



5th IEA International Research Conference

26–28 June 2013



Workshops 24–25 June 2013
Singapore



International Association
for the Evaluation of
Educational Achievement



NANYANG
TECHNOLOGICAL
UNIVERSITY



NIE
NATIONAL
INSTITUTE OF
EDUCATION
SINGAPORE

Workshops

IRC-2013 AGENDA

WORKSHOPS

24–25 June 2013 | 9:00–17:00 (coffee breaks at 10:15–10:45 and 14:45–15:15; lunch break at 12:00–13:30)

Workshop 1 Introduction to IEA Databases and IDB Analyzer Room NIE7-01-TR708	Workshop 2 Using HLM With International Large-Scale Assessment Data Room NIE7-01-TR709	Workshop 3 Assessment Designs, Item Response Theory, and Proficiency Estimates Room NIE7-01-TR710	Workshop 4 Sampling in Large-Scale Assessments in Education Room NIE7-01-TR712
--	--	---	--

RECEPTION

25 June 2013 | 19:00 | Location Pan Pacific Singapore

CONFERENCE

26–28 June 2013

Wednesday, 26 June 2013	Thursday, 27 June 2013	Friday, 28 June 2013
Registration 8:00–16:00 Foyer of NIE6-01-LT1	Registration 8:30–16:00 Foyer of NIE6-01-LT1	Registration 8:30–12:00 Foyer of NIE6-01-LT1
Opening Ceremony 9:00–9:30 NIE6-01-LT1	Keynote 3 Inequality and Academic Achievement 9:00–10:00 NIE6-01-LT1 Larry V. Hedges , Northwestern University, United States	Keynote 4 Quality of Schools and Teaching: What Can We Learn From International Studies? 9:00–10:00 NIE6-01-LT1 Eckhard Klieme , German Institute for International Educational Research
Keynote 1 Mathematics Education in Singapore 9:30–10:30 NIE6-01-LT1 Berinderjeet Kaur , National Institute of Education, Singapore	Coffee Break 10:00–10:30 Foyer of NIE6-01-LT1	Coffee Break 10:00–10:30 Foyer of NIE6-01-LT1
Coffee Break 10:30–11:00 Foyer of NIE6-01-LT1	Parallel Sessions 3 10:30–12:00 A: PIRLS/prePIRLS: School Factors, Age Effects, and Reading Achievement B: TIMSS: School Effectiveness in Math and Science C: TIMSS: Student, Class, and School Level Effects in TIMSS D: CIVED/ICCS: Contextual Factors and Civic Attitudes	Parallel Sessions 5 10:30–12:00 A: TIMSS: Issues in Cross-Country Measurement and Analysis B: TIMSS/TEDS-M: Effects of Instructional Methods and Teacher Motivation C: ICCS: Immigrant Background and Civic Attitudes in ICCS
Keynote 2 TIMSS and PIRLS 2011: A Cross-Country Analysis of Relative School Effectiveness in Reading, Mathematics, and Science at the Fourth Grade 11:00–12:30 NIE6-01-LT1 Ina V.S. Mullis and Michael O. Martin , Boston College, United States	Lunch Break 12:00–13:30	Lunch Break 12:00–13:30
Lunch Break 12:30–14:00	Parallel Sessions 4 13:30–15:00 A: TIMSS/PIRLS: Long-Term Changes in Math and Reading Achievement B: TIMSS: Immigrant Students in TIMSS C: TIMSS: Within-Country Analysis of Items and Differences in Achievement D: ICCS: Civic Participation and School Climate	Parallel Sessions 6 13:30–15:00 A: PIRLS/TIMSS: Home and School Factors in PIRLS and TIMSS B: TIMSS: Student Motivation, Attitudes, and Self-Concept in TIMSS C: ICILS: Aspects of Measuring Computer and Information Literacy
Parallel Sessions 1 14:00–15:30 A: PIRLS/TIMSS: Influence of Reading Ability and Home Language on Math and Science Achievement B: TIMSS: Methodological Issues in Large-Scale Assessment C: TIMSS/TIMSS Advanced: Predictors of Science Achievement D: ICCS: Civic Achievement, Perceptions, and Expected Participation	Coffee Break 15:00–15:30 Foyer of NIE6-01-LT1	Coffee Break 15:00–15:30 Foyer of NIE6-01-LT1
Coffee Break 15:30–16:00 Foyer of NIE6-01-LT1		Closing Ceremony 15:30–16:30 NIE6-01-LT1
Parallel Sessions 2 16:00–17:30 A: PIRLS: Home Environment, Socioeconomic Status, and Reading Literacy B: TIMSS: Performance in the Science Content Domains C: Meeting With the Editors of <i>Large-Scale Assessments in Education</i> D: ICCS: Regional Comparisons of Civic Engagement and Curricula		
	Excursion & Group Dinner 18:00 Gardens by the Bay & Majestic Bay Seafood Restaurant	

PARALLEL SESSION ROOMS

A: NIE7-01-LT3

B: NIE7-01-LT4

C: NIE2-01-LT5

D: NIE3-01-LT9



5th IEA International Research Conference

26–28 June 2013

Workshops
24–25 June 2013
Singapore



International Association
for the Evaluation of
Educational Achievement



NANYANG
TECHNOLOGICAL
UNIVERSITY



NIE
NATIONAL
INSTITUTE OF
EDUCATION
SINGAPORE

unera 2013

TABLE OF CONTENTS

PROGRAM OVERVIEW	1
Monday, 24 June 2013	1
Tuesday, 25 June 2013	1
Wednesday, 26 June 2013	2
Thursday, 27 June 2013	4
Friday, 28 June 2013	6
COMMITTEES	9
PRE-CONFERENCE WORKSHOPS	11
Workshop 1: Introduction to IEA Databases and IDB Analyzer	11
Workshop 2: Using HLM With International Large-Scale Assessment Data	11
Workshop 3: Assessment Designs, Item Response Theory, and Proficiency Estimates	12
Workshop 4: Sampling in Large-Scale Assessments in Education	13
KEYNOTE LECTURES	15
Keynote 1: Mathematics Education in Singapore	17
Keynote 2: TIMSS and PIRLS 2011: A Cross-Country Analysis of Relative School Effectiveness in Reading, Mathematics, and Science at the Fourth Grade	19
Keynote 3: Inequality and Academic Achievement	21
Keynote 4: Quality of Schools and Teaching: What Can We Learn From International Studies? ...	23
SESSION ABSTRACTS	25
Session 1A PIRLS/TIMSS: Influence of Reading Ability and Home Language on Math and Science Achievement	27
Session 1B TIMSS: Methodological Issues in Large-Scale Assessment	29
Session 1C TIMSS/TIMSS Advanced: Predictors of Science Achievement	31
Session 1D ICCS: Civic Achievement, Perceptions, and Expected Participation	33
Session 2A PIRLS: Home Environment, Socioeconomic Status, and Reading Literacy	35
Session 2B TIMSS: Performance in the Science Content Domains	36
Session 2D ICCS: Regional Comparisons of Civic Engagement and Curricula	38
Session 3A PIRLS/prePIRLS: School Factors, Age Effects, and Reading Achievement	40
Session 3B TIMSS: School Effectiveness in Math and Science	42
Session 3C TIMSS: Student, Class, and School Level Effects in TIMSS	44
Session 3D CIVED/ICCS: Contextual Factors and Civic Attitudes	45
Session 4A TIMSS/PIRLS: Long-Term Changes in Math and Reading Achievement	47
Session 4B TIMSS: Immigrant Students in TIMSS	49
Session 4C TIMSS: Within-Country Analysis of Items and Differences in Achievement	51
Session 4D ICCS: Civic Participation and School Climate	52
Session 5A TIMSS: Issues in Cross-Country Measurement and Analysis	53
Session 5B TIMSS/TEDS-M: Effects of Instructional Methods and Teacher Motivation	54
Session 5C ICCS: Immigrant Background and Civic Attitudes in ICCS	56

Session 6A PIRLS/TIMSS: Home and School Factors in PIRLS and TIMSS.....	57
Session 6B TIMSS: Student Motivation, Attitudes, and Self-Concept in TIMSS.....	59
Session 6C ICILS: Aspects of Measuring Computer and Information Literacy.....	60
INDEX OF PARTICIPANTS	63
PRACTICAL INFORMATION	65
Conference Venue, Internet Access, and Lunch.....	67
Map of NIE	68
Transportation Information	69
Conference Hotels and Group Dinner.....	71
General Information About Singapore.....	72
Important Numbers and Tourist Information.....	74
Medical Care	76
Singapore MRT & LRT System Map.....	77

PROGRAM OVERVIEW

Monday, 24 June 2013

9:00 – 17:00	Workshop 1 Introduction to IEA Databases and IDB Analyzer Location: NIE7-01-TR708 Plamen Mirazchiyski and Andrés Sandoval-Hernández , IEA Data Processing and Research Center, Germany	Workshop 2 Using HLM With International Large-Scale Assessment Data Location: NIE7-01-TR709 Leslie Rutkowski , Indiana University, United States Agnes Stancel-Piatak , IEA Data Processing and Research Center, Germany	Workshop 3 Assessment Designs, Item Response Theory, and Proficiency Estimates Location: NIE7-01-TR710 Eugenio Gonzalez , Educational Testing Service, United States	Workshop 4 Sampling in Large-Scale Assessments in Education Location: NIE7-01-TR712 Sabine Meinck , IEA Data Processing and Research Center, Germany
10:15 – 10:45	Coffee Break Location: Foyer of NIE6-01-LT1			
12:00 – 13:30	Lunch Break Location: NTU Campus			
14:45 – 15:15	Coffee Break Location: Foyer of NIE6-01-LT1			

Tuesday, 25 June 2013

9:00 – 17:00	Workshop 1 Introduction to IEA Databases and IDB Analyzer (continued) Location: NIE7-01-TR708 Plamen Mirazchiyski and Andrés Sandoval-Hernández , IEA Data Processing and Research Center, Germany	Workshop 2 Using HLM With International Large-Scale Assessment Data (continued) Location: NIE7-01-TR709 Leslie Rutkowski , Indiana University, United States Agnes Stancel-Piatak , IEA Data Processing and Research Center, Germany	Workshop 3 Assessment Designs, Item Response Theory, and Proficiency Estimates (continued) Location: NIE7-01-TR710 Eugenio Gonzalez , Educational Testing Service, United States	Workshop 4 Sampling in Large-Scale Assessments in Education (continued) Location: NIE7-01-TR712 Sabine Meinck , IEA Data Processing and Research Center, Germany
10:15 – 10:45	Coffee Break Location: Foyer of NIE6-01-LT1			
12:00 – 13:30	Lunch Break Location: NTU Campus			
14:45 – 15:15	Coffee Break Location: Foyer of NIE6-01-LT1			
19:00	Welcome Reception Location: Pan Pacific Singapore A shuttle bus service will be provided between the NTU campus and the reception site.			

Wednesday, 26 June 2013

8:00 – 16:00	Registration Location: Foyer of NIE6-01-LT1			
9:00 – 9:30	Opening Ceremony Location: NIE6-01-LT1 Lee Sing Kong , Director of NIE Hans Wagemaker , Executive Director of IEA Anne-Berit Kavli , Chair of IEA			
9:30 – 10:30	Keynote 1 Mathematics Education in Singapore Location: NIE6-01-LT1 Invited Speaker: Berinderjeet Kaur , National Institute of Education, Nanyang Technological University, Singapore Chair: Sue Thomson			
10:30 – 11:00	Coffee Break Location: Foyer of NIE6-01-LT1			
11:00 – 12:30	Keynote 2 TIMSS and PIRLS 2011: A Cross-Country Analysis of Relative School Effectiveness in Reading, Mathematics, and Science at the Fourth Grade Location: NIE6-01-LT1 Invited Speakers: Ina V.S. Mullis and Michael O. Martin , TIMSS & PIRLS International Study Center, Boston College, United States Chair: Hans Wagemaker			
12:30 – 14:00	Lunch Break Location: NTU Campus			
14:00 – 15:30	Session 1A: PIRLS/TIMSS Influence of Reading Ability and Home Language on Math and Science Achievement Location: NIE7-01-LT3 Chair: Siew Yee Lim Discussant: Jan-Eric Gustafsson The Impact of Reading Ability on TIMSS Mathematics and Science Achievement at the Fourth Grade: An Analysis by Item Reading Demands Ina V.S. Mullis, Michael O. Martin, Pierre Foy Is English Proficiency a Source of Construct-Irrelevant Variance in Student Performance in TIMSS 2011? The Case of Singapore Hui Leng Ng, Seau Fah Foo, Pik Yen Lim, Chew Leng Poon Use of English at Home and Singapore Student Performance in PIRLS and TIMSS Hui Leng Ng, Chew Leng Poon, Lee Shan Chan, Huey Bian Ng	Session 1B: TIMSS Methodological Issues in Large-Scale Assessment Location: NIE7-01-LT4 Chair: Jana Straková Discussant: Matthias von Davier Steps in the Development of Diagnostic Education Information Gregory Camilli Using Plausible Values in Secondary Analysis in the Large-Scale Assessment TIMSS Inga Laukaityte, Marie Wiberg Hierarchical Modeling With Large-Scale Assessment Data: Influence of Intra-Class Correlation on Sampling Precision Sabine Meinck, Caroline Vandenplas	Session 1C: TIMSS/TIMSS Advanced Predictors of Science Achievement Location: NIE2-01-LT5 Chair: Barbara Malak-Minkiewicz Discussant: Kok Leong Boey Analysis of Science Intended Curriculum Based on Topics Recurrence Masoud Kabiri, Mahmood Ghazi Tabatabaei A New Way of Recognizing the Spatial Distribution of Educational Issues: Regional Variation of Science Literacy in the Finnish TIMSS 2011 Data Jouni Vettenranta, Heidi Harju-Luukkainen Teachers' Professional Engagement and Student Achievement in Physics: Secondary Analyses of the Dutch TIMSS Advanced 2008 Data M.R.M. Meelissen, M. Drent, P.J.C. Sleegers	Session 1D: ICCS Civic Achievement, Perceptions, and Expected Participation Location: NIE3-01-LT9 Chair: Lars Qvortrup Discussant: Wolfram Schulz Multiple Pathways to Success: Exploring the Link Between Quality Assurance and Students' Civic Achievement by Using Qualitative Comparative Analysis (QCA) Triin Lauri, Anu Toots Cross-National Equivalence of Students' Perceptions of Good Citizenship in ICCS Dorota Weziak-Bialowolska, Maria Magdalena Isac Predictors of Asian Adolescents' Expected Future Legal Protest Participation: A Multidimensional Rasch Modeling and Path Analysis Jinxin Zhu, Xiaoxue Kuang, Kerry John Kennedy, Magdalena Mo Ching Mok

Wednesday, 26 June 2013

15:30 – 16:00	Coffee Break Location: Foyer of NIE6-01-LT1			
16:00 – 17:30	Session 2A: PIRLS Home Environment, Socioeconomic Status, and Reading Literacy Location: NIE7-01-LT3 Chair: Andrea Netten Discussant: Monica Rosén The Influence of Home Environment on Reading Achievement Lisa De Bortoli, Greg Macaskill Effects of Early Home and Preschool Environments on Reading Literacy: Longitudinal Evidence From PIRLS Rolf Strietholt, Nina Hoglebe, Wolfgang Böttcher, Wilfried Bos	Session 2B: TIMSS Performance in the Science Content Domains Location: NIE7-01-LT4 Chair: Chew Leng Poon Discussant: Wolfram Schulz Estimation of Science Topic Area Scores for Iranian Eighth Graders in TIMSS 2007 Masoud Kabiri A DIF Analysis of the TIMSS 2007 Assessment in Physics and Chemistry Focusing on the Matching of the Test Items and Curricula: Comparison of Japanese and Korean Eighth Graders Yasuhito Hagiwara, Kenji Matsubara School Emphasis on Academic Success: Exploring Changes in Performance Employing Two-Level SEM Trude Nilsen, Jan-Eric Gustafsson	Session 2C Meeting With the Editors of <i>Large-Scale Assessments in Education</i> Location: NIE2-01-LT5 Eugenio Gonzalez, Matthias von Davier, Hans Wagemaker	Session 2D: ICCS Regional Comparisons of Civic Engagement and Curricula Location: NIE3-01-LT9 Chair: Julian Fraillon Discussant: Bruno Losito The 'Civic Potential' of Students: An Investigation of Students' Civic Knowledge and Conceptions of Active Citizenship in Five Asian Societies Kui Foon Chow, Kerry John Kennedy Political Activism of Low Achieving and High Achieving Students in 10 European Countries Tõnu Idnurm, Anu Toots National Curricular Guidelines and Citizenship Education in Schools in Latin American Countries Martín Bascopé, Macarena Bonhomme, Cristián Cox, Juan Carlos Castillo, Daniel Miranda

Thursday, 27 June 2013

8:30 – 16:00	Registration Location: Foyer of NIE6-01-LT1			
9:00 – 10:00	Keynote 3 Inequality and Academic Achievement Location: NIE6-01-LT1 Invited Speaker: Larry V. Hedges , Northwestern University, United States Chair: Hans Wagemaker			
10:00 – 10:30	Coffee Break Location: Foyer of NIE6-01-LT1			
10:30 – 12:00	Session 3A: PIRLS/prePIRLS School Factors, Age Effects, and Reading Achievement Location: NIE7-01-LT3 Chair: Oliver Neuschmidt Discussant: Ina V.S. Mullis Exploring Relationships Among Macro Contexts, Principals' Time Use for Interaction With Individual Students and Academic Achievement Moosung Lee, Allan Walker, Ji-Hoon Ryoo Factors That Affect South African Reading Literacy Achievement: Evidence From prePIRLS 2011 Using Aspects of Carroll's Model of School Learning Surette van Staden, Roel Bosker Relative Age and Reading Achievement: School Entry Age, Grade Progression, and Cross-National Variation in Age Effects Ben Dalton	Session 3B: TIMSS School Effectiveness in Math and Science Location: NIE7-01-LT4 Chair: Chew Leng Poon Discussant: Michael O. Martin The Effects of School and Students' Educational Contexts in Korea, Singapore, and Finland using TIMSS 2011 Soojin Kim, Jihyun Park, Sangwook Park, Sungsook Kim School Effectiveness in Mathematics in Sweden and Norway in 2003, 2007, and 2011 Marie Wiberg, Ewa Rolfsman, Inga Laukaityte School Effectiveness in the Nordic Countries in Relation to PISA and TIMSS Ewa Rolfsman, Marie Wiberg, Inga Laukaityte	Session 3C: TIMSS Student, Class, and School Level Effects in TIMSS Location: NIE2-01-LT5 Chair: Berinderjeet Kaur Discussant: Sabine Meinck A Multilevel Analysis of Mathematically Low-Achieving Students in Singapore Qian Chen Background Factors Behind Mathematics Achievement in the Finnish Education Context: Explanatory Models Based on TIMSS 1999 and TIMSS 2011 Data Pekka Kupari, Kari Nissinen	Session 3D: CIVED/ICCS Contextual Factors and Civic Attitudes Location: NIE3-01-LT9 Chair: Bruno Losito Discussant: Andrés Sandoval-Hernández A 1999–2009 Trend in Expected Electoral Participation in Seven European Post-Communist Countries Plamen Mirazchiyski, Diego Cortés Impact of Track Attended on Civic Attitudes of Secondary School Students in the Czech Republic Jana Straková, Jaroslava Simonová Attitudes Towards Political Engagement Among Lower Secondary Students in East Asian Countries: Results From ICCS 2009 John Ainley, Wolfram Schulz, Julian Fraillon
12:00 – 13:30	Lunch Break Location: NTU Campus			

