

— 2015 —

# CEMO

Centre for Educational Measurement

---

ANNUAL REPORT



UiO : **Faculty of Educational Sciences**  
University of Oslo





The Centre for Educational Measurement at the University of Oslo (CEMO) is an international research unit which conducts basic research in educational measurement and applied research in early childhood, primary and higher education. CEMO develops national competence by disseminating knowledge about educational measurement to stakeholders and teaching of Master and PhD students. The centre collaborates with similar units in many other countries and is part of an international research network.

# CEMO IN BRIEF

Centre for Educational Measurement at the University of Oslo (CEMO) is an active research unit chaired by Professor Sigrid Blömeke. As of December 2015, CEMO consists of 14 employees, including three Professor II positions. Several positions (professorship, post-doctoral researcher, and PhD candidates) will be filled next year, and CEMO will hence continue to grow also in 2016.

In 2015, CEMO arranged its two first conferences. The one-day conference 'Assessment and learning - Fields Apart?', arranged in cooperation with Knowledge Centre for Education and Oxford University Centre for Educational Measurement, was visited by some 80 participants. At CEMO's three-day international conference Standard Setting: International State of Research and Practices in the Nordic Countries, in September, 150 international researchers and policy makers met to discuss this controversial topic. The conferences provided great opportunities for CEMO to reach out to a broader audience, as a complement to the centre's increased visibility in both regular and social media (press releases, homepage, Facebook, and Twitter) and active participation at other conferences and meetings.

Brown bag seminars were continued and the centre hosted a series of High Profile talks, where renowned national and international scholars were invited to give open lectures followed by a one hour discussion. CEMO organized many workshops and courses ranging from an introduction to data management via item-response theory to advanced multilevel modeling.

CEMO extended its UiO collaborations by forming a research group together with the EKVA group at the Department of Teacher Education and School Research, and by participating in a project at the Medical Faculty. International agreements on collaboration were signed with the University of Luxembourg and with the University of Kiel.

In 2015, 42 scientific articles were published by CEMO authors/co-authors. Two awards were granted CEMO members: PhD Candidate Stephan Daus won the poster prize at IMPS (International Meeting for Psychometric Society), Beijing, and Postdoctoral Fellow Ronny Scherer won the 'New assessment researcher award' at the AEA Europe Conference in Glasgow.



# TABLE OF CONTENTS

## **CEMO in brief**

### **1 The director's comments** 6

### **2 Scientific activities** 8

Research profile

Publications

Awards

### **3 Education and research training** 10

Courses

### **4 Scientific outreach** 12

Assessment and Learning - Fields Apart?

Standard Setting: International State of Research and Practices in the Nordic Countries

Websites and social media

### **5 Management & administration** 14

Administrative structure

The CEMO Board and the internal Scientific Advisory Board

### **6 Finances** 18

Accounting principles

Financial report 2015 for Project 205435

### **7 Appendices** 19

CEMO members and Guest Researchers

CEMO events

Production

# 1 THE DIRECTOR'S COMMENTS

CEMO has reached its crucial objective in 2015 by building up a stable research environment. We have moved to new premises at Forskningsparken, to the NEMKO building (Gaustadalleen 30), and we were able to hire more outstanding colleagues. From the U.S., David Rutkowski and Leslie Rutkowski have joined CEMO as professors – both with strong research records in the field of international large-scale assessments. Furthermore, we agreed with the Medical Faculty on a joint research project about the assessment of competencies gained during medical education. Muirne Paap from The Netherlands and Stefan Schaubert from Germany are the two Postdoctoral Fellows who started with their work on this project in 2015. Melaku Tesfa Tesema from Ethiopia started at CEMO as a PhD student. We are in addition proud that we could attract Anders Skrandal from the Norwegian Institute of Public Health (FHI) as Professor II to our centre. He is an internationally renowned psychometrician and the incoming president-elect of the Psychometric Society. Finally, Nina Hogrebe, Lars Jenßen and Rolf Strietholt from Germany were visiting scholars at CEMO during parts of the year 2015.

