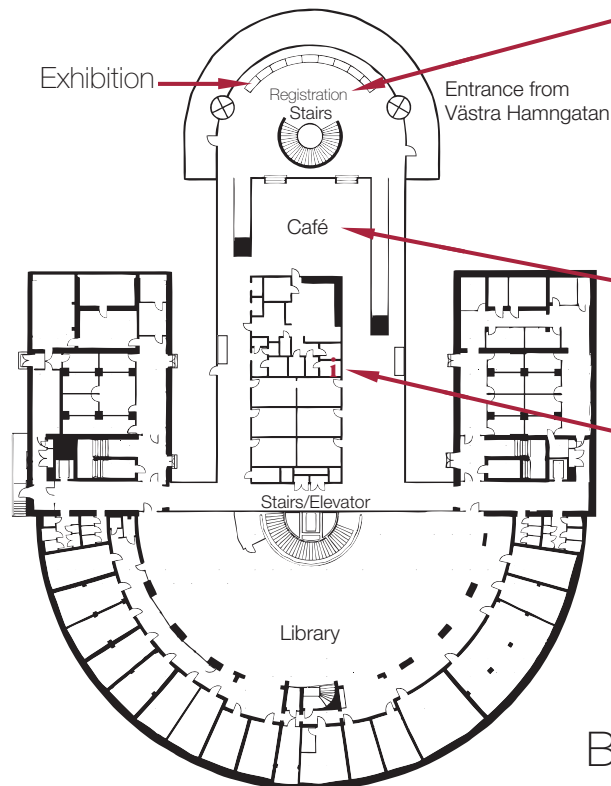
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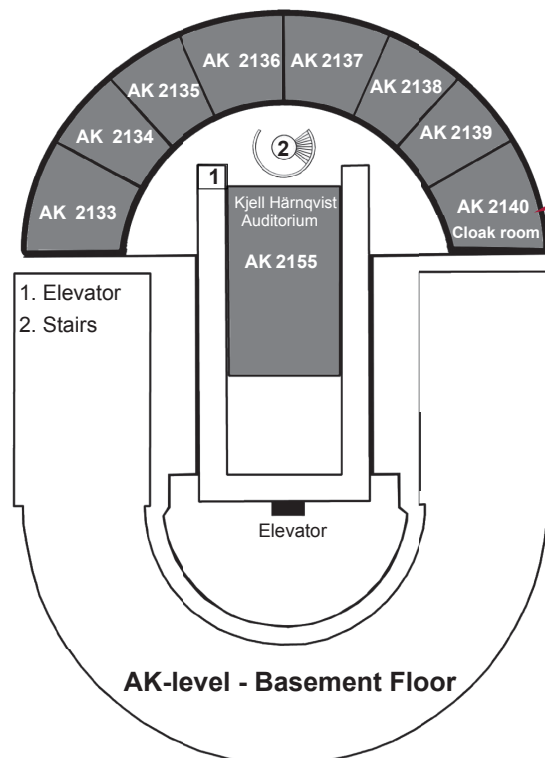
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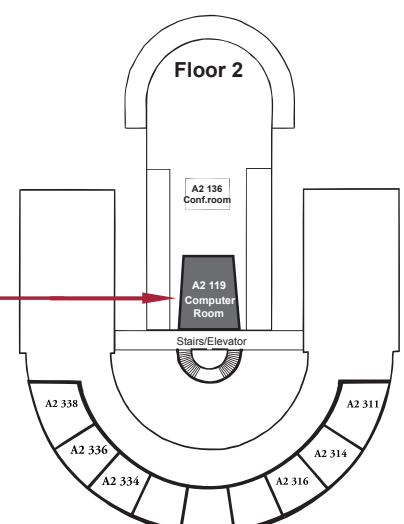
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Second floor



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