Thursday, 27 June 2013

13:30 – 15:00	Session 4A: TIMSS/PIRLS Long-Term Changes in Math and Reading Achievement Location: NIE7-01-LT3 Chair: Susan Wee Discussant: Peter Nyström A Remedial Action Based on Taiwanese Students' Results in TIMSS Su-Wei Lin, Pi-Hsia Hung, Fou-Lai Lin PIRLS Messages Revisited: Changes in Reading Literacy Achievement of Dutch Fourth Graders and Associated Factors in the Last Decade Andrea Netten, Marinus Voeten, Mienke Droop, Ludo Verhoeven	Session 4B: TIMSS Immigrant Students in TIMSS Location: NIE7-01-LT4 Chair: Pekka Kupari Discussant: Sue Thomson Predictors of School Violence Internationally: The Importance of Immigrant Status and Other Factors David Rutkowski, Leslie Rutkowski, Justin Wild Mathematics Achievement of Immigrant Students Dirk Hastedt A Cross-Ethnic Comparison of Mathematics Achievement in the Trends in International Mathematics and Science Study 2011 (TIMSS) Beti Lameva, Zhaneta Chonteva	Session 4C: TIMSS Within-Country Analysis of Items and Differences in Achievement Location: NIE2-01-LT5 Chair: Sabine Meinck Discussant: Jouni Välijärvi A Comparison of PISA and TIMSS Against England's National Curriculum Newman Burdett, Linda Sturman Evaluating Measurement Properties of Attitudinal Items Related to Learning Science in Taiwan From TIMSS 2007 Pey-Yan Liou	Session 4D: ICCS Civic Participation and School Climate Location: NIE3-01-LT9 Chair: Anu Toots Discussant: Lars Qvortrup Student Participation at School and Future Civic Engagement: Results From ICCS 2009 Wolfram Schulz, John Ainley, Julian Fraillon Exploring School Resilience to Violence in Mexico and Colombia: An Analysis Using Data From ICCS 2009 Andrés Sandoval-Hernández
15:00 – 15:30	Coffee Break Location: Foyer of NIE6-01-LT1			
18:00	Excursion & Group Dinner Location: Gardens by the Bay & Majestic Bay Seafood Restaurant A shuttle bus service will be provided between the hotels and the restaurant. Participants will have an opportunity to view the gardens at Gardens by the Bay prior to the dinner.			

Friday, 28 June 2013

8:30 – 12:00	Registration Location: Foyer of NIE6-01-LT1		
9:00 – 10:00	Keynote 4 Quality of Schools and Teaching: What Can We Learn From International Studies? Location: NIE6-01-LT1 Invited Speaker: Eckhard Klieme , German Institute for International Educational Research (DIPF) Chair: Anne-Berit Kavli		
10:00 – 10:30	Coffee Break Location: Foyer of NIE6-01-LT1		
10:30 – 12:00	Session 5A: TIMSS Issues in Cross-Country Measurement and Analysis Location: NIE7-01-LT3 Chair: Andrés Sandoval-Hernández Discussant: Leslie Rutkowski Examining the Behavior of “Reversed Directional” Items in the TIMSS 2011 Context Questionnaire Scales Martin Hooper, Alka Arora, Michael O. Martin, Ina V.S. Mullis Statistical Techniques Utilized in Analyzing TIMSS Databases in Science Education From 1996 to 2012: A Methodological Review Pey-Yan Liou, Yi-Chen Hung	Session 5B: TIMSS/TEDS-M Effects of Instructional Methods and Teacher Motivation Location: NIE7-01-LT4 Chair: Qian Chen Discussant: David Rutkowski What Works Where? The Relationship Between Instructional Variables and Student Achievement in Mathematics and Science in Low-, Medium- and High-Achieving Countries Ruth Zuzovsky Effects of Teaching Strategy on Student Mathematics Achievement Addressing Cognitive Domains: A Comparative Study of Hong Kong and Singapore Xueying Ji, Qiaoping Zhang How Do the Reasons to Become a Teacher Influence Future Secondary Mathematics Teachers’ Teaching Competence and Intention Toward a Teaching Career? Chia-Jui Hsieh, Pei-Chen Wu, Shu-Jyh Tang, Feng-Jui Hsieh	Session 5C: ICCS Immigrant Background and Civic Attitudes in ICCS Location: NIE2-01-LT5 Chair: Plamen Mirazchiyski Discussant: Anu Toots Civic Knowledge and Engagement Among Students From Immigrant and Non-Immigrant Backgrounds Tim Friedman, Wolfram Schulz, Julian Fraillon, John Ainley Civic Knowledge and Student Attitudes Towards Corruption: The Chilean Case – A Multilevel Path Analysis Approach Diego Carrasco, Roberto Gonzalez, Flavio Cortés, Leonardo García, Nicolás Dassen
12:00 – 13:30	Lunch Break Location: NTU Campus		

Friday, 28 June 2013

13:30 – 15:00	Session 6A: PIRLS/TIMSS Home and School Factors in PIRLS and TIMSS Location: NIE7-01-LT3 Chair: Sue Thomson Discussant: Plamen Mirazchiyski Influences of Early Home Factors on Later Achievement in Reading, Math and Science: An Analysis of the Swedish Data From PIRLS and TIMSS 2011 Monica Rosén, Jan-Eric Gustafsson, Kajsa Yang Hansen Schools and Social Origins: Do Schools Matter More for Disadvantaged Students? Erica Raimondi Tracking Effects on Mathematics Achievement in the Czech Republic David Greger, Hana Voňková, Martin Chvát	Session 6B: TIMSS Student Motivation, Attitudes, and Self-Concept in TIMSS Location: NIE7-01-LT4 Chair: Jouni Välijärvi Discussant: Martina Meelissen Attitudes Toward School, Homework, Subject Matter Value, Self-Concept and Positive Affect: A Structural Equation Model Maher M. Abu-Hilal, Faisal Abdelfattah, Adel Abduljabbar, Herbert W. Marsh Examining the Relationship Between Student Academic Achievement and Self-Concept in the I/E, BFLPE, and Combined Models – Evidence From East Asian Countries' Data in TIMSS 2007 Yi-Chen Hung, Pey-Yan Liou	Session 6C: ICILS Aspects of Measuring Computer and Information Literacy Location: NIE2-01-LT5 Chair: Paulína Koršňáková Discussant: Sabine Meinck Equating From a National to an International Assessment Eveline Gebhardt, Lisa De Bortoli Measuring Computer and Information Literacy Across Countries Julian Fraillon, John Ainley, Eveline Gebhardt, Wolfram Schulz Psychometric Assessment of ICILS Test Items on Hong Kong and Korean Students – A Rasch Analysis Pey Tee Oon, Nancy Law, Soojin Kim, Sungsook Kim, See Ki Tse
15:00 – 15:30	Coffee Break Location: Foyer of NIE6-01-LT1		
15:30 – 16:30	Closing Ceremony Location: NIE6-01-LT1 Chew Leng Poon, Ministry of Education, Singapore Berinderjeet Kaur, National Institute of Education, Singapore Barbara Malak-Minkiewicz, IEA Secretariat, Netherlands		

COMMITTEES

Proposal Review Committee

Jo-Ann Amadeo, Marymount University, United States
Shaljan Aarepattamannil, National Institute of Education, Singapore
Kiril Bankov, Sofia University, Bulgaria
Carolyn Barber, University of Missouri-Kansas City, United States
Horst Biedermann, University of Flensburg, Germany
Qian Chen, National Institute of Education, Singapore
Eugenio Gonzalez, Educational Testing Service, United States
Jan-Eric Gustafsson, University of Gothenburg, Sweden
Carole Hahn, Emory University, United States
Larry V. Hedges, Northwestern University, United States
Andris Kangro, University of Latvia, Latvia
Berinderjeet Kaur, National Institute of Education, Singapore
Mary Koutselini, University of Cyprus, Cyprus
Dominique Lafontaine, University of Liège, Belgium
Rainer Lehmann, Humboldt University of Berlin, Germany
Svein Lie, University of Oslo, Norway
Fou-Lai Lin, National Taiwan Normal University, Chinese Taipei
Bruno Losito, Roma Tre University, Italy
Barbara Malak-Minkiewicz (Chair), IEA Secretariat, Netherlands
Michael O. Martin, Boston College, United States
Christian Monseur, University of Liège, Belgium
Ina V.S. Mullis, Boston College, United States
Tjeerd Plomp, University of Twente, Netherlands
Lars Qvortrup, Aalborg University, Denmark
David Robitaille, University of British Columbia, Canada
Monica Rosén, University of Gothenburg, Sweden
David Rutkowski, Indiana University, United States
Leslie Rutkowski, Indiana University, United States
Jack Schwille, Michigan State University, United States
Knut Schwippert, University of Hamburg, Germany
Jana Straková, Charles University in Prague, Czech Republic
Anu Toots, Tallinn University, Estonia
Judith Torney-Purta, University of Maryland, United States
Jouni Välijärvi, University of Jyväskylä, Finland
Jan van Damme, KU Leuven, Belgium
Wiel Veugelers, University of Amsterdam / University of Humanistic Studies, Netherlands
Ruth Zuzovsky, Kibbutzim College of Education, Technology and the Arts / Tel Aviv University, Israel

Organizing Committee

Shaljan Aarepattamannil, National Institute of Education, Singapore
Kok Leong Boey, National Institute of Education, Singapore
Qian Chen, National Institute of Education, Singapore
Berinderjeet Kaur (Local Chair), National Institute of Education, Singapore
Barbara Malak-Minkiewicz (Chair), IEA Secretariat, Netherlands
Alana Yu, IEA Secretariat, Netherlands

PRE-CONFERENCE WORKSHOPS

24–25 June 2013

Workshop 1: Introduction to IEA Databases and IDB Analyzer

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

Location: NIE7-01-TR708

This workshop will provide an overview of the IEA databases currently available, with particular emphasis on the most recently released databases (TIMSS 2011, PIRLS 2011, ICCS 2009, and TEDS-M). As part of the workshop, participants will also be instructed on how to use the IDB Analyzer. The IDB Analyzer is an application developed by the 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—implications 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; and
- 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 laptop PC with Windows and SPSS installed (Windows and SPSS are required to use the IDB Analyzer). Free copies of the IDB Analyzer will be distributed at the workshop.

Workshop 2: Using HLM With International Large-Scale Assessment Data

Leslie Rutkowski, *Indiana University, United States*

Agnes Stancel-Piatak, *IEA Data Processing and Research Center, Germany*

Location: NIE7-01-TR709

This workshop will introduce participants to the basic theory and application of multilevel or hierarchical linear modeling (HLM). In the context of cross-country, school, and student achievement data, the rationale for HLM analysis will be introduced. Participants will learn how to prepare datasets and import them to the HLM 7 software (Raudenbush & Bryk, 2011). Using PIRLS 2011 data, participants will also formulate relevant hypotheses for policy research regarding the relationship of socioeconomic and immigrant status with reading achievement. Ample opportunity will be provided to work through several examples. Model specification and interpretation will be a central focus of this workshop.

An example of the type of analysis that will be presented is testing for the presence of an immigration effect. This test will evaluate whether there is a significant relationship between student immigrant

status and academic performance within a two-level model (students in schools in a specific country). Various model specifications that consider some of the complexities associated with immigrant students will be considered. For example, we will differentiate between student first- and second-generation immigrant status. Further, we will examine the moderating effect of socioeconomic status on immigrant status and achievement. Fundamental statistics will be interpreted (i.e., slopes, variance accounted for, variance components), 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 school-level contexts are related to achievement and whether student-level relationships are moderated by the school context. Finally, participants will extend the analysis to a three-level model framework, and determine whether the effect of immigrant status differs across education systems and how.

The following topics will be covered during the workshop:

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

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

Workshop 3: Assessment Designs, Item Response Theory, and Proficiency Estimates

Eugenio Gonzalez, *Educational Testing Service, United States*

Location: NIE7-01-TR710

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

The following topics will be covered during the workshop:

- Overview of assessment design principles: advantages and disadvantages of current designs of large-scale assessments, consequences for analysis;
- Overview of principles of item response theory: advantages and disadvantages of different models, limitations of IRT models, using Parscale to compute item parameters and proficiency estimates; and
- 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, using DESI to compute proficiency estimates and plausible values.

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

Workshop 4: Sampling in Large-Scale Assessments in Education

Sabine Meinck, *IEA Data Processing and Research Center, Germany*

Location: NIE7-01-TR712

The workshop introduces the sampling methodology applied in large-scale educational surveys, its background, and its significance. The concepts of cluster sampling, stratification, and bias and precision are defined and illustrated. The selection process is illustrated by means of examples. The necessity of using weights when analyzing data from complex sampling designs is demonstrated and the calculation of weights is explained. Other implications for data analysis, particularly the need for specific methods of variance estimation, are also examined. The workshop comprises lectures and hands-on trainings for the various subjects.

The following topics will be covered during the workshop:

- Introduction to the concepts of statistical sampling, characteristics of complex samples, implications for analysis and interpretation;
- Sampling theory and underlying concepts: sampling methods, defining the target population, defining sample size, stratification, clustering, calculating coverage and participation rates, replacement of units;
- Computing sampling weights: calculating probabilities of selection, weighting components, post-stratification, rescaling of weights;
- Variance estimation in simple and complex samples: definition, working with simple random samples, calculating replicate weights, clustering effects and intra-class correlations, effect of stratification on sampling variance, design effect;
- Jackknife (JK1 and JK2) and balanced repeated replication techniques in large-sale assessments; and
- Calculating statistical significance in large-scale assessments: evaluating differences between independent or dependent samples, selecting directionality and significance level, dummy coding and regression techniques.

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

KEYNOTE LECTURES

KEYNOTE LECTURE 1

Mathematics Education in Singapore

Berinderjeet Kaur, *National Institute of Education, Nanyang Technological University, Singapore*

26 June 2013 | 9:30–10:30 | Location: NIE6-01-LT1

Chair: Sue Thomson, *Australian Council for Educational Research*

Profile of Berinderjeet Kaur: Berinderjeet Kaur is a Professor of Mathematics Education and Head of the Centre for International Comparative Studies (CICS) at the National Institute of Education in Singapore. Her primary research interests are in the area of classroom pedagogy of mathematics teachers and comparative studies in mathematics education. She has been involved in numerous international studies of mathematics education and was the Mathematics Consultant to TIMSS 2011. She is also a member of the MEG (Mathematics Expert Group) for PISA 2015. As the President of the Association of Mathematics Educators (AME) from 2004–2010, she has been actively involved in the professional development of mathematics teachers in Singapore and is the founding chairperson of the Mathematics Teachers Conferences that started in 2005. She is also the founding editor of the AME Yearbook series that started in 2009. On Singapore's 41st National Day in 2006, she was awarded the Public Administration Medal by the President of Singapore.

Abstract: Singapore's education system has evolved over time and so has mathematics education in Singapore. The present day school mathematics curricula can best be described as one that caters for the needs of every child in school. It is based on a framework that has mathematical problem solving as its primary focus. The developments from 1946 to 2012 that have shaped the present school mathematics curricula in Singapore are direct consequences of developments in the education system of Singapore during the same period.

A school curriculum can be defined in terms of its aims, content and resources, teaching and learning strategies, and assessment practices. However it also exists within a broader context involving the physical, political, cultural, economic, and social environments that define and constrain its role in educating the people. It is clear from the review of the developments in the education system of Singapore in the last six decades that the aims of the school curriculum are shaped by economic policies of the government that are necessary for the survival of Singapore in a fast changing world. School mathematics curriculum as part of the school curriculum has played a significant role in the economic development and progress of Singapore during the last six decades. As mathematics is a compulsory subject for pupils in school, the mathematics curriculum at the primary and secondary school levels is differentiated to cater to the needs and abilities of pupils in the different courses. Core mathematical concepts are common to all courses and the content for the less able students is a subset of the content for the more able students.

In conclusion it may be said that Singapore's education system has evolved over time into one that offers quality education for all in school. In tandem Singapore's school mathematics curriculum too has evolved over time. Today every child in school does mathematics that is suited to his or her ability. As people are the only resource of Singapore, education is the key to the success of its economy and in turn survival. School mathematics curriculum, at present, emphasizes a balance between mastery over basic skills and concepts in mathematics and the application of higher order thinking skills to solve mathematical problems. Singapore's outstanding mathematics performance in the Trends in International Mathematics and Science Study (TIMSS) from 1995 till 2011 has signaled to both mathematics teachers and educators that the teaching and learning of mathematics is making progress

in the right direction. Needless to say, the TIMSS data is also providing educators and researchers in Singapore much food for thought that informs ongoing fine tuning of the curricula.