We are all very enthusiastic about the chance to work in an internationally recognized research unit in the field of educational measurement. Many of our activities in terms of research and publications, conferences and workshops, talks and project meetings attracted national and international attention. We published more than 40 journal articles on topics covering the full cycle of educational measurement. One major 2015 event was our conference on “Standard setting in the Nordic countries” – a very controversial topic. About 150 participants, 20 presenters and five keynote speakers from 11 different countries discussed the different perspectives on it and presented up-to-date research.

We are particularly happy about the great internal collaboration at the University of Oslo with EKVA

and ILS, ISP and IPED. CEMO has received tremendous support by the Faculty of Education, the CEMO Board and the Scientific Advisory Board during this past year. They have served as links to existing research and teaching and provided valuable input to our work. We are looking forward to joint activities, in particular with respect to teaching. Our mission is to establish educational measurement as a field that is profoundly developed in all students enrolled at our Faculty. Statistical literacy is nowadays an essential and indispensable competence needed in education.

Next year's efforts at CEMO will be focused on developing a systematic teaching plan for building up statistical literacy and competence in educational measurement from the BA through the MA to the PhD level. We will also fill the last professorship available and another PhD position. A major event will be the joint conference about differential educational effectiveness of the EARLI SIGs 18 and 23, which we will host. And, of course, we will go on with our successful informal presentations and talks at the Brown bag seminar.

We are all looking forward to 2016 with great expectations!

On behalf of the CEMO team,



Sigrid Blömeke, Director of CEMO





## 2 SCIENTIFIC ACTIVITY

Centre for Educational Measurement at the University of Oslo (CEMO) is a research unit which contributes to development of national competence within the field of educational measurement.

The unit shall conduct applied research within the fields of early childhood education, primary and secondary education, and higher education, and basic research within the field of educational measurement.

Basic research is the primary task for the centre, and CEMO researchers are specialized on psychometrics and latent variable models, measurement equivalence, innovative assessment formats, and causal inference from observational data. These methodological issues frequently appear in several different substantive areas where CEMO researchers are involved; from measuring socio-emotional and cognitive outcomes prior to school age, via international large scale assessments and twenty first century skills, to examination models with objective structured clinical examinations and rater effects.





## Research profile

CEMO's research profile is divided into the following methodological and substantive areas:

### Methodological areas

- Application and applicability of advanced measurement techniques
- Measurement equivalence across groups & time
- Modeling of causes & effects, development & change, and multi-level effects
- Innovative assessment formats & new areas of skills

### Substantive areas

- Early childhood, primary, secondary and higher education
- National & international large-scale assessment of student and teacher knowledge, beliefs, skills
- Contextual effects on instructional quality and achievement

## Publications

The researchers at CEMO published 42 scientific articles in 2015. The themes varied and covered several fields like science education, mathematical competence, aggression, item calibration, MC-SIM-EX method, testlet effects and intelligence. For a full list of CEMO publications, see Appendices.

CEMO also published five press releases and was co-author on one article on [www.forskning.no](http://www.forskning.no).

## Awards

Stephan Daus, Trude Nilsen and Johan Braeken won the poster prize at IMPS (International Meeting for Psychometric Society) in Beijing, China, for the poster entitled 'Explaining item difficulty heterogeneity across content groups with curricular coverage'.

Ronny Scherer won the 'New assessment researcher award' at the AEA Europe Conference in Glasgow, Scotland, and gave his keynote on Problem Solving in the 21st Century: Innovations in Assessment and Psychometric Modeling.



# 3 EDUCATION AND RESEARCH TRAINING

The unit shall in collaboration with the host institution educate candidates at the master- and doctoral levels within the field of educational measurement. This should be done within the framework of already existing programs within the fields of education, special education, and subject didactics.

In 2015, CEMO arranged five PhD courses and one workshop. Participation at the courses was credited one ECTS without documentation and three ECTS with documentation.

## Courses

### **UV9250: Equating test scores with IRT techniques, Dr. Norman Verhelst (EURO-METRICS)**

The three days course introduced the basic principles of IRT, including model specification, estimation of item and person parameters, and testing of model fit. Different designs of test linking and equating were discussed from methodological and practical points of view. Several examples of designs for test equating were presented and discussed, and participants carried out hands-on exercises.