KEYNOTE LECTURE 2

TIMSS and PIRLS 2011: A Cross-Country Analysis of Relative School Effectiveness in Reading, Mathematics, and Science at the Fourth Grade

Ina V.S. Mullis and Michael O. Martin, *TIMSS & PIRLS International Study Center, Boston College, United States*

26 June 2013 | 11:00–12:30 | Location: NIE6-01-LT1

Chair: Hans Wagemaker, *IEA*

Profile of Ina V.S. Mullis: TIMSS & PIRLS International Study Center, Executive Director, Dr. Ina Mullis has been an energetic force in large-scale assessment, first nationally and then internationally. Beginning with TIMSS 1995 and then in founding PIRLS, over her 20 years with IEA Ina has played a key leadership role in building TIMSS and PIRLS into the global assessment programs they are today. She accomplished this by maintaining a relentless focus on excellence as the pathway to success and by insisting on producing increasingly useful and policy relevant data. She pioneered the idea of steadily evolving assessments as the basis for measuring trends while keeping pace with educational change.

With her enduring commitment to excellence in assessment design and development, Ina has made major contributions to each of the TIMSS and PIRLS assessments, including more recently TIMSS Advanced as well as prePIRLS and ePIRLS. She also has spearheaded reporting the TIMSS and PIRLS reports, authoring or co-authoring about 50 TIMSS and PIRLS reports as well as numerous papers and articles.

Profile of Michael O. Martin: As Executive Director of the TIMSS & PIRLS International Study Center, Dr. Michael “Mick” Martin has led and contributed to a myriad of advances in assessment methods. Since his early work on IEA’s 1991 Reading Literacy Study through TIMSS 1995, the founding of PIRLS in 2001, and now 20 years of TIMSS trends, he has built a long standing reputation for excellence in international assessment. With vigilance and good humor combined with a deep understanding and appreciation of good measurement, he has steadfastly worked to improve the quality of the methods, procedures, and documentation underlying each TIMSS and PIRLS assessment. In addition, he has been a long-serving and valuable member of IEA’s Technical Expert Group.

The international TIMSS and PIRLS community owes a debt to Mick for his ingenuity and leadership. He has been known to observe that everything in international large-scale assessment is a “trade-off” between the ideal and the attainable. Over the years, he has been masterful in optimizing the trade-offs in directing TIMSS and PIRLS.

Abstract: For each of the countries assessing the same fourth grade students in TIMSS and PIRLS 2011, the TIMSS & PIRLS International Study Center explored hierarchical linear models of school effectiveness. Based on a strong conceptual model of factors universally relevant to promoting high educational achievement, we began by analyzing how school environment and instruction are related to student achievement in reading, mathematics, and science. The three school environment scales included in the analyses were *Schools Are Safe and Orderly*, *Schools Support Academic Success*, and *Adequate Environment and Resources*; and the two school instruction scales were *Early Emphasis on Reading Skills* and *Students Engaged in Reading, Mathematics, and Science Lessons*. In particular, the school environment factors had a significant impact in all three subject areas in a number of countries.

Next, because an effective school is one that has an effect on student achievement over and above any home background influences, the analysis relied on parents' responses to questions on the PIRLS parents' questionnaire to control for home background. The *Home Resources for Learning* scale summarized parents' responses about their levels of education and occupation, as well as the presence of educational supports in the home. In addition, two scales described parents' reports of their children's abilities in reading and mathematics on entering school – the *Early Literacy Tasks* scale and the *Early Numeracy Tasks* scale. Taken together, these scales provided a strong control for the impact of student home background, covering the general socioeconomic status of the home as well as the emphasis on early learning and encouraging a good start in school. In almost every country, these scales were related to achievement in all three subjects, showing the reinforcing nature of the relationship between home and school. Schools with students from advantaged home backgrounds tend to benefit generally by having academically supportive environments and offering more advanced curriculum and instruction.

KEYNOTE LECTURE 3

Inequality and Academic Achievement

Larry V. Hedges, *Northwestern University, United States*

27 June 2013 | 9:00–10:00 | Location: NIE6-01-LT1

Chair: Hans Wagemaker, *IEA*

Profile of Larry V. Hedges: Larry V. Hedges is the Board of Trustees Professor of statistics and professor of educational and social policy at Northwestern University. He was formerly the Stella M. Rowley Distinguished Service Professor of education, psychology, and sociology at the University of Chicago. His research interests include the development of statistical methods for educational and social research, and educational policy analysis. Major areas of his methodological work include the development of statistical methods for combining evidence from multiple empirical research studies (meta-analysis) and the design and interpretation of social experiments. His work on educational policy concerns the relation of school resources to educational outcomes and the development of evidence-based social policy. He is currently president of the Society for Research on Educational Effectiveness. He is a member of the U.S. National Education Sciences Board and the National Academy of Education, and a Fellow of the American Academy of Arts and Sciences, the American Educational Research Association, the American Statistical Association, and the American Psychological Association. His books include *Statistical Methods for Meta-Analysis* (with Ingram Olkin), *The Handbook of Research Synthesis and Meta-Analysis* (with Harris Cooper and Jeff Valentine) and *The Social Organization of Schooling* (with Barbara Schneider).

Abstract: There is substantial variation across countries in economic inequality and recent studies have suggested that economic inequality is related to economic growth. What is less clear is whether economic inequality is related to academic achievement. There is a dynamic relation between inequality and achievement so that economic inequality at one point in time may be associated with the growth of mean academic achievement, but may also be related to growth in academic and economic inequality. This in turn may be related to future changes in achievement or inequality. While there is strong evidence within some developed countries (especially the United States) that income inequality and performance on academic tests are related, it is less clear that this is the case in all countries or across countries. Data from TIMSS and PIRLS are used to study these associations and the ways in which they differ depending on how inequality is measured (Gini index versus quantile differences) and whether they are different for reading and mathematics. We also examine confounding factors that might obscure relations between inequality and achievement.

KEYNOTE LECTURE 4

Quality of Schools and Teaching: What Can We Learn From International Studies?

Eckhard Klieme, *German Institute for International Educational Research (DIPF)*

28 June 2013 | 9:00–10:00 | Location: NIE6-01-LT1

Chair: Anne-Berit Kavli, *IEA*

Profile of Eckhard Klieme: Eckhard Klieme is a Professor for Educational Research, and the German representative to IEA. Since 2001, he directs the Department of Educational Quality and Evaluation at the German Institute for International Educational Research (DIPF). Eckhard has a strong background in educational measurement, educational effectiveness, and comparative studies. He graduated from the University of Bonn with diploma both in mathematics and psychology, and a Ph.D. in Psychology. Before joining DIPF, he was a senior researcher at the Max Planck Institute for Human Development in Berlin. Eckhard has been involved in several large-scale assessment programs, both at a national and an international level. He was head of the TIMSS video team in Germany, ran validation studies for TIMSS and TIMSS Advanced 1995, and developed the assessment of problem solving competencies for the Adult Literacy and Life Skills Survey (ALL). He also has been involved in the PISA studies since 1998 and is currently Study Director for questionnaire development, and chair of the International Questionnaire Expert Group in PISA 2015. At DIPF, he directed the German National Assessment of Language Skills (2001–2006), as well as classroom studies on mathematics and science education, and large-scale evaluation programs for school improvement.

Abstract: International Large-Scale Assessments (ILSA) primarily aim at measuring and comparing student achievement. However, in its early years IEA developed a broader framework – the CIPO-model – which connects student outcomes to aspects of the systemic and cultural context (e.g., cultural values and tracking policies), input (e.g., class size and teacher qualifications), and process factors (such as opportunity-to-learn, i.e., coverage of concepts and tasks in classroom teaching). The CIP variables are measured by questions put to students, teachers, principals, and parents. ILSA allow for describing the distribution of CIP factors within and between countries, and their relation with student achievement. OTL, for example, has been shown to be strongly correlated with student outcomes.

If we define “good schools” as “schools reaching high levels of student achievement on average,” ILSA data may be used to characterize “good schools”: CIP factors that are positively correlated with mean achievement are considered to be indicative of school quality. International studies have shown that cultures (educational systems) differ with regard to their respective indicators of “good schools.” For example, resources are mainly relevant in developing countries. Also, the relationship between school climate factors and student achievement varies between systems. Other factors identified as relevant in many countries include academic expectations, assessment and evaluation policies, and leadership. Studying patterns of such variables, and their relationships with outcomes, helps understand the impact of culture and system structure on schooling. Similarly, analyses on the classroom level will help understand good teaching.

The lecture will present some recent research on OTL and school climate based on ILSA data. Cultural differences will become visible, and factors related to school quality will be identified. However, in educational effectiveness research, “good schools” are nowadays identified by value-added measures rather than gross outcomes. Therefore, more complex analytical strategies such as difference-in-differences approaches and longitudinal enhancements (such as the SIMS study on

student growth and classroom processes, and the national enhancement to TIMSS 1995 in Germany) will be discussed.

SESSION ABSTRACTS

SESSION 1A: PIRLS/TIMSS

Influence of Reading Ability and Home Language on Math and Science Achievement

26 June 2013 | 14:00–15:30 | Location: NIE7-01-LT3

Chair: Siew Yee Lim, *Ministry of Education, Singapore*

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

The Impact of Reading Ability on TIMSS Mathematics and Science Achievement at the Fourth Grade: An Analysis by Item Reading Demands

Ina V.S. Mullis, Michael O. Martin, and Pierre Foy, *TIMSS & PIRLS International Study Center, Boston College, United States*

This research uses the TIMSS/PIRLS 2011 database to explore the impact of reading achievement on mathematics and science achievement at the fourth grade internationally. The TIMSS 2011 fourth grade mathematics and science items were sorted into three groups of relative reading demand (high, medium, and low) for each subject based on a holistic evaluation. These reading demand item groups were used to create three different achievement subscales for mathematics and science. The subscales will be used to examine the relationship between PIRLS reading comprehension and performance on TIMSS mathematics and science items with different levels of reading demands within and across countries. This research will provide insight into the extent to which a lack of reading comprehension skills may give students a disadvantage in learning mathematics and science.

Keywords: reading in mathematics, reading in science, item reading demand, gender

Is English Proficiency a Source of Construct-Irrelevant Variance in Student Performance in TIMSS 2011? The Case of Singapore

Hui Leng Ng, Seau Fah Foo, Pik Yen Lim, and Chew Leng Poon, *Ministry of Education, Singapore*

Proficiency in reading in the test language is a potential source of construct-irrelevant variance that could threaten inferences about achievement on paper-and-pencil mathematics and science tests. When present, it is particularly problematic for international studies such as TIMSS where students in some education systems might be tested in a language different from their dominant home language. Hauger and Sireci (2008) investigated this using the TIMSS 1999 Grade 8 (G8) science data of three countries—including Singapore—and found little evidence of substantive differential item functioning (DIF) associated with how often students spoke the test language at home in all three countries. However, a limitation of their study was that they had used the frequency of speaking the test language at home as a proxy for reading proficiency in the test language. This is particularly so in Singapore because English—the test language—is the language of instruction for mathematics and science (and almost all other subjects) such that students from non-English-speaking homes who do not speak English frequently at home might also have high English-language proficiency. Therefore, we extended their work in two ways. First, we replicated their study using the frequency of speaking English at home as a proxy for reading proficiency in English, but using Singapore's TIMSS 2011 data for *both* G4 and G8 in *both* mathematics and science. Secondly, for G4, we also used the students' PIRLS 2011 reading scores as a more direct proxy of proficiency in reading English. We detected more items with DIF when we used the PIRLS 2011 reading scores than when we used the frequency of speaking English at home as the proxy for reading proficiency. However, overall, we still found little evidence that TIMSS 2011 mathematics and science items were substantively, differentially difficult for students with different proficiency in reading English.

Keywords: DIF, test language, TIMSS

Use of English at Home and Singapore Student Performance in PIRLS and TIMSS

Hui Leng Ng, Chew Leng Poon, Lee Shan Chan, and Huey Bian Ng, *Ministry of Education, Singapore*

According to Chall's (1983, 1996) reading-stage theory, children are expected to start to read to learn—as opposed to learn to read—at around Grade 4 (G4). Poor reading skills at G4 could thus be an impediment to learning in other areas. Research also shows that the home-language environment is an important channel through which family socioeconomic status (SES) influences a child's language development. This is a pertinent issue in traditionally multilingual and multicultural societies like Singapore, and also increasingly in places with a growing migrant population where the home-language environment is becoming more diverse. However, few studies have examined the impact of home language on school achievement in systems where the language of instruction is not the dominant home language for a *majority* of students. Using Singapore's PIRLS/TIMSS 2011 data, we investigated the association between home language and students' reading, mathematics and science achievement. We found that G4 students who spoke English—the language of the PIRLS/TIMSS assessments in Singapore—less frequently at home had lower reading, mathematics and science scores than those who spoke it more frequently, even after controlling for family SES and other student-background characteristics. However, the relationship between frequency of speaking English and mathematics/science performance virtually disappeared when the students' reading proficiencies were also taken into account. This implies that reading proficiency is an important predictor of mathematics and science performance in school at G4. Our results suggest that reading proficiency is an important factor influencing achievement that warrants more attention, especially by educators looking for a remediation lever to help students from lower-SES families.

Keywords: home language, SES, achievement, TIMSS, PIRLS

SESSION 1B: TIMSS

Methodological Issues in Large-Scale Assessment

26 June 2013 | 14:00–15:30 | Location: NIE7-01-LT4

Chair: Jana Straková, *Charles University in Prague, Czech Republic*

Discussant: Matthias von Davier, *Educational Testing Service, United States*

Steps in the Development of Diagnostic Education Information

Gregory Camilli, *University of Colorado, United States*

A method for investigating school (or state or country) level effects is proposed using item-level mathematics data from a typical large-scale assessment. A rationale for a diagnostic model at the higher-order level is offered, followed by a description of a multilevel multidimensional IRT (MIRT) model for this purpose. Third, an efficient aggregate model is proposed for estimating capacities at the higher-order unit. Features of this approach include: potentially borrowing item parameters from official IRT calibrations of large-scale programs, and determining a confirmatory factor structure. The model has been shown to be robust under various simulations. Results will be presented for the TIMSS 2007 data. Specifically, class-level factors will be estimated and aggregated to the jurisdiction level for exploring the population and policy differences on mathematics outcomes internationally at the elementary level.

Keywords: IRT, multilevel, multidimensional, MIRT, education policy, mathematics

Using Plausible Values in Secondary Analysis in the Large-Scale Assessment TIMSS

Inga Laukaityte and Marie Wiberg, *Umeå University, Sweden*

Plausible values are typically used in large-scale assessment studies, in particular the Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA). Despite its large spread there still exist some questions of the usage of the plausible values and how the usage affects the statistical analysis. The aim of this paper is to demonstrate the role of plausible values in large-scale assessment surveys when multilevel modeling is used. In order to achieve this goal, different user strategies of plausible values for multilevel models as well as means and variances were examined. The results show that some commonly used user strategies give incorrect results while others give reasonable estimates although incorrect standard errors. This finding is important for everyone who wants to make secondary analysis of large-scale assessment studies which uses plausible values, especially those with interest in using multilevel models to analyze the data.

Keywords: multilevel modeling, mathematics achievement, simulation study

Hierarchical Modeling With Large-Scale Assessment Data: Influence of Intra-Class Correlation on Sampling Precision

Sabine Meinck, *IEA Data Processing and Research Center, Germany*

Caroline Vandenplas, *University of Lausanne, Switzerland*

Most data collected in educational large-scale assessments (LSA) is very well suited for multilevel modeling because sampled individuals are usually nested within clusters (e.g., students nested within schools). Hierarchical models allow for the effect of explanatory variables at different clustering levels; parameters can be determined as fixed or random effects depending on the research question. All model parameters are however estimated based on random samples and are therefore subject to

sampling error. A Monte Carlo simulation was utilized to explore the connections between the sample sizes at different levels and intra-class correlation coefficients (ICCs) in settings that mimic scenarios typical for LSA. It was observed that varying levels of ICC influence the margins of sampling variance of the estimated model parameters in different amounts and even different directions. Assuming fixed sample sizes, the coefficients of variation (CVs) of the model parameters *mean of random intercepts* (γ_{00}) and *slope of random intercepts* (γ_{01}) increased with increasing ICC levels, as expected. However, the inverted relationship was observed for parameters U_0 – *variance of random intercepts*, γ_{10} – *mean of random slopes*, and β_1 – *fixed slope*: with increasing ICC, the CVs decreased. The findings can help us to determine sample sizes in LSA when particular hierarchical models are to be investigated.

Keywords: methodology, sampling, HLM

SESSION 1C: TIMSS/TIMSS ADVANCED

Predictors of Science Achievement

26 June 2013 | 14:00–15:30 | Location: NIE2-01-LT5

Chair: Barbara Malak-Minkiewicz, *IEA Secretariat, Netherlands*

Discussant: Kok Leong Boey, *National Institute of Education, Singapore*

Analysis of Science Intended Curriculum Based on Topics Recurrence

Masoud Kabiri and Mahmood Ghazi Tabatabaei, *University of Tehran, Iran*

Analysis of the intended curriculum in science was the main focus of this study. One aspect of intended curriculum relates to the number of grades that each topic repeated in the curriculum. To quantify, a measure was introduced to facilitate comparative analysis and computations were done for grade eight of TIMSS 2007. It was entitled as the topic recurrence rate which showed the average of recurrence of topics per country. Furthermore, the role of the index on science average scale point was examined. Results revealed the relationship was not significant, so recurrence of topics was not interpreted as an important predictor of science achievement.

Keywords: intended curriculum, science achievement, topic recurrence index

A New Way of Recognizing the Spatial Distribution of Educational Issues: Regional Variation of Science Literacy in the Finnish TIMSS 2011 Data

Jouni Vetterranta, *University of Jyväskylä, Finland*

Heidi Harju-Luukkainen, *University of Helsinki, Finland*

Socioeconomic and cultural factors play a crucial role in students' educational achievement. We tend to use statistical models that provide an overview of different underlying socioeconomic variables when explaining educational achievement, but easily forget that these models only present an average or give a cross-sectional picture of the real life situations. In this way we may get a largely simplified view on things and forget the effect of underlying cultural factors, for example.

In this paper we take a closer look at the Finnish TIMSS 2011 data and try to present a new way of analyzing the data beyond the regular models. Firstly, we outline a two-stage linear model for science performance and its underlying socioeconomic factors. In that model, the distribution of explanatory factors and model residuals are observed. Secondly, we try to visualize the regional variation of science literacy scores and look for possible local accumulations. This variation and grouping of performance, together with relevant background factors, are studied by means of a spatial statistical method called kriging (e.g., Isaaks and Srivastava, 1989; Brimicombe, 2000). With the help of this model, contour maps are drawn in order to reveal and visualize, for example, any clear clusters of science literacy scores across Finland.