### **UV9254: Advanced Multilevel Modeling, Prof. Jan-Eric Gustafsson and Postdoctoral Fellow Ronny Scherer**

The two days advanced course introduced the concept of multilevel structural equation modeling and provided a number of applications from substantive areas. Among other models, doubly-latent, mediation, confirmatory factor-analytic and structural equation models were covered.

### **UV9200: Introduction to Data Management, Associate Professor Johan Braeken and PhD Candidate Stephan Daus**

A two day introductory course to data management focusing on common every-day tasks, operations, and practical problems an educational researcher might encounter when dealing with data.

### **UV9214: Regression Analysis, Associate Professor Johan Braeken**

A four days course focusing on basic concepts and principles of simple and multiple regression, and various strategies for using multiple regression.

### **UV9255: Causal Modelling in non-experimental data, Professor II Henrik D. Zachrisson**

This three days course combined lectures and hands-on exercises, and built up knowledge and skills in using advanced econometric modeling techniques.

### **Workshop: Introduction to meta-analysis using structural equation modeling, Associate Professor Mike W.-L. Cheung (National University of Singapore)**

The two days workshop provided an introduction to meta-analytic structural equation modeling (MASEM). It covered both basic and advanced techniques in conducting MASEM. Besides lectures focusing on the theory of MASEM, participants were given the opportunity to conduct MASEM in practical sessions.





## 4 SCIENTIFIC OUTREACH

Through its research- and development activities the unit shall develop and disseminate knowledge to relevant stakeholders in the sector of education.

The unit shall in its area of competence be an advisor to the Norwegian Ministry of Education and Research and the Norwegian Directorate for Education and Training.

The unit shall through collaboration contribute to competence development in educational measurement at other universities and higher education institutions.

There are explicit assignments to the centre to disseminate knowledge and develop competence. Educational measurement often has profound impact both on individuals and on processes and outcomes of teaching and learning. This, in combination with the fact that educational measurement often is non-transparent and technically complex generates a need to recognize multiple stakeholders who have different information needs, such as students, parents, teachers, school-leaders, local politicians and administrative bodies and national politicians and administrative bodies.

A central part of CEMO's scientific outreach is the open seminars with internal and external prominent researchers. In 2015, CEMO continued the weekly Brown bag seminars in addition to organizing six High Profile talks and two conferences.

### **Assessment and Learning – Fields Apart?**

This one-day conference was arranged 3 March in cooperation with Knowledge Centre for Education and Oxford University Centre for Educational Measurement. The question if assessment and

learning are fields apart was highlighted from various points of view by researchers, policy stakeholders, and practitioners. The conference was visited by some 80 participants.

### **Standard setting: International State of Research and Practices in the Nordic Countries**

From 21 to 23 September CEMO organized the first ever Nordic conference on standard setting. Around 150 participants from 11 different countries were represented.

The conference was opened by Secretary General in the Norwegian Ministry of Education and Research, Trond Fevolden, and by Rector of the University of Oslo, Ole Petter Ottersen, as well as by director of CEMO, Sigrid Blömeke.

Major research questions subject to debate during the conference were among others:

- What is the big difference between an A and a B, and where should the line go?
- Is a C today better than it was in 2005?





To entertain the academic point of view, CEMO had gathered world-leading researchers within the field of educational measurement. Highly renowned educational researchers and representatives from both the Norwegian, Swedish and Danish governments were in attendance. One of the objectives of the conference was to open opportunities for a common Nordic approach.

The conference was co-sponsored by the Norwegian Ministry of Education and Research, the Norwegian Research Council, and the Swedish Skolverket.

#### **External workshops by CEMO members**

CEMO members have been teaching at international venues in addition to their courses on campus at the University of Oslo. Postdoctoral Fellow Stefan Schaubert has given lectures on Was Sie schon immer über "Cronbach's Alpha" wissen wollten, aber bisher nicht zu fragen wagten and Publizieren in der medizinischen Bildungsforschung in Leipzig, Germany and on Introduction to the R Program-

ming Language for Statistical Computing and Graphics in Berne, Switzerland. PhD Candidate Stephan Daus and Associate Professor Johan Braeken gave a workshop on *Explanatory item response model – IRT for research* at 16th annual conference of the Association for Educational Assessment (AEA) in Europe, Glasgow, Scotland.