While also the explanatory factors tend to be clustered, these clusters do not necessarily follow the same pattern. Thus, regional variation in student factors does not explain the between-school variance. This can be confirmed by observing the contour map of random school intercepts, which shows clear clustering in this respect.

This knowledge is useful for local authorities and for national education policy as well. It is crucial to identify local special characteristics or cultural features for possible improvements and, on the other hand, in nationwide education policy it is important to consider whether there is a need for particular regional interventions.

Keywords: science literacy, GIS, kriging method, regional policy, social capital

Teachers' Professional Engagement and Student Achievement in Physics: Secondary Analyses of the Dutch TIMSS Advanced 2008 Data

M.R.M. Meelissen, M. Drent, and P.J.C. Sleegers, *University of Twente, Netherlands*

Teacher engagement has been the subject of many studies, especially in the context of teacher leadership. Its relation with educational outputs, such as student achievement, is often implied but has been hardly supported by empirical evidence. Using the data of TIMSS Advanced 2008, we investigated if the assumption, that a high level of professional engagement is one of the effectiveness enhancing conditions of schooling, is true for physics teachers in the final year of Dutch secondary education. First, the different concepts and indicators for teacher engagement used in the research literature were addressed. The exploration of the data started with a cluster analysis to define different 'types' of teachers with regard to their level of professional engagement. We found three type of teachers: private practice teachers, teacher professionals and teacher leaders. Multilevel analyses were conducted to explore the relationships between the different types of teachers' professional engagement and student achievement on the TIMSS Advanced physics test. In contrast to the literature, we found that students who are taught by a teacher showing a low level of professional engagement (private practice teachers) outperformed the students taught by professionally engaged teachers. These findings were discussed by taking into account the context of the specific characteristics of the students and teachers that participated in TIMSS Advanced 2008.

Keywords: physics, teachers, professional engagement, academic achievement

SESSION 1D: ICCS

Civic Achievement, Perceptions, and Expected Participation

26 June 2013 | 14:00–15:30 | Location: NIE3-01-LT9

Chair: Lars Qvortrup, *Aalborg University, Denmark*

Discussant: Wolfram Schulz, *Australian Council for Educational Research*

Multiple Pathways to Success: Exploring the Link Between Quality Assurance and Students' Civic Achievement by Using Qualitative Comparative Analysis (QCA)

Triin Lauri and Anu Toots, *Tallinn University, Estonia*

The importance of responsible citizen has risen in most countries. However, the variation of civic achievement across countries is substantial and raises the question on quality of teaching and learning. The current paper analyzes the complex causal link between high civic achievement and national quality assurance systems by using data of the ICCS 2009 teacher questionnaire and encyclopedia. Thirty eight countries from Europe, Asia and Latin America with different approaches to teachers' professional development and students' assessment that form the core of the quality assurance have been selected. We assume that there are different configurations of quality assurance systems producing high civic achievement. By using fuzzy set Qualitative Comparative Analysis (fsQCA), we investigate in set theoretic notions these various pathways composed of five institutional features of national quality assurance systems. The analysis is conducted in two steps. Firstly, we determine the remote conditions of success, i.e., the outcome enabling conditions (Schneider & Wagemann, 2006). The second step aims to define consistent solutions that illustrate the interplay between institutional features and the context in which these are embedded. We test, first, whether countries with different levels of social and human development differ also in outcome enabling conditions? Second, whether 'national testing' is one of the necessary components in the sufficient configuration, which produces high civic achievement? And finally, we study the sufficient combinations of conditions under which countries demonstrate high civic achievement. QCA fuzzy set method adds a new insight into the analysis of large scale survey data by making use of qualitative data of study encyclopedias. From the practical point of view study findings allow for improving national quality assurance systems in secondary education.

Keywords: ICCS encyclopedia, civic achievement, students' assessment, quality assurance, fuzzy set method

Cross-National Equivalence of Students' Perceptions of Good Citizenship in ICCS

Dorota Weziak-Bialowolska and Maria Magdalena Isac, *European Commission – Joint Research Centre, Italy*

The study reported in this article assesses whether two concepts measured in the International Civic and Citizenship Education Study (ICCS) 2009, namely (1) students' perceptions of the importance of conventional citizenship and (2) students' perceptions of the importance of social-movement-related citizenship, are comparable across all countries participating in the study. In particular by means of confirmatory multi-group factor analysis we tested for invariance of measurements across countries which can ensure that meaningful comparisons can be conducted. The results show a complex picture indicating that the concepts are not necessarily comparable across all countries involved in ICCS and their use for secondary data analysis can be more or less feasible across all countries depending on the research questions and the methodology applied. Scientific and practical implications are discussed.

Keywords: citizenship values, measurement invariance, concept equivalence, factor analysis, ICCS

Predictors of Asian Adolescents' Expected Future Legal Protest Participation: A Multidimensional Rasch Modeling and Path Analysis

Jinxin Zhu, Xiaoxue Kuang, Kerry John Kennedy, and Magdalena Mo Ching Mok, *The Hong Kong Institute of Education*

Aims: This study aims to explore the external and internal factors that potentially predict and explain Asian adolescents' intention related to future legal protest participation. These factors include political self-efficacy, political interest, and adolescents' political experience.

Data source: The data were taken from a student questionnaire conducted in five societies, Hong Kong SAR, Indonesia, Korea, Thailand, and Taiwan, as part of the International Civic and Citizenship Education Study (ICCS).

Sample: The sample of this study comprised 23,654 students (aged around 14), from 673 classes from 667 schools, with 11,850 (50.1%) male students and 11,587 (49.0%) female students, and 217 (0.9%) students who did not indicate their gender.

Methods: Multidimensional random coefficients multinomial logit model (MRCMLM) was employed to generate five sets of plausible values, as five samples of the estimates, for each variable using ConQuest (Version 2.0). Using MPlus software (Muthén & Muthén, 2012), path analysis was employed to analyze each set of plausible values five times to get the averaged result.

Result: The present study identified political interest and political self-efficacy as significant predictors of their intention to participate in legal protests in the future. With the exception of Taiwanese students, community participation might directly affect the participation of Asian adolescents in future legal protest. Both political discussion and school participation have only indirect and not strong effects via political interest or political self-efficacy. This means that if the activities do not arouse interest, or enhance the self-efficacy of adolescents, the impact on future legal protest participation is doubtful.

Keywords: adolescent, political socialization, political self-efficacy, political interest, protest

SESSION 2A: PIRLS

Home Environment, Socioeconomic Status, and Reading Literacy

26 June 2013 | 16:00–17:30 | Location: NIE7-01-LT3

Chair: Andrea Netten, *National Center for Language Education, Netherlands*

Discussant: Monica Rosén, *University of Gothenburg, Sweden*

The Influence of Home Environment on Reading Achievement

Lisa De Bortoli and Greg Macaskill, *Australian Council for Educational Research*

Home environment plays an important role in a child's academic achievement. In this research, the influence of home environment on reading achievement is explored using the PISA 2011 data for Australia and a number of high performing countries. Home environment refers to socioeconomic background, books in the home, parents' attitudes towards reading and parents' involvement with their child's early literacy development.

Correlations and basic regression analyses were used to propose a path model of the home environment factors and student attitudes and confidence that may influence reading achievement. The findings show the variance of reading achievement explained in the path model ranged from 11% to 28% across the selected countries, being generally higher in English speaking and European countries and lower in Asian countries.

Keywords: reading achievement, path analysis, home environment

Effects of Early Home and Preschool Environments on Reading Literacy: Longitudinal Evidence From PIRLS

Rolf Strietholt, *University of Dortmund, Germany*

Nina Hogrebe, *Westfälische Wilhelms-Universität Münster, Germany*

Wolfgang Böttcher, *Westfälische Wilhelms-Universität Münster, Germany*

Wilfried Bos, *University of Dortmund, Germany*

This study investigates the causal effects of preschool and home environments on reading achievement at the end of primary school. We use PIRLS trend data on country level and relate the level of parental engagement in early home literacy activities and preschool participation to reading achievement by means of a longitudinal fixed effects model on country level. Cross-country analyses allow for causal conclusions as they circumvent the problem of allocation and selection mechanisms that operate on lower levels within countries. Furthermore, the methodological approach of our study extends the perspective on the effect of children's early learning environments on later student achievement by being able to draw more general conclusions. We find that in countries where parents get more engaged over time, reading achievement also increases. However, our study does not support any causal relationship between preschool participation and student achievement.

Keywords: early home literacy activities, preschool, reading achievement, causal effects

SESSION 2B: TIMSS

Performance in the Science Content Domains

26 June 2013 | 16:00–17:30 | Location: NIE7-01-LT4

Chair: Chew Leng Poon, *Ministry of Education, Singapore*

Discussant: Wolfram Schulz, *Australian Council for Educational Research*

Estimation of Science Topic Area Scores for Iranian Eighth Graders in TIMSS 2007

Masoud Kabiri, *Research Institute for Education, Iran*

Results of TIMSS were published in two levels – average scale score (math or science scores) and domain score (cognitive or content domain scores). While knowledge about domain scores is useful, more detailed information is needed about students' performance. In the present article, the focus is on estimation of topic area science scores for Iranian eighth graders in TIMSS 2007. Based on items in each topic area, 12 estimations were done by applying plausible values methodology. Results showed that compared to the average science scale score of Iran, some topic areas such as “forces and motion”; “physical states, changes in matter, electricity and magnetism”; and “earth processes, cycles and history” had been achieved better than others. On the other hand, “light and sound”; “cells, their functions and human health”; and “ecosystems” had not been achieved well. Furthermore, some topic areas performed better in higher benchmarks whereas others are good in lower benchmarks, considering relatively similar averages. In addition, private schools are significantly better than public schools; but, higher averages of girls rather than boys were not significant in all topic areas. Findings suggested that more detailed knowledge about performance of topic areas or even topics help to give diagnostic information for curriculum developers and policy makers.

Keywords: science education, plausible values, diagnostic information

A DIF Analysis of the TIMSS 2007 Assessment in Physics and Chemistry Focusing on the Matching of the Test Items and Curricula: Comparison of Japanese and Korean Eighth Graders

Yasuhito Hagiwara and Kenji Matsubara, *National Institute for Educational Policy Research, Japan*

The present study analyzed the differential item functioning (DIF) between Japanese and Korean eighth graders in the TIMSS 2007 assessment in physics and chemistry using item response models. Matching of each test item and the coverage of national curricula of the two countries was taken into account.

The result showed that, after controlling for the latent trait, the advantage of Japanese eighth graders over Korean students was almost lost when the items were not covered by Japan's curriculum but were covered by Korea's one in the cognitive domain of applying in both physics and chemistry. The result also showed that Japanese eighth graders tended to solve the items more easily than Korean students after controlling for the latent trait when the items were covered by Japan's curriculum but were not covered by Korea's one in the cognitive domains of applying and knowing in chemistry. On the other hand, it became clear that, compared with Korean students, Japanese eighth graders tended to have difficulties solving the items after controlling for the latent trait when the items were not covered by Japan's curriculum but were covered by Korea's one in the domain of knowing in physics. However, such obvious relationships between the test-curriculum matching and the status of DIF were not found in the domain of reasoning.

In conclusion, it could be valid to say that the differences in the coverage of the two countries' national curricula are associated with the differences in the item difficulty particularly in the domains of knowing and applying.

Keywords: differential item functioning, test-curriculum matching analysis, physics, chemistry, eighth graders

School Emphasis on Academic Success: Exploring Changes in Performance Employing Two-Level SEM

Trude Nilsen, *University of Oslo, Norway*

Jan-Eric Gustafsson, *University of Gothenburg, Sweden*

The main purpose of this study is to investigate the impact of possible changes in *School Emphasis on Academic Success* (SEAS) on changes in science performance in Norway from 2007 to 2011.

After almost two decades of declining science performance, Norwegian eighth graders performed significantly better in TIMSS 2011 than in 2007. Between the last two cycles of TIMSS, a new curriculum was implemented in Norway. The new curriculum has an enhanced focus on academic success and in educational policy discussions there is an increasing attention on academic performance.

Previous research has demonstrated the importance of schools' collective trust, efficacy, and performance emphasis (or SEAS) for academic achievement. In addition to SEAS, safe schools (SAFE) is another aspect of school climate which is important to academic success. We thus investigate whether changes in educational policy are reflected in changes in SEAS and SAFE from 2007 to 2011, and whether possible changes in SEAS and SAFE may explain increased performance in science in general, and in earth science specifically.

We employ a two-level (student and teacher-level) structural equation modeling (SEM) approach, using the software Mplus. Utilizing merged data from TIMSS 2007 and 2011, we investigate mediation models. Two models were built, one in which science achievement at class-level is a latent variable indicated by the four sub-domains physics, chemistry, biology and earth science, and one where achievement in the four sub-domains is measured as manifest variables. Our main result is that change in SEAS explains change in science achievement in all four sub-domains.

Keywords: school emphasis on academic success, safe schools, science, earth science, SEM

SESSION 2D: ICCS

Regional Comparisons of Civic Engagement and Curricula

26 June 2013 | 16:00–17:30 | Location: NIE3-01-LT9

Chair: Julian Fraillon, *Australian Council for Educational Research*

Discussant: Bruno Losito, *Roma Tre University, Italy*

The ‘Civic Potential’ of Students: An Investigation of Students’ Civic Knowledge and Conceptions of Active Citizenship in Five Asian Societies

Kui Foon Chow and Kerry John Kennedy, *The Hong Kong Institute of Education*

This paper contains a person-centered analysis of Asian young adolescents’ intention to participate in the future through political participation including electoral and other active political participation. It is based on the IEA International Civic and Citizenship Education Study 2009 which investigated the ways in which young people in lower secondary schools were being prepared to undertake their roles as citizens. Data from approximately 23,000 students from five Asian societies, i.e., Taiwan, Hong Kong, Korea, Indonesia and Thailand, were analyzed to inform the homogeneity and heterogeneity of adolescents’ intention to participate within and between societies as well as sub-regions in Asia.

This study indicated that Asian students’ conceptions of active citizenship are not unidimensional. Based on their expected participation in five kinds of civic activities, they can be classified into four distinct types: 1) *Active Participants*: students who are relatively most enthusiastic in participating in various kinds of civic activities; 2) *Conventional Participants*: students who favor voting most but reject illegal protest while holding possibilities with other activities; 3) *Radical Participants*: students who are generally not certain about any kinds of activities but hold possibilities about them; and 4) *Minimal Participants*: students who are relatively least motivated to participate across various activities except they are still positive about voting. The proportion of types varies across the five societies. For example, Taiwan and Hong Kong share parallel proportions across four citizen types. Unlike her East Asian peers, Korea has an exceptionally large proportion of ‘Radical Participants’ students. Despite sharing a similar proportion of ‘Minimal Participants’, Indonesia and Thailand showed large differences in proportions of the other types.

In relation to civic knowledge, it is observed across the four participant types that Active Participants possess on average the highest civic knowledge score while Radical Participants the least. Conventional Participants and Minimal Participants are associated with comparable average civic knowledge scores. The results, in general, suggest there may be both complementarity and trade-off between civic knowledge and intention to participate. The findings reported here challenge the current literature on students’ civic competence, which commonly conceptualizes and measures the term by summing it up in multiple dimensions but ignores the possible contested and diverse nature.

Keywords: ICCS, civic and citizenship education, comparative citizenship education studies, civic knowledge, active citizenship, Asia

Political Activism of Low Achieving and High Achieving Students in 10 European Countries

Tõnu Idnurm and Anu Toots, *Tallinn University, Estonia*

The current paper uses ICCS 2009 data to investigate political interest and participatory attitudes of low and high achieving students in ten European countries. Our claim is that low cognitive competencies are not necessarily associated with low interest in politics and political participation. We assume that students in educational risk do not form a uniform group but instead represent

different patterns of citizenship participation. Furthermore, their participation patterns currently in school and in future politics are probably different. Low achievement may hinder trust towards and participation in school activities. However, for future political activism the effect of low achievement may be both encouraging (compensating) or discouraging. Larger cross-country variance is to be expected in future political activism, partly explained by the political context. Two separate cluster analyses have been run to test the assumptions. The analysis resulted in four clusters differing by respondents' self-efficacy, and real or expected participation in various forms. Regarding current activism in school, low achieving students belong mainly to one cluster whereas in future political activism they become divided into two opposite groups – one is totally alienated from politics whereas another group has high self-efficacy and readiness for multiple participation. Contrary to low achievers, high achieving students become more uniform in their future political activism. There is also interesting cross-country variance in the clustering. By focusing on youth subgroups the current analysis contributes to a better understanding of contemporary youth citizen activism and helps to design better targeted measures for education policy interventions.

Keywords: ICCS, low achievers, political interest, school activities, political participation, cluster analysis

National Curricular Guidelines and Citizenship Education in Schools in Latin American Countries

Martín Bascopé, Macarena Bonhomme, Cristián Cox, Juan Carlos Castillo, and Daniel Miranda,
Pontificia Universidad Católica de Chile

The aim of this study is to contrast two different sources of information regarding citizenship education in Latin America: curricular guidelines, and students' civic attitudes and practices. When analyzing curricular guidelines, we consider the official national documents of the respective ministries of education, whereas regarding civic practices and attitudes, we analyze the results of the 2009 ICCS study. By using quantitative methods, we contrast the curricular emphasis and students' results for each of the six countries considered. Our findings show that several curricular absences are associated with students' low achievement in civic and citizenship knowledge and attitudes. Therefore, these results provide some guidelines for improving the official curricular documents and developing more empirical research on less-covered civic topics. Finally we encourage further research on classroom practices, especially on the topics highlighted in this research, such as authoritarianism, peaceful coexistence, national and regional identity, and accountability. Inside classroom research is very important to have a complete view of civic/citizenship curricular guidelines and practices, considering the limitations implied by looking at the intended curriculum (official documents) rather than the one implemented.

Keywords: civic/citizenship education, curriculum, Latin America, political socialization, comparative/international studies

SESSION 3A: PIRLS/PREPIRLS

School Factors, Age Effects, and Reading Achievement

27 June 2013 | 10:30–12:00 | Location: NIE7-01-LT3

Chair: Oliver Neuschmidt, *IEA Data Processing and Research Center, Germany*

Discussant: Ina V.S. Mullis, *Boston College, United States*

Exploring Relationships Among Macro Contexts, Principals' Time Use for Interaction With Individual Students and Academic Achievement

Moosung Lee, *The University of Hong Kong*

Allan Walker, *The Hong Kong Institute of Education*

Ji-Hoon Ryoo, *University of Virginia, United States*

This study has two goals. First, it aims to examine the impact of macro contexts on elementary school principals' time allocation for interaction with individual students when key organizational contexts are controlled for. Second, it further explores the impact of macro contexts and principals' time allocation on academic achievement. Specifically, the study focuses on analyzing how economic, socio-cultural and institutional features of societies influence the amount of time principals spend interacting with individual students which, in turn, is assumed to impact academic achievement. The study employed multilevel path modeling to analyze data on 5,927 principals in 34 societies, drawn from the Progress in International Reading Literacy Study (PIRLS) 2006. Results indicate that interacting with individual students as part of the principal role appears to be conceived and enacted differently across the 34 societies. The variation in principals' time usage was influenced by macro societal culture and the institutional arrangement of educational systems, when organizational contexts were held constant. Furthermore, the status of economic development as a key macro contextual factor was significantly linked to academic achievement, whereas the proposed test of principals' *direct effects* on student learning was not supported. The study contributes to a growing body of research on principals' time use that seeks to understand how the practice of school leadership is influenced by macro contexts as well as organizational conditions. By further linking principals' time use for interaction with individual students to academic achievement, the study contributes to building a solid foundation for a future research agenda aimed at investigating principals' *direct effect* on student learning internationally.

Keywords: principal time use, principal leadership, macro contexts, interaction with students, direct effect of principal leadership, academic achievement

Factors That Affect South African Reading Literacy Achievement: Evidence From prePIRLS 2011 Using Aspects of Carroll's Model of School Learning

Surette van Staden, *University of Pretoria, South Africa*

Roel Bosker, *University of Groningen, Netherlands*

This study aims to identify factors that predict reading literacy achievement among Grade 4 students in South Africa by utilizing aspects of Carroll's model of school learning. The study draws on the preProgress in International Reading Literacy Study (prePIRLS) 2011 data, which places South African Grade 4 students' results substantially below the international center point of 500 at 461 (SE=3.7). Selected items from the prePIRLS 2011 student, parent and teacher questionnaires were used in a two-level model to determine the effect of student aptitude, opportunity to learn and quality of instructional events on reading literacy achievement. The results point to the statistical significance of engaged reading and cultivating motivation for reading among students from an early age, specifically through parental involvement in introducing early literacy activities as a foundation of

reading literacy by school-going age. Other results provide evidence for the importance of the value of reading across the curriculum not confined to formal reading lessons only. The teaching of reading comprehension skills and strategies is identified as a significant predictor of reading literacy achievement, instruction of which should form an integral part of teaching reading in the classroom.

Keywords: Carroll's model of school learning, contextual factors, prePIRLS 2011, reading literacy achievement

Relative Age and Reading Achievement: School Entry Age, Grade Progression, and Cross-National Variation in Age Effects

Ben Dalton, *RTI International, United States*

Comparing populations with different age structures for the same grade raises important questions about the processes that create these distributions and how those processes differ across countries. This paper discusses the importance of school entry age and grade progression for understanding age distributions in the Progress in International Reading Literacy Study (PIRLS), and analyzes variations in the effects of age among the PIRLS 2006 participating jurisdictions. Results diverge from the common finding that older students have an advantage over their younger peers. Using a measure of age relative to the most common (modal) age for fourth graders in each jurisdiction, and controlling for a derived measure of grade progression, the findings show that modal age fourth-graders typically perform better than younger students as well as perform better than above-mode aged students. Continued attention is warranted in international assessment programs to the factors that shape age and grade distributions.

Keywords: age, reading literacy, PIRLS, fourth grade

SESSION 3B: TIMSS

School Effectiveness in Math and Science

27 June 2013 | 10:30–12:00 | Location: NIE7-01-LT4

Chair: Chew Leng Poon, *Ministry of Education, Singapore*

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

The Effects of School and Students' Educational Contexts in Korea, Singapore, and Finland using TIMSS 2011

Soojin Kim, Jihyun Park, Sangwook Park, and Sungsook Kim, *Korea Institute for Curriculum and Evaluation*

In order to obtain an adequate amount of information on what the students have achieved and how students can improve the learning, it is necessary to understand the educational contexts where the learning takes place. In this study, the structural relation of students' mathematics achievement and educational context variables were examined among three countries such as Korea, Singapore and Finland using TIMSS 2011 data. The educational contextual variables were selected from the questionnaire for school principals, teachers and students to analyze the intended curriculum of each country. Having mathematics achievement scores as an indicator of attained curriculum, this study tries to model the school effectiveness and examine which factors are affecting the mathematics achievement most. A two-level model of student and school were analyzed. As the results, this study found out the educational contextual characteristics of high performance and reasons why these countries are outperformed well in spite of many involved factors, and the social and cultural differences between countries.

Keywords: context variables, TIMSS 2011, mathematics achievement

School Effectiveness in Mathematics in Sweden and Norway in 2003, 2007, and 2011

Marie Wiberg, Ewa Rolfsman, and Inga Laukaityte, *Umeå University, Sweden*

International studies like TIMSS usually highlight students' study result changes between two assessments. The aim of this study is to identify factors that contribute to the explanation why some schools are effective but others are less effective in terms of the students' academic achievement in mathematics on TIMSS. We focus on the school efficiency in Sweden and Norway at the time points 2003, 2007 and 2011. In the core subject mathematics, Sweden's result declined in TIMSS between 2003 and 2011 while Norway's result increased. Since Sweden and Norway have similar educational systems it is of interest to examine the increase in Norway as opposed to the decline in Sweden between 2003 and 2011. We used multilevel analysis in order to separate the effect of school level variables from the effect of students' home environment and to take care of the sampling design used in TIMSS. The results show that Norway and Sweden exhibit different trends. In Norway it was possible to identify school level factors which affect the students' achievements. In Sweden this could not be obtained. Note, in both countries at all three time points most of the student home background factors were significant suggesting that the students' background plays a large role in mathematics achievement.

Keywords: multilevel analysis, school level factors, efficient schools, country comparison

School Effectiveness in the Nordic Countries in Relation to PISA and TIMSS

Ewa Rolfsman, Marie Wiberg, and Inga Laukaityte, *Umeå University, Sweden*

In a Nordic perspective, the Finnish students overall achieve the highest score on PISA, while the Swedish students exhibit declining results. The results of the Swedish students have drawn attention to the quality of education and the role of the educational professionals and the efficiency of the school. It is therefore of vital importance to investigate whether these results can be related to school level factors in a Nordic perspective. However, TIMSS and PISA exhibit similarities as well as differences as they target different subjects. In addition, the results on TIMSS and PISA differ between countries. The aim of this study is to investigate whether school level factors can contribute to the explanation of the results for the Nordic countries participating in PISA 2009 and, if so, identify factors that can be influenced in order to enhance students' achievement. We focus on school effectiveness in relation to PISA, since all Nordic countries participate in PISA. However, the results are contrasted to results from TIMSS for Sweden and Norway. In order to separate the effect of school level variables from the effect of students' home environment and to take care of the sampling design used in TIMSS and PISA, multilevel analysis was used. The results show that only a few school level factors were significant, and only in Sweden and Finland. Furthermore, school level factors in Sweden and Norway on PISA differ from school level factors based on TIMSS data.

Keywords: PISA, TIMSS, school effectiveness, school questionnaire, principal

SESSION 3C: TIMSS

Student, Class, and School Level Effects in TIMSS

27 June 2013 | 10:30–12:00 | Location: NIE2-01-LT5

Chair: Berinderjeet Kaur, *National Institute of Education, Singapore*

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

A Multilevel Analysis of Mathematically Low-Achieving Students in Singapore

Qian Chen, *National Institute of Education, Singapore*

In this study, TIMSS 2007 data were analyzed with a particular focus on mathematically low-achieving students at grade four in Singapore. Specifically, the quantity and major characteristics of mathematically low-achieving fourth graders were examined. Furthermore, eight variables at the student level and nine variables at the school/class level were used to build the two-level hierarchical generalized linear model so as to predict the status of mathematically low-achieving fourth graders. The final model suggested that six variables at the student level (i.e., student gender, number of books at home, frequency of test language spoken at home, frequency of mathematics homework, student's self-confidence in learning mathematics, student's perception of school safety) and two variables at the school/class level (i.e., teacher professional development opportunity and principal's perception of school climate) significantly predicted the status of mathematically low-achieving fourth graders. Implications for educational research and practice are presented at the end of this paper.

Keywords: low-achieving, mathematics achievement, grade four, TIMSS 2007, Singapore

Background Factors Behind Mathematics Achievement in the Finnish Education Context: Explanatory Models Based on TIMSS 1999 and TIMSS 2011 Data

Pekka Kupari and Kari Nissinen, *University of Jyväskylä, Finland*

The aim of this study is to explore student, classroom and school factors behind mathematics achievement of the Finnish secondary school students. What are the background factors most strongly related to achievement in the Finnish educational context, and what are the changes in the explanatory models between TIMSS 1999 and TIMSS 2011? The conceptual framework for this study is based upon the IEA thinking on curriculum, while the TIMSS curriculum model establishes a comprehensive description of factors that have been shown effective in increasing achievement in mathematics and science. In total, 14 background variables situated in student, classroom and school levels are explored. In analyzing the data, multilevel modeling is applied. First tentative results show that the most significant predictors for students' mathematics achievement are very similar in 1999 and 2011. Furthermore, the three-level model of TIMSS 2011 data provides new information regarding the distribution of the total variance in mathematics achievement, suggesting that differences between classes in mathematics achievement are bigger than thought before.

Keywords: mathematics, student achievement, background factors, multilevel modeling

SESSION 3D: CIVED/ICCS

Contextual Factors and Civic Attitudes

27 June 2013 | 10:30–12:00 | Location: NIE3-01-LT9

Chair: Bruno Losito, *Roma Tre University, Italy*

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

A 1999–2009 Trend in Expected Electoral Participation in Seven European Post-Communist Countries

Plamen Mirazchiyski and Diego Cortés, *IEA Data Processing and Research Center, Germany*

During the first decade after the collapse of communism in Europe, civic participation in former communist countries was found to be lower than in the western counterparts. Literature suggests this is rooted mainly in the aversion from the mandatory civic participation during the totalitarian regime, disillusionment and disappointment from the democratic new regimes emerging in the 1990s. This article uses data from seven countries from 1999 and 2009, 10 and 20 years after the fall of the communistic regimes in Europe. Results show that the levels of anticipated electoral participation in studied Eastern European and Central European post-communist countries have changed from 1999 to 2009, but in different directions.

Keywords: electoral participation, youth, democracy, post-communist

Impact of Track Attended on Civic Attitudes of Secondary School Students in the Czech Republic

Jana Straková and Jaroslava Simonová, *Charles University in Prague, Czech Republic*

Many research studies have dealt with the impacts of the stratification of education systems on student outcomes and student self-concept. Little attention has been given to the impact of stratification on the formation of civic attitudes. This paper examines the attitudes of Czech students in different tracks of secondary education towards participation in elections, civic and school engagement, and ethnic minority rights, and how the differences in student attitudes have changed in the different schools and tracks in the past decade. The paper also explores the school factors that influence student attitudes. Data from CIVED (Civic Education Study) in 1999 and the Civic Attitudes of Young People Survey (OPM) in 2010 are used. The data were analyzed by means of hierarchical multilevel modeling. The results show that attitudes did not change between 1999 and 2010. However, we found significant differences in attitudes between different tracks: students from the general track have more positive attitudes than students from vocational tracks. The differences between tracks did not increase between 1999 and 2010.

Keywords: civic attitudes, tracking, IEA CIVED, upper secondary education

Attitudes Towards Political Engagement Among Lower Secondary Students in East Asian Countries: Results From ICCS 2009

John Ainley, Wolfram Schulz, and Julian Fraillon, *Australian Council for Educational Research*

Based on student survey data from five East Asian countries, the paper contains an analysis of attitudes towards the use of personal connections in politics and towards personal morality among politicians. The first part of the analysis describes the extent and variations of these attitudes which are viewed as of particular relevance within the East Asian context. The second part of the analysis investigates the relationship of these attitudes with student background and school-related variables

such as civic knowledge as well as uncovering to what extent these attitudes are related to indicators of future civic engagement among students.

Keywords: cross-national research, citizenship education, Asian region

SESSION 4A: TIMSS/PIRLS

Long-Term Changes in Math and Reading Achievement

27 June 2013 | 13:30–15:00 | Location: NIE7-01-LT3

Chair: Susan Wee, *Ministry of Education, Singapore*

Discussant: Peter Nyström, *University of Gothenburg, Sweden*

A Remedial Action Based on Taiwanese Students' Results in TIMSS

Su-Wei Lin, *National University of Tainan, Chinese Taipei*

Pi-Hsia Hung, *National University of Tainan, Chinese Taipei*

Fou-Lai Lin, *National Taiwan Normal University, Chinese Taipei*

Shrinking achievement gaps is very important in educational and social progress. TIMSS provides information on the achievement gaps among different countries in mathematics and science. For Taiwan, based on the results of TIMSS 2003, there was an excellent average performance in Taiwan. However, the proportion of low achievers was high and the overall students' learning interest and self-efficacy were quite low. In order to narrow the achievement gaps in Taiwan, the policy of After School Alternative Program (ASAP), was proposed by the Ministry of Education (MoE) and National Science Council (NSC), which aimed at ensuring both academic excellence and equity by providing new opportunities and challenges for Taiwan to advance the goal of closing the achievement gap. The purpose of this study was to precisely analyze ASAP fourth and eighth graders' math achievement results during 2009–2010. By comparing ASAP students' math achievements and affect profiles of three time points, the results showed that the effects of ASAP not only improve academic performance but also reduce negative goal orientation about mathematics learning. However, there were still 12% of Taiwanese eighth grade participants identified as low-achievers in TIMSS 2011; the result showed we still need to make more efforts and to figure out a more considerate policy in facilitating the proportion of low-achievers.

Keywords: TIMSS, mathematics achievement gap, low achiever, remedial program, After School Alternative Program

PIRLS Messages Revisited: Changes in Reading Literacy Achievement of Dutch Fourth Graders and Associated Factors in the Last Decade

Andrea Netten, *National Center for Language Education, Netherlands*

Marinus Voeten, *Radboud University Nijmegen, Netherlands*

Mienke Droop, *Radboud University Nijmegen, Netherlands*

Ludo Verhoeven, *Radboud University Nijmegen, Netherlands*

This study examined changes in reading literacy achievement in the past decade and how various background factors and the students' literacy environment have an impact on the reading literacy outcomes of fourth grade students in the Netherlands, using 2001, 2006 and 2011 PIRLS data. A multilevel modeling analysis was conducted to explore changes in reading literacy achievement and to what extent gender, SES, ethnicity, linguistic background and school characteristics have a differentiated effect on reading literacy outcomes. An attempt was made to explain the changes in reading literacy achievement by the students' literacy environment (early literacy activities and abilities, reading strategies, time spent on reading, and computer use). A significant decline in reading literacy achievement between 2001 and 2011 was found. All factors had a significant effect at the student level. Contextual effects at the classroom level were found for SES, ethnicity, linguistic background and number of books in the home. School size and school location showed statistically significant effects on the reading literacy outcomes at the school-level. Regarding background, the conclusion can be drawn that the trend in reading literacy achievement in the Netherlands in the past

decade was related with gender and to some extent with SES of students. Ethnic or linguistic background did not play a significant role. Concerning the literacy environment, two relevant interactions were found significant for early literacy activities in the home, and early literacy abilities.

Keywords: reading achievement, SES, ethnicity, early literacy, gender differences

SESSION 4B: TIMSS

Immigrant Students in TIMSS

27 June 2013 | 13:30–15:00 | Location: NIE7-01-LT4

Chair: Pekka Kupari, *University of Jyväskylä, Finland*

Discussant: Sue Thomson, *Australian Council for Educational Research*

Predictors of School Violence Internationally: The Importance of Immigrant Status and Other Factors

David Rutkowski, Leslie Rutkowski, and Justin Wild, *Indiana University, United States*

Recent studies have documented differences in achievement between immigrant and native-born students (Peguro, 2009; Suárez-Orozco, Bang, & Onaga, 2010). Further, research has identified differential impacts of school violence for immigrant students on achievement and that immigrant students experience more school violence than their native born peers (Rutkowski, Rutkowski, & Engel, 2013); however, the literature is less clear regarding what other factors can explain differences in violent experiences. The current paper takes up this discussion and uses TIMSS 2011 data and a multilevel zero-inflated Poisson regression model to examine the relationship between immigrant status and school violence after controlling for a number of theoretically important factors. Findings point to the importance of school attachment, sex, and achievement as explanatory variables. And, *ceteris paribus*, the effect of immigration remains in a number of countries after controlling for school and student factors. We discuss our findings as they relate to international educational policy.

Keywords: immigrant students, violence, TIMSS, school attachment

Mathematics Achievement of Immigrant Students

Dirk Hastedt, *IEA Data Processing and Research Center, Germany*

Globalization changed the challenges faced by educational systems around the world, and increased migration between countries and regions affects the educational systems in a growing number of countries (Castles, 2011). In most countries the number of immigrants is still increasing; the group of immigrants and their situation in various countries, however, is very heterogeneous. Nonetheless, in most countries immigrant students lag behind the achievement of non-immigrant students.

IEA data provides a good basis for further research on the situation of immigrant students since it does not only include achievement measures but also rich information on student and school background. For example, IEA TIMSS assesses mathematics and science achievement of grade four and grade eight students every four years. Analysis of this data, using the IEA IDB Analyzer, can inform about trends of immigrant students' achievement as well as help understand their situation and find positive examples of their achievement.