#### **Websites and social media**

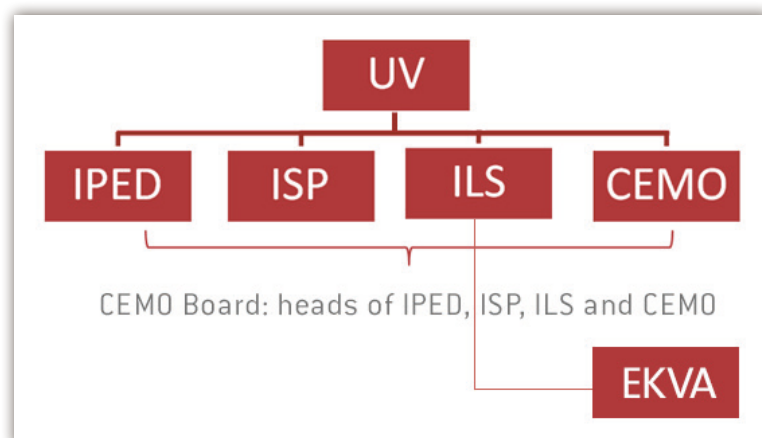
During 2015, CEMO further developed the both Norwegian and English websites. Numbers of followers on social media increased significantly. Both Twitter and Facebook were used almost daily to spread information about CEMO's research activities, possibilities, and cooperation. On the websites the main features remain the personal pages for each CEMO member, information on CEMO's research, upcoming events, and list of publications.

For more information visit our website:

**[www.uv.uio.no/cemo](http://www.uv.uio.no/cemo)**

## 5 MANAGEMENT & ADMINISTRATION

CEMO is established as a research unit hosted by the Faculty of Educational Sciences (UV) at the University of Oslo (UiO). The centre moved premises in August and is now located in Gaustadalleen 30. The Norwegian Ministry of Education and Research and UiO are CEMO's main financial contributors. They constitute the final reporting entities that define the guidelines under which CEMO is to operate. UV is responsible for the main load of administrative support.



*UV = Faculty of Educational Sciences; IPED = Department of Education; ISP = Department of Special Needs Education; ILS = Department of Teacher Education and School Research; CEMO = Centre for Educational Measurement at University of Oslo; EKVA= Unit for quantitative analysis in education*

### Administrative structure

The centre is run by the director, Professor Sigrid Blömeke, and the Senior Adviser Anne-Catherine Lehre. Running and strategic issues are dealt with at regular meetings. The Senior Adviser is responsible for the daily running of CEMO. The administration also consists of Higher Executive Officer, Øystein Andresen. Tasks of the administration include, among other things, external communication, facilitating a good reception and stay for guests, maintenance of the websites, taking minutes from board meetings, recruiting interviews, and scientific advisory board meetings, and organizing and implementing the different events like courses, seminars, and workshops. CEMO's administration

also functions as permanent secretariat for the CEMO Board.

The Faculty of Educational Sciences is responsible for employments, CEMO's budgets and accounting, and partly for media and external communication. The general IT support is provided by the Department of Teacher Education and School Research.

### The board and the internal CEMO Scientific Advisory Board

The CEMO Board is an administrative body that meets every third or fourth month to focus on strategic and control functions as well as approving budgets, accounts, and annual reports.



## Comments by the CEMO Board chair: Rita Hvistendahl

The CEMO Board had three meetings in 2015; 4 February, 4 May and 9 December. The meetings were held at the Department of Teacher Education and School Research. A number of issues were also decided upon in electronic board meetings on 14 January, 5 August and 30 September.

The most important issue for the 2015 meetings has been to announce and fill positions, and unanimously deciding to announce a new professorship at CEMO. The evaluation committee found one applicant eligible, and the CEMO Board would like to thank the committee for their great efforts. Furthermore, the board extends their thanks to the interview committee. The board has also had the great pleasure of welcoming Leslie and David Rutkowski as professors of CEMO, in addition to Anders Skrondal as Professor II. The board has also welcomed Muirne Paap as Postdoctoral Fellow at CEMO, and Stefan Schaubert in a postdoctoral position shared between CEMO and the Faculty of Medicine. Finally, at the very last meeting in 2015, the board discussed and approved of the plans for courses at the bachelor level that were presented by the CEMO director Professor Sigrid Blömeke.

At a meeting with the Secretary of the Ministry of Education October 14, the CEMO Senior Adviser Anne-Catherine Lehre presented the CEMO staff, and the CEMO director Professor Sigrid Blömeke outlined impressive plans for the centre, including scientific activities such as courses at the PhD, master's and bachelor's level, for seminars and conferences, for research and dissemination and for international collaboration, all in the field of Educational Measurement.

The CEMO Board takes great pleasure in congratulating CEMO with the approval of both of their applications to the FINNUT program of the Research Council of Norway; "Embracing Heterogeneity in International Surveys: Optimal Test Design and Parameter Estimation" with Professor Leslie Rutkowski as Project Manager, and "Educational assessments of the 21st century: Measuring and understanding students' adaptability in complex problem solving situation" with Postdoctoral fellow Ronny Scherer as Project Manager.





## The CEMO Board in 2015

Name	Affiliation
Chair: Rita E. Hvistendahl	Head of Department of Teacher Education and School Research, UiO
Berit Rognhaug	Head of Department of Special Needs Education, UiO
Ola Erstad	Head of Department of Education, UiO
Ariel Sevendal	Trade union representative
Celestina da Silva	Student representative

The Internal CEMO Scientific Advisory Board (iSAB) was appointed by the CEMO Board. The Scientific Advisory Board gives invaluable suggestions and feedback on scientific and educational activity. They have played an active part in the recruitment processes at the centre. In December 2015, the CEMO Board closed down the iSAB, and CEMO wishes to thank its members for their dedication and good work. In 2016, an international, external Scientific Advisory Board will be appointed.

## The CEMO Scientific Advisory Board

Name	Affiliation
Rolf Vegar Olsen	Researcher, Department of Teacher Education and School Research, UiO
Arne O. Lervåg	Professor, Department of Education, UiO
Bente Hagtvet	Professor, Department of Special Needs Education, UiO

# 6 FINANCES

## Accounting principles

The Norwegian Ministry of Education and Research (7.056 MNOK core-funding to CEMO) and UiO (several positions) are CEMO's main financial contributors.

The table below shows the financial statement and budgeted expenses for the Project 205435 (Centre for Educational Measurement)

## Financial report 2015 for Project 205435

	Financial statement	Budgeted expenses
Opening balance	-6 631 816	-6 631 816
	-6 631 816	-6 631 816
Core funding	-7 056 000	
External income	-26 384	-6 600 000
Income from sales	-4 835	-450 000
	-7 087 219	-7 050 000
Salary (variable)	21 799	24 677
Holiday pay, payroll tax, pension	5 635	6 636
Salary Reimbursement	0	0
Salary expenses	130 470	
	157 904	31 313
Consultancy service	0	0
Travel costs, courses and conference	729 737	1 578 000
Other operating expenses	181 389	2 410 000
	911 126	3 988 000
Investments	213 330	0
	213 330	0
Own funding (UiO)	-5 055 352	-7 121 427
Overhead	1 882 725	2 180 166
Salary Reimbursement	6 945 619	8 043 376
Total netto contribution	3 772 992	3 102 115
<b>Total</b>	<b>-8 663 683</b>	<b>-6 560 388</b>



## 7 APPENDICES

### CEMO members

Name	Nationality	Position	Period
Gustafsson, Jan-Eric	Sweden	Professor II	Oct. 2012-
Lehre, Anne-Catherine WG	Norway	Senior Adviser	Jan. 2013-
Scherer, Ronny	Germany	Postdoctoral Fellow	Jan. 2014-
Braeken, Johan	Belgium	Associate Professor	Feb.2014-
Zachrisson, Henrik D.	Norway	Professor II	Jul. 2014-
Blömeke, Sigrid	Germany	Director	Aug.2014-
Andresen, Øystein	Norway	Higher Executive Officer	Aug.2014-
Daus, Stephan	Norway	PhD Candidate	Oct.2014-
Skrondal, Anders	Norway	Professor II	Jan.2015-
Tesema, Melaku Tesfa	Ethiopia	PhD Candidate	Jan.2015-
Schauber, Stefan	Germany	Postdoctoral Fellow	Mar.2015-
Rutkowski, Leslie	USA	Professor	Sep.2015-
Rutkowski, David	USA	Professor	Sep.2015-
Paap, Muirne	Netherlands	Postdoctoral Fellow	Oct.2015 -