This piece of research will highlight the characteristics of immigrant students and different situations of different subgroups of immigrant students. The paper will demonstrate how large-scale assessment (LSA) data such as TIMSS can shed some light on the situation of students with immigrant background and will highlight some of the results. It will describe the different situations that the countries are facing and how successfully they are achieving equal achievement of students with immigrant background.

Keywords: immigrants, mathematics achievement, TIMSS

A Cross-Ethnic Comparison of Mathematics Achievement in the Trends in International Mathematics and Science Study 2011 (TIMSS)

Beti Lameva, *National Examination Centre, Macedonia*

Zhaneta Chonteva, *Ministry of Education and Science, Macedonia*

The educational system in Macedonia is comprised of preschool, primary, secondary, and higher education. The official language in the Republic of Macedonia is Macedonian; all national groups in Macedonia are entitled to primary and secondary education in their native language. In primary schools, instruction is provided in Macedonian, Albanian, Turkish, and Serbian language. Turkish and Serbian ethnic groups make up less than 5% of the population and that is why TIMSS 2011 was conducted only in Macedonian and Albanian language.

Low achievement level (below the international average) of Macedonian students in mathematics is a well-known and determined fact for many years. Results of TIMSS 2011 have revealed many open questions about the differences in performance between ethnic Macedonian and ethnic Albanian students. Ethnic Albanian students have far lower performance in TIMSS studies compared to Macedonian. The main objective of this study is to explore the achievement motivation of the students as a factor behind the differences.

The study combines students' answers on TIMSS 2011 scales about three motivational constructs: intrinsic value, utility value and ability beliefs with their mathematics achievement scores obtained from the TIMSS 2011 mathematics achievement test. The expectancy-value theory of achievement motivation is being used as a theoretical framework (Wigfield & Eccles, 2002). The data is obtained from 2,600 ethnic Macedonian students and 1,600 ethnic Albanian students tested within 150 schools from Macedonia.

Results from the multivariate regression models reveal that students' ability beliefs are strong predictors of mathematics achievement both for Macedonian and Albanian eighth-graders. Utility value is a significant predictor for the Macedonian students; intrinsic value for the Albanian students.

Keywords: achievement motivation, ability beliefs, intrinsic value, utility value, multivariate regression models

SESSION 4C: TIMSS

Within-Country Analysis of Items and Differences in Achievement

27 June 2013 | 13:30–15:00 | Location: NIE2-01-LT5

Chair: Sabine Meinck, *IEA Data Processing and Research Center, Germany*

Discussant: Jouni Välijärvi, *University of Jyväskylä, Finland*

A Comparison of PISA and TIMSS Against England's National Curriculum

Newman Burdett and Linda Sturman, *National Foundation for Educational Research, United Kingdom*

This study updates an earlier NFER study validating the PISA and TIMSS test items in terms of their familiarity for secondary school students in England (Ruddock et al., 2006). The study explored whether item familiarity (or unfamiliarity) might help to explain apparent differences in attainment between the PISA and TIMSS surveys in 2000 and 2003. This related study addresses the fact that differential performance in England seems to remain. While there are several potential reasons for this, the difference in familiarity and reading demand between PISA and TIMSS may still impact on performance. In addition, the national teaching and assessment contexts have changed since 2006.

This study looks at item familiarity of maths and science items in TIMSS 2007, PISA 2009 and PISA 2012 and in addition looks at the curriculum context, which was not covered in the previous study.

This study found that:

- The assessment frameworks for PISA and TIMSS cover the same basic content and skills as the national curriculum for mathematics and science in England.
- The PISA test items compare with the TIMSS test items and both compare with those familiar to students in England.
- The implication of this research is that PISA and TIMSS outcomes can be validly used for the study and comparison of the English educational system.
- Changes in performance of students in England over time are unlikely to be due to a change in the items or frameworks of either international study, although reading demand might play a small part.

Keywords: international surveys, TIMSS, PISA, international comparisons

Evaluating Measurement Properties of Attitudinal Items Related to Learning Science in Taiwan From TIMSS 2007

Pey-Yan Liou, *National Central University, Chinese Taipei*

The study used exploratory factor analysis and confirmatory factor analysis to evaluate student attitudinal factors and items from the Trends in International Mathematics and Science Study (TIMSS) 2007. Taiwanese eighth-grade students' empirical data were analyzed to obtain derived factors from 12 items regarding student attitudes toward learning science. The results suggested that the three-factor model composed of 12 items instead of 11 items default in the TIMSS 2007 dataset was optimal for Taiwanese student data. Implications of creating derived variables from international LSA data for the education research community are also discussed.

Keywords: attitudinal items, factor analysis, large-scale data analysis, TIMSS

SESSION 4D: ICCS

Civic Participation and School Climate

27 June 2013 | 13:30–15:00 | Location: NIE3-01-LT9

Chair: Anu Toots, *Tallinn University, Estonia*

Discussant: Lars Qvortrup, *Aalborg University, Denmark*

Student Participation at School and Future Civic Engagement: Results From ICCS 2009

Wolfram Schulz, John Ainley, and Julian Fraillon, *Australian Council for Educational Research*

Civic and citizenship education aims to prepare young people for their roles as citizens in society. Potential learning outcomes include enhanced knowledge and understanding of civic-related issues as well as student attitudes and behaviors. This paper focuses on the importance of civic participation at school as part of this learning process. Civic participation at school has been emphasized increasingly in the literature in studies of the associations between student participation at school and their expected future engagement in society.

The data presented in this paper were collected as part of the International Civic and Citizenship Education Study (ICCS 2009), which surveyed 140,000 Grade 8 students as well as 60,000 teachers and 5,000 school principals in 38 countries. The data include measures of students' background, civic knowledge, attitudes and behaviors as well as context information about schools.

Keywords: civic and citizenship education, international comparisons, survey research

Exploring School Resilience to Violence in Mexico and Colombia: An Analysis Using Data From ICCS 2009

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

Violence in schools is currently one of the main social concerns in countries like Mexico and Colombia, and it is also one of the main threats for schools to be effective in providing high-quality education. This work uses data from ICCS 2009 to fit cluster robust logistic regression models to explore how schools immersed in high-risk environments manage to increase their probabilities of remaining resilient to violence. Preliminary results suggest that although context variables tend to show stronger associations, some schools variables (e.g., a positive school climate, including relationships between faculty, staff, and students; and teacher strategies that incorporate students into the educational process) also seem to play a significant role in preventing schools from experiencing violence in both countries. The paper concludes by discussing possible policy implications of the results and suggests topics for further research in the field.

Keywords: school resilience, violence, school climate

SESSION 5A: TIMSS

Issues in Cross-Country Measurement and Analysis

28 June 2013 | 10:30–12:00 | Location: NIE7-01-LT3

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

Discussant: Leslie Rutkowski, *Indiana University, United States*

Examining the Behavior of “Reversed Directional” Items in the TIMSS 2011 Context Questionnaire Scales

Martin Hooper, Alka Arora, Michael O. Martin, and Ina V.S. Mullis, *TIMSS & PIRLS International Study Center, Boston College, United States*

The TIMSS and PIRLS context questionnaire scales are robust cross-country measures of important aspects of the educational context. While the 2011 context questionnaire scales were very successful, the investigation delves into the question of the effectiveness of using reverse directional items in such scales. Through an exploration of extreme response sets, Rasch fit statistics, and confirmatory factor analysis, this study assesses the relationship between reverse directional items and response patterns in data from the fourth grade and eighth grade *Students Confident in Mathematics* scales. The results suggest that extreme response patterns are rare, and therefore the inclusion of the reverse directional items may not be justified for future development of this scale. In addition, the results of the Rasch fit statistics and the confirmatory factor analysis suggest that the reverse directional items have different psychometric properties than the straightforward items. This analysis recommends reconsidering the use of reverse directional items in future scale development, and further research on whether these patterns of fit of the reverse directional items are manifest through the other TIMSS and PIRLS scales.

Keywords: TIMSS, PIRLS, context questionnaire scales

Statistical Techniques Utilized in Analyzing TIMSS Databases in Science Education From 1996 to 2012: A Methodological Review

Pey-Yan Liou and Yi-Chen Hung, *National Central University, Chinese Taipei*

A methodological review of science education articles using the TIMSS databases published by journals indexed in the SSCI database from 1996 to 2012 was conducted. The identified 34 articles are analyzed in terms of the statistical techniques used to analyze the TIMSS databases. The results indicate that the weights and design effects, essential adjustments for analyzing the TIMSS databases, were used in more than half of the studies. The study also summarized the most commonly used quantitative methods for analyzing TIMSS in these articles. Suggestions regarding the use of statistical techniques and reporting are made for researchers who utilize the TIMSS databases in their research.

Keywords: TIMSS, large-scale data analysis, data analysis reporting, weights, design effects

SESSION 5B: TIMSS/TEDS-M

Effects of Instructional Methods and Teacher Motivation

28 June 2013 | 10:30–12:00 | Location: NIE7-01-LT4

Chair: Qian Chen, *National Institute of Education, Singapore*

Discussant: David Rutkowski, *Indiana University, United States*

What Works Where? The Relationship Between Instructional Variables and Student Achievement in Mathematics and Science in Low-, Medium- and High-Achieving Countries

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

Hierarchical multilevel regression analysis was employed to explore the relationship between the frequency of using a set of instructional variables and the average score of schools in mathematics and science. The models specified for this analysis were two-level models of schools nested in countries (49) that participated in TIMSS 2007. The regression coefficient of a set of instructional variables on the mean score of schools in mathematics and science in three groups of countries grouped according to level of achievement provides us with an answer to the research question – whether or not frequent use of these modes of instruction is similarly associated with learning outcomes in low-, medium-, and high-achieving countries. A similar association might support a generalization regarding an instructional theory about “what works” and “what does not work” in education.

Findings of this study show that frequent implementation of constructivist modes of instruction were found to be positively associated with learning outcomes in high- and medium-achieving countries, but negatively associated with learning outcomes in low-achieving countries.

These findings confirm conclusions reached in other studies that replacing teacher-led (traditional) practices with more student-led (constructivist) practices does not necessarily result in more learning for all. Evaluating the differential effect of teacher practices in different countries grouped according to achievement level can help to shape effective pedagogical practices and also have implications for teacher training in different countries.

Keywords: instructional effectiveness, traditional and constructivist instruction, multilevel analysis

Effects of Teaching Strategy on Student Mathematics Achievement Addressing Cognitive Domains: A Comparative Study of Hong Kong and Singapore

Xueying Ji, *Michigan State University, United States*

Qiaoping Zhang, *The Chinese University of Hong Kong*

This study used TIMSS 2007 eighth grade mathematics data and explored similarities and differences of teaching strategies and student mathematics achievement in three cognitive domains: knowing, applying, and reasoning between Hong Kong and Singapore, so as to investigate the potential effects of teaching strategy on student achievement. We found that both Hong Kong and Singapore students performed high on knowing, applying, and reasoning. There is significant difference in student mathematics achievement in applying and reasoning between the two places. Singapore students performed significantly better than Hong Kong students on applying and reasoning.

Looking at teaching strategies, both Hong Kong and Singapore teachers frequently use teaching strategies focused on applying and reasoning. Teaching strategies focused on applying and reasoning are used in some lessons or about half of the lessons in both places. Singapore, however, has a significantly more frequent use of teaching strategies focused on applying than Hong Kong, which we interpreted as reasonably corresponding to their significantly better student performance in applying.

Therefore, we concluded that teaching strategy has effects on student mathematics achievement in cognitive domains. Teacher instruction relates to student learning outcomes.

Keywords: teaching strategy, cognitive domains, mathematics achievement, TIMSS 2007

How Do the Reasons to Become a Teacher Influence Future Secondary Mathematics Teachers' Teaching Competence and Intention Toward a Teaching Career?

Chia-Jui Hsieh, Pei-Chen Wu, Shu-Jyh Tang, and Feng-Jui Hsieh, *National Taiwan Normal University, Chinese Taipei*

This study drew on data from TEDS-M and focused on whether and how the reasons to become a teacher influence future secondary mathematics teachers' mathematics-related teaching competence including mathematics content knowledge (MCK) and mathematics pedagogical content knowledge (MPCK), and the intention toward a teaching career. Based on previous research results (Hsieh et al., 2010; Hsieh, Hsieh, & Tang, 2012), we used cluster analysis to group secondary future teachers into three motivation categories according to the reasons to become a teacher, and then further analyzed and compared the performance of these types of future teachers in target variables. The results reveal that there is a significant difference in the distribution of motivation categories in different countries. For most countries, intrinsic motivation and empathy from prior learning experience have a positive influence on future mathematics teachers' performance in MCK and MPCK, as well as their intention toward a teaching career.

Keywords: international comparison, teaching motivation, teaching competence, teaching intention, TEDS-M

SESSION 5C: ICCS

Immigrant Background and Civic Attitudes in ICCS

28 June 2013 | 10:30–12:00 | Location: NIE2-01-LT5

Chair: Plamen Mirazchiyski, *IEA Data Processing and Research Center, Germany*

Discussant: Anu Toots, *Tallinn University, Estonia*

Civic Knowledge and Engagement Among Students From Immigrant and Non-Immigrant Backgrounds

Tim Friedman, Wolfram Schulz, Julian Fraillon, and John Ainley, *Australian Council for Educational Research*

Civic and citizenship education has the goal of preparing young people for their role as citizens in society through the acquisition of civic knowledge and development of positive attitudes toward engagement. However, globalization and higher levels of migration have led to a re-thinking of the way education should prepare young people for citizenship in an increasingly globalized world which is no longer only defined by notions of nation states. This paper focuses on the relationship between immigrant background and indicators for civic knowledge and engagement. The data used were collected as part of the IEA International Civic and Citizenship Education Study (ICCS 2009), and includes measures of students' background, civic knowledge, attitudes and behaviors as well as context information about schools and education systems. It will explore to which extent immigrant background influences young people's preparation for citizenship across a diverse range of national contexts.

Keywords: civic and citizenship education, international studies, survey research

Civic Knowledge and Student Attitudes Towards Corruption: The Chilean Case – A Multilevel Path Analysis Approach

Diego Carrasco, *University of Sussex, United Kingdom / Pontificia Universidad Católica, Chile*

Roberto Gonzalez, *Pontificia Universidad Católica, Chile*

Flavio Cortés, *Pontificia Universidad Católica, Chile*

Leonardo García, *Sistema Regional de Evaluación y Desarrollo de Competencias Ciudadanas (SREDECC)*

Nicolás Dassen, *Inter-American Development Bank*

A series of explanatory models of permissiveness of corruption were fitted, to estimate the effect of civic knowledge, given the levels of other civic attitudes such as authoritarianism in the government, trust in civic institutions and law disobedience. Using data from the International Civic and Citizenship Education Study (ICCS) 2009 from the subpopulation of Chile, multilevel path models were estimated. Consistently with previous results, our analyses showed there is a negative relation between civic knowledge and permissiveness of corruption, authoritarianism in the government, trust in civic institutions and law disobedience. Furthermore, decomposition of direct and indirect effects shows the relationship between civic knowledge and permissiveness of corruption seems to be partially mediated by the endorsement of authoritarianism in the government. These results are of educational importance, as abstract concepts which characterize government behavior such as authoritarianism, populism, clientelism, nepotism, monopoly of mass media, among others, which are considered threats for democracy are not explicitly covered by the Chilean educational curriculum.

Keywords: civic knowledge, corruption, authoritarianism, indirect effects, plausible values

SESSION 6A: PIRLS/TIMSS

Home and School Factors in PIRLS and TIMSS

28 June 2013 | 13:30–15:00 | Location: NIE7-01-LT3

Chair: Sue Thomson, *Australian Council for Educational Research*

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

Influences of Early Home Factors on Later Achievement in Reading, Math and Science: An Analysis of the Swedish Data From PIRLS and TIMSS 2011

Monica Rosén, Jan-Eric Gustafsson, and Kajsa Yang Hansen, *University of Gothenburg, Sweden*

The purpose is to investigate the influence of early home background factors on achievement in reading, math and science. The effect of SES on school achievement has in Sweden been shown to be fairly large and stable across studies. However, less is known about what role early educational activities at home and early skills may have on achievement differences found in Grade 4. With the TIMSS and PIRLS 2011 study a unique opportunity to investigate this matter in some detail is offered, as pupils in Grade 4 have been tested in the three subject domains, and their parents provide information on a wide range of early home activities, early reading and numerical skills and other potential influences from the children's homes. In this paper the data from the Swedish participation has been utilized for analyzing such relationships. A latent variable approach was adopted and the effects of early home factors were investigated in a path analysis, which allowed determination of direct and indirect effects. The results show a somewhat differential pattern of relations for math achievement as compared to science and reading. No gender differences were found in any of the factors that were related to achievement in Grade 4, whilst boys were found to have a higher average performance in math and science and girls in reading.

Keywords: home factors, early skills, reading, science, and math achievement, SEM

Schools and Social Origins: Do Schools Matter More for Disadvantaged Students?

Erica Raimondi, *University of Trento, Italy*

This paper investigates the relationship between students' social origins and students' reading performances on the one hand, and the relationship between these performances and the specific primary schools the students attend on the other hand. Moreover, it examines whether primary schools vary in the degree of influence they exert on the achievement of students from different family backgrounds, in terms of parents' education and occupation.

The main findings of the multilevel analyses on PIRLS 2006 data for Sweden, Germany and Italy are that social origins influence students' performances (particularly in Sweden), achievement varies among primary schools (especially in Germany and Italy), and schools attended matter more for students with lower social origins.

Keywords: social origins, achievement, differences between schools, multilevel, PIRLS

Tracking Effects on Mathematics Achievement in the Czech Republic

David Greger, Hana Vořková, and Martin Chvál, *Charles University in Prague, Czech Republic*

Tracking is for many years in the center of educational debates, mainly the impact of tracking on students' achievement and on educational inequalities. In the Czech Republic there exist multiple forms of tracking. So far analyses of tracking have concentrated on differentiation encountered at the age of 11, when students enter academic multi-year gymnasia. However there are many other forms of

tracking in the Czech education system and the selection of students happens already at the age of 6, 8 or 11. This type of early tracking is known under the label “schools/classes with extended teaching” in math, science, information technologies, and foreign language, but they are also formed for specializing in music, art and sport. In the present paper we are using TIMSS 2007 population 2 (eighth graders) data to analyze the effects of tracking on math achievement. Using a two-level HLM model and controlling for various student and school characteristics, including student and school SES, we have shown an independent effect of tracking on math achievement using TIMSS 2007 Grade 8 math data. We are comparing seven different types of tracking and its effects on math achievement as well as other characteristics of students in these tracks (student composition, aspirations, attitudes, etc.). The present paper shows that the big part of between-school variance can be explained by characteristics of the Czech education system, mainly through its large differentiation and early-tracking practices.