### CEMO guest researchers

Name	Nationality	Period
Jenßen, Lars	Germany	Feb.-Jul.2015
Strietholt, Rolf	Germany	Jul.-Dec.2015
Hogrebe, Nina	Germany	Aug.-Oct.2015

## CEMO events

### High Profile talks

Name	Seminar title	Date
Gabrielsen, Egil	Presentation of the PIAAC results	29 Jan
Nagengast, Benjamin	When Research on Motivation Meets Methodology: Bringing the 'x' Back to Expectancy-Value Theory	26 Feb
Dearing, Eric	Methodological Triangulation in Quasi-experimental Evaluation: Two Wrongs Don't Make a Right, but Three Might	11 Jun
Rutkowski, David	Educational Capacity Building in South Sudan	16 Oct
Sitek, Michal	What Can Large-scale Assessment Data Tell Us About the Educational Reforms in Poland?	20 Oct
Hastedt, Dirk and Hatlevik, Ove	Results From IEA's International Computer and Information Literacy Study (ICILS) 2013	15 Dec

### Brown bag seminars

Name	Seminar title	Date
Melby-Lervåg, Monica	Evidence for the Effectiveness of Educational Interventions: Methodological Challenges in Meta-analyses	13 Jan
Rutkowski, David/ Rutkowski, Leslie	Research on International Large-scale Assessments	20 Jan
Blömeke, Sigrid	Validity of a Test Battery Assessing Pre-school Teachers' content, Pedagogical Content and General Pedagogical Knowledge	27 Jan
Scherer, Ronny	Modeling Teachers' Self-Efficacy Across Countries: Results From the TALIS 2013 Study	3 Feb
Hjetland, Hanne Næss	Preschool Predictors of Later Reading Comprehension Ability: A Campbell Systematic Review	10 Feb
Guttersrud, Øystein	Practical Rasch Measurement - the National Sample Test in Science at Grade 10	17 Feb
Jenßen, Lars	Assessment of Pre-School Teachers' Knowledge and Skills	24 Feb
Lervåg, Arne Ola	Using Structural Equation Modeling to Determine the Role of General Language-skills in the Development of Decoding Skills	10 Mar
Skrondal, Anders	Using Factor Scores as Proxies for Latent Variables in Structural Equation Modeling (SEM)	17 Mar

Ystrøm, Eivind/Zambrana, Imaç Maria	Environmental and Genetic Factors Underlying Reproduction of Level & Type of Education	12 May
Nilsen, Trude/Scherer, Ronny	Relating Instructional Quality and Learning Outcomes for Different School Climates. A Multi-group, Multi-level SEM Approach	19 May
Schauber, Stefan	Assessment of Competence in Medical Education	26 May
Jenßen, Lars	Application of Latent State-Trait Theory in Educational Research: Does the Situation Matter?	2 Jun
Zachrisson, Henrik D.	Replication and Robustness in Educational Research	9 Jun
Siddiq, Fazilat/Scherer, Ronny	Validating a Measure of Teachers' Emphasis on Developing Students' Digital Information and Communication Skills (TEDDICS)	16 Jun
Rutkowski, David	Causal Inferences with Large Scale Assessment Data: Using a Validity Framework	15 Sep
Mastekaasa, Arne	Immigrant Concentration and Student Outcomes in Norwegian Upper Secondary Schools	29 Sep
Strietholt, Rolf	How is Inequality Measured in International Studies on Educational Achievement?	13 Oct
Tesema, Melaku Tesfa	Predictive Validity of High School Grades for Participation and Success in Higher Education	27 Oct
Nilsen, Trude	Differences in Differences: A Trend Analysis of TIMSS 2007 and 2011	3 Nov
Paap, Muirne	Developing a Computerized Adaptive Test to Map/Measure Life Quality of Patients with COPD	17 Nov
Lie, Svein	A Very Personal Description of the Role of Educational Measurement in Norway During the Last 70 Years	24 Nov
Daus, Stephan	Cells Are Challenging and Evolution Effortless? Digging into Norwegian Pupils' Achievement in Science Topics, and the Link to Curricular Coverage	1 Dec
Rutkowski, Leslie	One Size (Still) Does Not Fit All: The Case For Tailoring International Assessments To Meet Regional- or Country-specific Needs	8 Dec