Keywords: Czech Republic, tracking, math achievement, TIMSS 2007, school effects, two-level HLM model

SESSION 6B: TIMSS

Student Motivation, Attitudes, and Self-Concept in TIMSS

28 June 2013 | 13:30–15:00 | Location: NIE7-01-LT4

Chair: Jouni Välijärvi, *University of Jyväskylä, Finland*

Discussant: Martina Meelissen, *University of Twente, Netherlands*

Attitudes Toward School, Homework, Subject Matter Value, Self-Concept and Positive Affect: A Structural Equation Model

Maher M. Abu-Hilal, *Sultan Qaboos University, Oman*

Faisal Abdelfattah, *King Saud University, Saudi Arabia*

Adel Abduljabbar, *King Saud University, Saudi Arabia*

Herbert W. Marsh, *King Saud University, Saudi Arabia / University of Western Sydney, Australia*

The study investigates the relations among a set of motivational constructs: liking school, homework, subject value, positive affect and self-concept in math and science among eighth grade Saudi students. Both descriptive and SEM modes of analysis were used to test the relationships. The results revealed significant effects for liking school, homework on subject value, positive affect and self-concept. Also, subject value had significant positive effects on positive affect and self-concept in matching domains (math and science) but negative effects on non-matching domains. The constructs included in the study attest that they are distinct constructs and need to be treated as distinct constructs rather than conflated ones. The implications of the results are that researchers and educators should not take for granted the importance of homework and value of subject matter in their effects on self-concept and positive affect.

Keywords: school attitudes, homework, subject value, positive affect, self-concept

Examining the Relationship Between Student Academic Achievement and Self-Concept in the I/E, BFLPE, and Combined Models – Evidence From East Asian Countries' Data in TIMSS 2007

Yi-Chen Hung and Pey-Yan Liou, *National Central University, Chinese Taipei*

The aim of this study was to examine the relationship between student achievement and self-concept of science/mathematics by using a combined model consisting of the internal/external frame of reference (I/E) and the big-fish-little-pond effect (BFLPE) models in three high-performing East Asian countries. The samples were from the Trends in International Mathematics and Science Study (TIMSS) 2007 eighth-grade and fourth-grade student data in Taiwan, Japan, and Hong Kong. Multilevel structural equation modeling (MSEM) was used to analyze whether the data fit the combined models, and to examine the relationship between student self-concept and achievement at different levels. The results suggest that the combined model fit the data well, and most of the predictions of the combined model were supported by the data from these three countries. Furthermore, the results also show that the effects of the BFLPE and the I/E were generally larger in Grade 8. Finally, implications of the findings and suggestions for future research are discussed.

Keywords: internal/external frame of reference model, big-fish-little-pond effect model, TIMSS, multilevel structural equation modeling (MSEM)

SESSION 6C: ICILS

Aspects of Measuring Computer and Information Literacy

28 June 2013 | 13:30–15:00 | Location: NIE2-01-LT5

Chair: Paulína Koršňáková, *IEA Secretariat, Netherlands*

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

Equating From a National to an International Assessment

Eveline Gebhardt and Lisa De Bortoli, *Australian Council for Educational Research*

Australia will be a participant in the inaugural IEA International Computer and Information Literacy Study (ICILS) and, at a national level, Australia has been involved in a National Assessment Project in Information and Communication Technology Literacy (NAP-ICTL) that has taken place every three years since 2005. The assessments of ICILS and NAP-ICTL are very similar in nature. However, the assessments are targeted at different year levels (Year 8 in ICILS versus Year 6 and Year 10 in NAP-ICTL) and the two assessments do not have common tasks.

In order to link the assessments, two modules from the NAP-ICTL assessment were included in the Australian ICILS field trial. This provided a unique opportunity to investigate equating a national to an international assessment. The equating procedure consisted of four steps and resulted in a plausible growth curve from Year 6 to Year 10 on the international ICILS scale. This suggests that similar equating steps can be applied to equate the NAP-ICTL 2011 scale to the official ICILS 2013 main study scale. As a result, a wider range of skills can be described along the proficiency scale as well as more accurate growth patterns. Equating to the ICILS main study will enable exploring the performance of Year 6 and Year 10 Australian students from ICT literacy when benchmarked against the international ICILS assessment scale.

Keywords: test equating, item response theory, computer and information literacy, large-scale assessment, international assessment

Measuring Computer and Information Literacy Across Countries

Julian Fraillon, John Ainley, Eveline Gebhardt, and Wolfram Schulz, *Australian Council for Educational Research*

This paper describes the properties and content of the computer and information literacy (CIL) achievement scale based on the responses of 8,933 students from 20 countries to the International Computer and Information Literacy Study (ICILS) field trial test items. The paper briefly outlines the process of generating the described scale before presenting and examining the substance of the scale. The scale is based on data from the 83 test items used in the ICILS field trial. The described scale comprises four discrete described achievement levels that are further articulated by examples of achievement. Key aspects of the cognitive differences between the levels are discussed and some questions are raised about the way in which the achievement of students below Level 1 and at or above Level 5 will be dealt with in the main survey.

Keywords: ICILS, computer and information literacy, ICT, achievement scale, progress map

Psychometric Assessment of ICILS Test Items on Hong Kong and Korean Students – A Rasch Analysis

Pey Tee Oon, *The University of Hong Kong*

Nancy Law, *The University of Hong Kong*

Soojin Kim, *Korea Institute for Curriculum and Evaluation*

Sungsook Kim, *Korea Institute for Curriculum and Evaluation*

See Ki Tse, *The University of Hong Kong*

The IEA International Computer and Information Literacy Study (ICILS) 2013 is the first international comparative study that aims to examine the outcome of Grade 8 students' computer and information literacy (CIL) across 19 countries. The measurement of CIL focuses on students' ability to use computers within and outside of school in the information age. Students are asked to complete two test modules, out of a total of four, which are conducted exclusively on computers. The present study reports psychometric properties of the test modules based on the results garnered from the field trial which was in preparation for the main study. A total sample of 804 students from Hong Kong and South Korea participated in the field trial. Rasch-anchored analysis was employed to analyze the data. The items for the four test modules demonstrated adequate psychometric properties – they target the students reasonably well and show the property of invariance across the relevant sub-samples.

Keywords: ICILS, computer and information literacy, psychometric assessment, Rasch analysis

INDEX OF PARTICIPANTS

- Abdelfattah, Faisal, 7, 59
Abduljabbar, Adel, 7, 59
Abu-Hilal, Maher M., 7, 59
Aditomo, Anindito
Alagaran II, Jose Reuben Quelet
AlAli, Mariam
Ang, Ching Ling
Areepattamannil, Shaljan, 9
Arora, Alka, 6, 53
Aslaksen, Helmer
Axelsson, Maria
Bascopé, Martín, 3, 39
Basl, Josef
Boey, Kok Leong, 2, 9, 31
Borg, Carola Anna-Karin
Buckley, Sarah
Bugas, Ruth Quintillan
Bundsgaard, Jeppe
Camilli, Gregory, 2, 29
Carrasco, Diego, 6, 56
Carstens, Ralph
Centurino, Victoria Anne
Chamberlain, Megan Carroll
Chan, Lee Shan, 2, 28
Chan, Wai Meng Jeffrey
Chen, Qian, 4, 6, 9, 44, 54
Chhinh, Sitha
Chow, Kui Foon, 3, 38
Chua, Lai Choon
Chua, Roy
Chvál, Martin, 7, 57
Colmant, Marc
Dalton, Ben, 4, 41
De Bortoli, Lisa, 3, 7, 35, 60
Desa, Deana
Dindyal, Jaguthsing
Drent, M., 2, 32
Foo, Seau Fah, 2, 27
Fraillon, Julian, 3–7, 38, 45, 52, 56, 60
Galadova, Andrea
Gebhardt, Eveline, 7, 60
Gonzalez, Eugenio, 1, 3, 9, 12
Greger, David, 7, 57
Gustafsson, Jan-Eric, 2–3, 7, 9, 27, 37, 57
Hagiwara, Yasuhito, 3, 36
Hamani Ounteni, Moussa
Hashim, Suramase
Hedges, Larry V., 4, 9, 21
Hersbach, Elizabeth
Ho, FooHim
Hogrebe, Nina, 3, 35
Hooper, Martin, 6, 53
Howie, Sarah Jane
Hsieh, Chia-Jui, 6, 55
Hung, Yi-Chen, 6–7, 53, 59
Idnurm, Tõnu, 3, 38
Janotová, Zuzana
Ji, Xueying, 6, 54
Jonker, Karen
Kabiri, Masoud, 2–3, 31, 36
Kaur, Berinderjeet, 2, 4, 7, 9, 17, 44
Kavli, Anne-Berit, 2, 6, 23
Kennedy, Kerry John, 2–3, 34, 38
Kirkham, Sarah Anne
Klieme, Eckhard, 6, 23
Koršňáková, Paulína, 7, 60
Koussihouede, Oswald
Kreckova, Simona
Kupari, Pekka, 4–5, 44, 49
Kuyper, Arend Matthew
Kwek, David Swee Hong
Lam, Karen
Latourelle, Joanne
Laukaityte, Inga, 2, 4, 29, 42–43
Lauri, Triin, 2, 33
Lee, Moosung, 4, 40
Lee, Yim Ping
Lim, Boon Leong
Lim, Ivan
Lim, Pik Yen, 2, 27
Lim, Siew Yee, 2, 27
Lin, Huiyuan
Liou, Pey-Yan, 5–7, 51, 53, 59
Losito, Bruno, 3–4, 9, 38, 45
Lundgren, Eva
Malak-Minkiewicz, Barbara, 2, 7, 9, 31
Martin, Michael O., 2, 4, 6, 9, 19, 27, 42, 53
Matsubara, Kenji, 3, 36
Mazheruddin, Mohammed
Meelissen, Martina, 2, 7, 32, 59
Meinck, Sabine, 1–2, 4–5, 7, 13, 29, 44, 51, 60
Mirazchiyski, Plamen, 1, 4, 6–7, 11, 45, 56–57

Mok, Magdalena Mo Ching, 2, 34
 Molbæk, Louise
 Morales, Fatima Michelle Alagaran
 Mullis, Ina V.S., 2, 4, 6, 9, 19, 27, 40, 53
 Netten, Andrea, 3, 5, 35, 47
 Neuschmidt, Oliver, 4, 40
 Ng, Huey Bian, 2, 28
 Ng, Hui Leng, 2, 27–28
 Nilsen, Trude, 3, 37
 Nyström, Peter, 5, 47
 Ong, Saw Lan
 Oon, Pey Tee, 7, 61
 Park, Sangwook, 4, 42
 Poon, Chew Leng, 2–4, 7, 27–28, 36, 42
 Qvortrup, Lars, 2, 5, 9, 33, 52
 Raimondi, Erica, 7, 57
 Rosén, Monica, 3, 7, 9, 35, 57
 Rutkowski, David, 5–6, 9, 49, 54
 Rutkowski, Leslie, 1, 5–6, 9, 11, 49, 53
 Sandoval-Hernández, Andrés, 1, 4–6, 11, 45, 52–53
 Schulz, Wolfram, 2–7, 33, 36, 45, 52, 56, 60
 Sheu, Jen Jang
 Soh, Yi An
 Stancel-Piatak, Agnes, 1, 11
 Straková, Jana, 2, 4, 9, 29, 45
 Strietholt, Rolf, 3, 35
 Suppiah Shanmugam, S. Kanageswari
 T. Velayutham, Sarveswary
 Tan, Hwa Mei
 Tang, Shu-Jyh, 6, 55
 Tankeu, Bassile Xavier
 Thomson, Sue, 2, 5, 7, 17, 49, 57
 Tirtowaluyo, Isabella
 Tomasek, Vladislav
 Toots, Anu, 2–3, 5–6, 9, 33, 38, 52, 56
 Välijärvi, Jouni, 5, 7, 9, 51, 59
 van Staden, Surette, 4, 40
 Vettenranta, Jouni, 2, 31
 Vittrup, Bonnie Hidia
 von Davier, Matthias, 2–3, 29
 Voňková, Hana, 7, 57
 Wagemaker, Hans, 2–4, 19, 21
 Wee, Susan, 5, 47
 Weziak-Bialowolska, Dorota, 2, 33
 Wiberg, Marie, 2, 4, 29, 42–43
 Wu, Pei-Chen, 6, 55
 Yeo, Kim Chuan
 Yu, Alana, 9
 Yu, Stella
 Zhang, Qiaoping, 6, 54
 Zhu, Jinxin, 2, 34

PRACTICAL INFORMATION

CONFERENCE VENUE

National Institute of Education (NIE)

Nanyang Technological University (NTU)

1 Nanyang Walk, Singapore 637616

Tel: +65 6790 3888

www.nie.edu.sg

Internet Access at NIE

NIE provides free wireless connection for conference participants. This connection is referred to as HOTSPOTS@NIE, and supports the well-known IEEE 802.11a/b/g standards for wireless. Information on how to access this network will be provided with your name badge.

Lunch on the NTU Campus

Participants are responsible for arranging lunch for themselves. There are a number of canteens and cafes located throughout the NTU campus. The following suggested options are both within walking distance:

NIE Canteen

Basement 1, NIE Block 4

Hours: Monday–Friday 7:00–18:00

This is the closest canteen to the conference venue. It has 10 stalls selling a variety of food and drinks, and 5 stalls serving halal food.

NTU Canteen A

NTU Block N2.1

This canteen can be reached by the stairway from the south side of the NIE Block 1 administration building. It provides a greater selection of eateries including two food courts and several restaurants:

- **Food Connection** (food court with local dishes such as Indonesian panggang, fishball minced meat noodles, mini wok, and chicken biryani)
Hours: Monday–Friday 7:00–21:00, Saturday 7:00–15:00
- **The New World** (food court)
Hours: Monday–Saturday 8:00–21:00
- **Executive Café** (offers Asian-inspired dishes from snacks to a full course set menu)
Hours: Monday–Saturday 10:00–22:00
- **The Palette** (serves western-style meals including sandwiches, salads, and pasta)
Hours: Monday–Saturday 7:00–21:30
- **McDonald's**
Hours: Monday–Saturday 7:00–24:00, Sunday 10:00–18:00
- **Canadian Pizza, Old Chang Kee, and Subway**
Hours: Monday–Friday 7:00–21:00, Saturday 7:00–15:00

Map of the National Institute of Education

Keynote Lectures (Registration & Coffee Breaks in Foyer)

Parallel Sessions

Workshops

Conference Shuttle Bus

Toilet

Lift

Stairway

Keynote Lectures (Registration & Coffee Breaks in Foyer)

Parallel Sessions

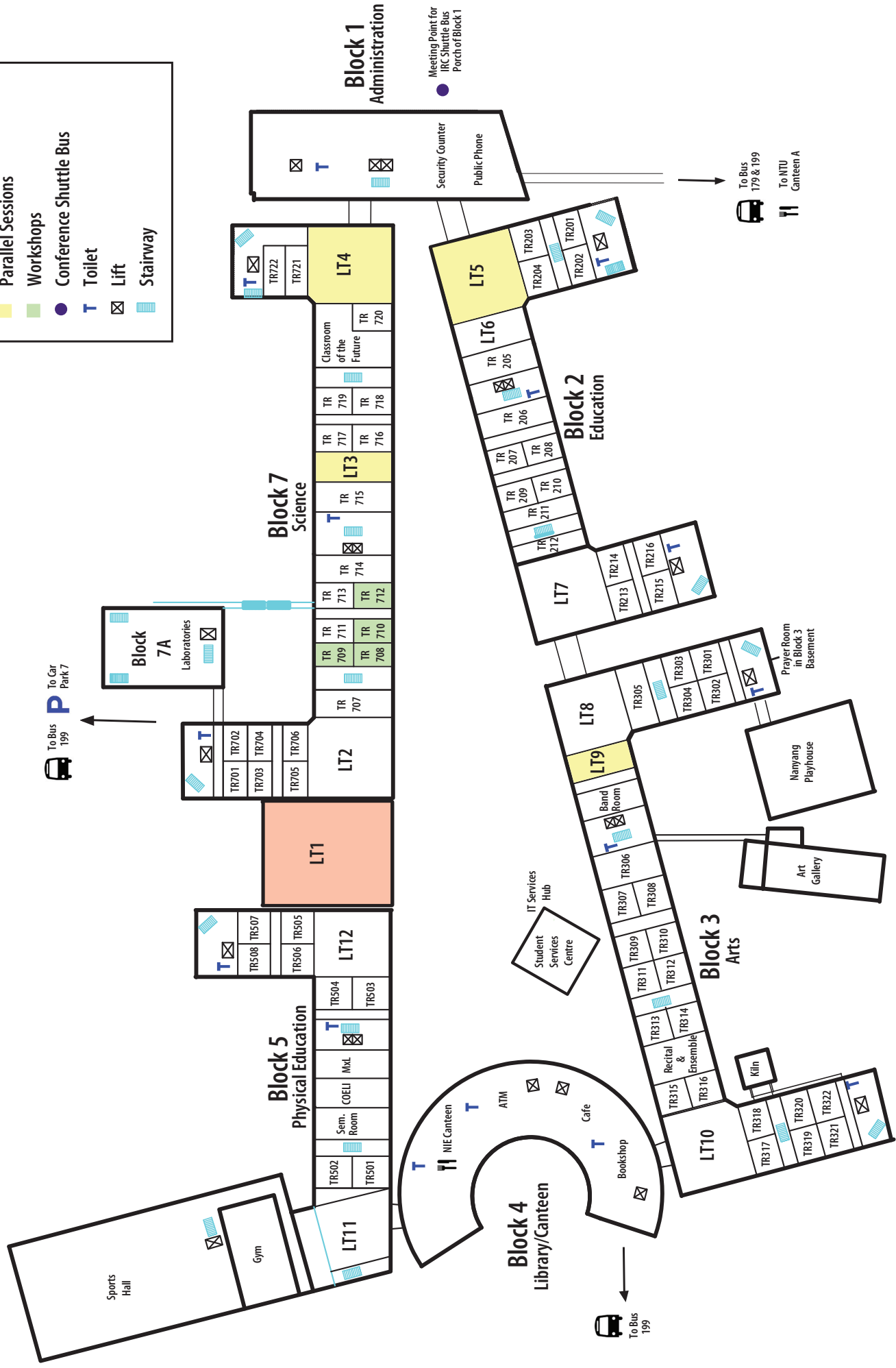
Workshops

Conference Shuttle Bus

Toilet

Lift

Stairway



TRANSPORTATION INFORMATION

Conference Shuttle Bus Service

A complimentary shuttle bus will be offered at designated times on 24–28 June 2013 to facilitate participants' travel between the conference hotels (Pan Pacific Singapore, PARKROYAL on Beach Road, and Nanyang Executive Centre) and the conference/workshop venue, reception, and group dinner. Please arrive five minutes before the departure time to allow time for boarding the bus.

Date	Departure Time	Departure Location(s)	Shuttle Service
24 June 2013	7:45	Pan Pacific Lobby & PARKROYAL Lobby	From Conference Hotels to NIE
	8:30	NEC Guest Wing	
	17:15	NIE Block 1 Porch	Return to Conference Hotels
25 June 2013	7:45	Pan Pacific Lobby & PARKROYAL Lobby	From Conference Hotels to NIE
	8:30	NEC Guest Wing	
	17:30	NIE Block 1 Porch	From NIE to Reception
	22:00	Pan Pacific Lobby	Return to Conference Hotels
26 June 2013	7:30	Pan Pacific Lobby & PARKROYAL Lobby	From Conference Hotels to NIE
	8:15	NEC Guest Wing	
	17:45	NIE Block 1 Porch	Return to Conference Hotels
27 June 2013	7:45	Pan Pacific Lobby & PARKROYAL Lobby	From Conference Hotels to NIE
	8:30	NEC Guest Wing	
	15:30	NIE Block 1 Porch	Return to Conference Hotels
	17:15	NEC Guest Wing	From Conference Hotels to Excursion & Group Dinner
	18:00	Pan Pacific Lobby & PARKROYAL Lobby	
	22:00	Majestic Bay Seafood Restaurant	Return to Conference Hotels
28 June 2013	7:45	Pan Pacific Lobby & PARKROYAL Lobby	From Conference Hotels to NIE
	8:30	NEC Guest Wing	
	16:45	NIE Block 1 Porch	Return to Conference Hotels

Travel to NIE by Public Transport

Take the Mass Rapid Transit (MRT) network to the Boon Lay MRT station (EW27). Proceed to the Boon Lay bus interchange, where you can take bus 179, 179A, or 199. Please note that service frequency reduces after 19:00.

- **Taking bus 179 or 179A:** Exit after 10 stops on Nanyang Drive in front of Lee Wee Nam Library (bus stop 27211). Cross the overhead bridge to go to NIE.
- **Taking bus 199:** Exit after 13 stops on Nanyang Drive opposite Lee Wee Nam Library (bus stop 27219). Follow the walkway to NIE (about 300 meters).

Travel to NIE by Car/Taxi

NIE uses cash card parking and has six car parks open to visitors. Car Park 7 is nearest to the registration desk (maximum cost: S\$4.80 per day for multiple entries).

- **From the Pan Island Expressway (PIE) towards Tuas:** Take Exit 36 and turn right onto Jalan Bahar. Turn left onto Nanyang Avenue and drive approximately 1.5 kilometers. At the roundabout, take the third exit onto Nanyang Drive. Turn right onto Nanyang Walk.
- **From the PIE towards the city:** Take Exit 38 and turn right at the traffic lights, then turn left off the ramp. Take the first right onto Nanyang Drive. Continue for about 1 kilometer and go through one roundabout, taking the second exit. Turn right onto Nanyang Walk.
- **From the Ayer Rajah Expressway (AYE) towards Jalan Boon Lay:** Take Exit 18 towards Pioneer Road. Take the third exit at the roundabout onto Pioneer Road North. Continue for about 3 kilometers and turn left onto Nanyang Crescent. Take the first right onto Nanyang Drive and continue for about 1 kilometer, going through one roundabout. Turn right onto Nanyang Walk.

CONFERENCE HOTELS

Pan Pacific Singapore

7 Raffles Boulevard, Marina Square, Singapore 039595

Tel: +65 6336 8111 | Fax: +65 6339 1861

www.panpacific.com/en/singapore/Overview.html

Nearest MRT stations: Esplanade (CC3), Promenade (CC4), City Hall (EW13/NS25)

Nearest bus lines: 36, 56, 75, 77, 97, 97E, 107M, 171, 195, 960

PARKROYAL on Beach Road

7500 Beach Road, Singapore 199591

Tel: +65 6505 5666 | Fax: +65 6296 3600

www.parkroyalhotels.com/en/hotels/singapore/beach_road/parkroyal/index.html

Nearest MRT stations: Bugis (EW12), Nicoll Highway (CC5)

Nearest bus lines: 100, 107, 107M, 961, 980

Nanyang Executive Centre (NEC)

Nanyang Technological University

60 Nanyang View, Singapore 639673

Tel: +65 6790 6699 / +65 6790 6697 | Fax: +65 6794 7860

www.ntu.edu.sg/nec/Pages/default.aspx

Nearest MRT stations: Boon Lay (EW27), Pioneer (EW28)

Nearest bus lines: 179, 179A, 199

RESTAURANT FOR THE GROUP DINNER

Majestic Bay Seafood Restaurant at Gardens by the Bay

Flower Dome, Gardens by the Bay

18 Marina Gardens Drive #01-10, Singapore 018953

Tel: +65 6604 6604

<http://majesticbay.sg>

Nearest MRT stations: Bayfront (CE1), Marina Bay (NS27/CE2)

Nearest bus line: 400

Advance registration is required to attend the group dinner.

GENERAL INFORMATION ABOUT SINGAPORE

About Singapore

Singapore is an island city-state with a total land area of 710 square kilometers. It is located in Southeast Asia, about 137 kilometers north of the equator. It has a population of about five million people comprising Chinese, Malays, Indians, and other ethnic groups. The four official languages are English, Chinese (Mandarin), Malay, and Tamil. Most Singaporeans speak English and their mother tongue.

Weather

Singapore is known for its hot and humid weather, with little variation throughout the year. The average daytime temperature in June is 31°C (88°F), dropping to around 24°C (75°F) in the evenings.

Currency and Exchange

The currency used in Singapore is the Singapore dollar (SGD or S\$). Money changing services can be found at the Singapore Changi Airport, most shopping centers, and hotels around the island. Automated teller machines (ATMs) are widely available and accept the major credit cards (e.g., Visa, MasterCard, and American Express).

Electricity Supply and Plugs

Singapore's standard electricity supply is 230 volts AC with a frequency of 50 hertz (230V/50Hz). Singapore uses a type G plug, which is a flat three-pin plug.

Cell Phone Usage

Singapore's international dialing code is +65. While in Singapore and if you have international roaming service on your cell phone, it is not necessary to press +65 as you will be automatically connected to the local numbers.

(No) Smoking

Smoking is an offence on the SMRT (Singapore Mass Rapid Transit) system, in public buses, taxis, lifts, and public eateries, and within a five-meter radius from most building entrances, except for allocated smoking areas that are clearly marked with bright yellow paint. Smoking is also not allowed in air-conditioned areas such as shopping centers, restaurants, entertainment outlets, and cinemas. A maximum fine of S\$1,000 may be imposed on first-time offenders.

Goods and Services Tax

A 7% goods and services tax (GST) is levied on all goods and services. The final amount for purchases should be the total of the item's price and 7% GST.

MRT and Public Buses

The main areas of the city are well-served by the Mass Rapid Transit (MRT) network. Single-trip train tickets can be purchased from ticket machines at any MRT station.

Buses may present more of a challenge as there are many routes, but they are also a great way to see Singapore. Bus fares can be paid in cash when boarding the bus, but please note that the exact amount is required and no change will be issued.

Another option is to purchase an ez-link card, which is a stored value card that can be used for all train and bus services. The card can be purchased from TransitLink ticket offices located at MRT

stations and bus interchanges. It costs S\$12, out of which S\$7 is stored value for use (the remaining S\$5 is the non-refundable cost of the card). The ez-link card can be topped up at any ticket office, and it can be returned for a refund of the unused stored value.

A third option is the Singapore Tourist Pass, which is available as a 1, 2, or 3-day pass and offers unlimited rides on Singapore's MRT/LRT trains and basic bus services. The price of the ticket starts at S\$10 for a 1-day pass (plus S\$10 deposit, which will be refunded if the card is returned within five days after the date of purchase). Passes are sold at selected MRT stations (Ang Mo Kio, Bugis, Changi Airport, Chinatown, City Hall, Harbourfront, Lavender, Orchard, and Raffles Place) and can be topped up for additional days of travel.

Taxis

Taxis can be flagged down 24 hours a day on most roads. There are also well-marked taxi stands located outside most major shopping centers and hotels. Alternatively, you can call for a taxi by using one of the taxi booking hotlines, such as 6342 5222 (6-DIAL-CAB). Do note that there is an additional booking fee. Taxi fares are metered and are based on a flag-down rate (ranging from S\$3.00 to S\$3.50) and the distance traveled. Additional surcharges may also apply (e.g., location, peak hour, midnight charges), but these will be reflected in the meter.

IMPORTANT NUMBERS

Emergency Hotlines

Police: 999 (toll-free)

Fire and Ambulance: 995 (toll-free)

Useful Telephone Numbers

Flight Information: 1800 542 4422*

Tourist Information: 1800 736 2000* (Monday–Friday 9:00–18:00)

Time of Day: 1711

Weather Information: 6542 7788

Dial-A-Cab: 6342 5222

*1800 numbers are toll-free within Singapore

TOURIST INFORMATION

Visitor Information Centers

Singapore Visitors Centre @ Orchard

Junction of Cairnhill Road and Orchard Road

Hours: 9:30–22:30 daily

Nearest MRT station: Somerset (NS23)

Nearest bus lines: 7, 14, 16, 65, 106, 111, 123, 175, 502

Singapore Visitors Centre @ ION Orchard

ION Orchard level 1 concierge

Hours: 10:00–22:00 daily

Nearest MRT station: Orchard (NS22)

Nearest bus lines: 14E, 124, 128, 143, 162, 162M, 167, 171, 190, 700, 700A

Chinatown Visitor Centre @ Kreta Ayer Square

2 Banda Street

Hours: Monday–Friday 9:00–21:00, Saturday–Sunday 9:00–22:00

Nearest MRT stations: Chinatown (NE4), Outram Park (EW16/NE3)

Nearest bus lines: 80, 124, 143, 145, 166

Useful Links

- www.yoursingapore.com: Singapore Tourism Board's comprehensive tourist information site, featuring information on Singapore's attractions, food, shopping, festivals, and more.
- www.1stopsingapore.net: An online travel series on popular tourist destinations in Southeast Asia, produced by local travel writers.
- www.streetdirectory.com: An online, interactive map of Singapore showing the location of places of interest, hotels, and MRT stations.
- www.transitlink.com.sg and www.publictransport.sg: Information about Singapore's public transport system, including system maps, arrival times, and fare information.

- www.greatsingaporesale.com.sg: Information on the Great Singapore Sale, an annual shopping event co-organized by the Singapore Tourism Board and other retail companies/malls to promote tourism in Singapore.
- www.hungrygowhere.com: An online food and dining guide that provides food reviews and is searchable by cuisine, location, and price range.

MEDICAL CARE

Singapore has world-class healthcare facilities, and both government and private hospitals/clinics are well equipped. Medical costs in private hospitals/clinics are generally higher than in government hospitals. The basic cost for a short consultation at a private clinic ranges from S\$20 to S\$30.

It is advisable to inquire about the estimated medical costs before proceeding with treatment. There are many medical clinics and hospitals in Singapore to suit different budgets. Among those nearer to the conference hotels are the following:

Clinics

Raffles Medical Group

252 North Bridge Road, #02-17 Raffles City Shopping Centre, Singapore 179103

Tel: +65 6339 6911 | Fax: +65 6334 6311

Hours: Monday–Friday 7:30–13:00 & 14:00–17:30, Saturday 7:30–13:00

Nearest MRT stations: City Hall (NS25/EW13), Esplanade (CC3)

Nearest bus lines: 14, 14E, 16, 36, 77, 106, 111, 128, 130, 131, 133, 162, 162M, 167, 171, 502, 502A, 518, 518A, 700, 700A, 850E, 857, 960

This is a private clinic located near Pan Pacific Singapore and PARKROYAL on Beach Road.

Tooth Angels & Co. Dental Surgeons

6 Eu Tong Sen Street, #B1-01 Central, Singapore 059817

Tel: +65 6222 6220 | Fax: +65 6222 6420

Hours: Monday–Saturday 10:00–20:00

Nearest MRT station: Clarke Quay (NE5)

Nearest bus lines: 2, 12, 33, 51, 54, 61, 63, 80, 124, 145, 147, 166, 174, 174E, 190, 197, 851, 961

This is a private dental clinic located near Pan Pacific Singapore and PARKROYAL on Beach Road.

Hospital

National University Hospital (NUH)

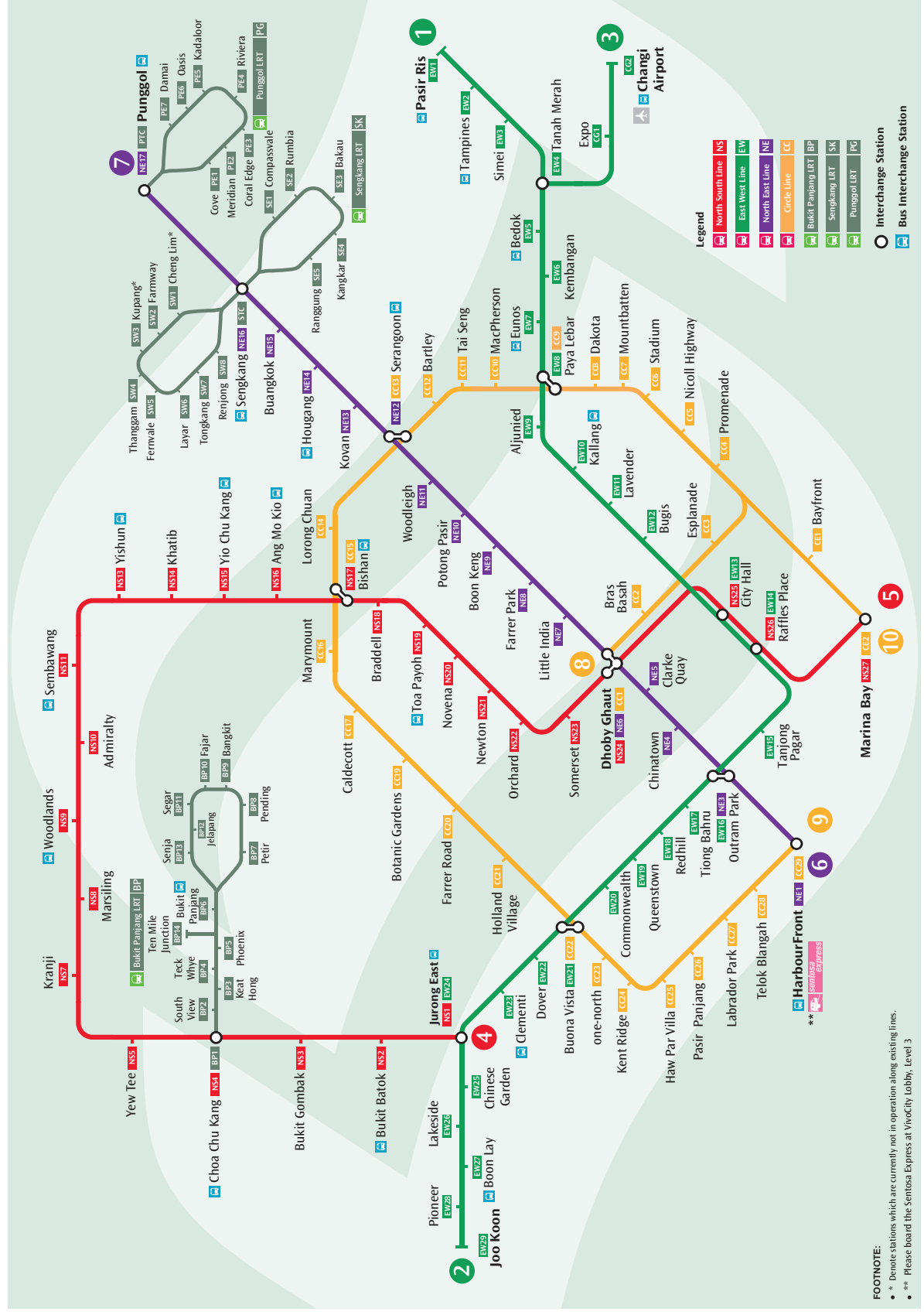
5 Lower Kent Ridge Road, Singapore 119074

Tel: +65 6779 5555

Nearest MRT station: Kent Ridge (CC24)

Nearest bus lines: 92, 95, 197, 200

NUH is a public hospital. It is one of the closer hospitals to the Nanyang Executive Centre.



Mass Rapid Transit System Map, © 2011 Land Transport Authority Singapore

Program

About IEA

The International Association for the Evaluation of Educational Achievement

(IEA) is an independent, international cooperative of national research institutions and governmental research agencies. It conducts large-scale comparative studies of educational achievement and other aspects of education, with the aim of gaining in-depth understanding of the effects of policies and practices within and across systems of education.

Through over 50 years of studying cross-national achievement, IEA has contributed substantially to the development of a worldwide community of researchers in educational evaluation. The aim of the IEA International Research Conference is to provide an international forum for researchers working with IEA data to exchange ideas and information on critical educational research issues.



5th IEA IRC

26–28 June 2013, Singapore

4th IEA IRC

1–3 July 2010, Gothenburg, Sweden

3rd IEA IRC

18–20 September 2008, Taipei, Chinese Taipei

2nd IEA IRC

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

1st IEA IRC

11–13 May 2004, Nicosia, Cyprus