## Conferences

Conference with the Norwegian Knowledge Centre for Education	
Theme	Date
Assessment and Learning – Fields Apart?	3 Mar
International conference	
Theme	Date
Standard setting: International State of Research and Practices in the Nordic Countries	21-23 Sep

## Courses

UV9250: Equating test scores with IRT techniques, Dr. Norman Verhelst, 23-27 Mar
A three days course on introducing basic principles of item response theory (IRT), different designs of test linking and equating, and hands-on exercises.

UV9254: Advanced Multilevel Modeling, Prof. Jan-Eric Gustafsson and Postdoctoral Fellow Ronny Scherer, 4+11 May
A two days advanced course on multilevel structural equation modeling, focusing on confirmatory factor analysis, and hands-on exercises..

UV9200: Introduction to Data Management, Associate Professor Johan Braeken and PhD Candidate Stephan Daus, 13-14 Aug
A two days introductory course to data management focusing on common every-day tasks, operations, and practical problems an educational researcher might encounter when dealing with data.

UV9214: Regression Analysis, Associate Professor Johan Braeken, 31 Aug-1 Sep and 10-11 Sep
A four days course focusing on basic concepts and principles of simple and multiple regression, and various strategies for using multiple regression.

Workshop: Introduction to meta-analysis using structural equation modeling, Associate Professor Mike W.-L. Cheung (National University of Singapore), 6-7 Oct
A two days theoretical and practical workshop introducing both basic and advanced techniques in meta-analytic structural equation modeling (MASEM).

UV9255: Causal Modelling in non-experimental data, Professor Il Henrik D. Zachrisson, 25-27 Nov
This three days course combined lectures and hands-on exercises, and built up knowledge and skills in using advanced econometric modeling techniques.

## Production

Contributors affiliated with CEMO in bold

### Articles in peer-reviewed journals

**Blömeke, S., Gustafsson, J.-E.** & Shavelson, R. (2015). Editorial: Approaches to competence measurement in higher education. *Zeitschrift für Psychologie*, 223, 1–2.

**Blömeke, S., Gustafsson, J.-E.** & Shavelson, R. (2015). Beyond dichotomies: Competence viewed as a continuum. *Zeitschrift für Psychologie*, 223, 3–13.

**Blömeke, S.**, Hoth, J., Döhrmann, M., Busse, A., Kaiser, G., & König, J. (2015). Teacher Change During Induction: Development of Beginning Primary Teachers' Knowledge, Beliefs and Performance. *International Journal of Science and Mathematics Education*, 13(2), 287-308.

**Blömeke, S., Jenßen, L.**, Dunekacke, S., Suhl, U., Grassmann, M. & Wedekind, H. (2015). Professionelle Kompetenz von Erzieherinnen messen: Entwicklung und Validierung standardisierter Leistungstests für frühpädagogische Fachkräfte. *Zeitschrift für Pädagogische Psychologie*, 29 (3-4), 177-191.

**Blömeke, S.**, & Kaiser, G. (2015). Effects of motivation on the belief systems of future mathematics teachers from a comparative perspective. In B. Pepin, & B. Roesken-Winter (Eds.), *From belief to dynamic affect systems in mathematics education* (pp. 227-243). Dordrecht: Springer.

**Blömeke, S.**, Kaiser, G., & Clarke, D. (2015). Preface for the Special Issue on "Video-Based Research on Teacher Expertise". *International Journal of Science and Mathematics Education*, 13(2), 257-266.

**Blömeke, S.** & Zlatkin-Troitschanskaia, O. (2015). Kompetenzen von Studierenden: Einleitung. *Zeitschrift für Pädagogik*; 61. Beiheft, 7-10.

Breinegaard, N., Rabe-Hesketh, S. and **Skrandal, A.** (2015). The transition model test for serial dependence in mixed-effects models for binary data. *Statistical Methods in Medical Research*. (DOI: 10.1177/0962280215588123).

Dang, C. P., **Braeken, J.**, Colom, R., Ferrer, E., & Liu, C. (2015). Do processing speed and short-term storage exhaust the relation between working memory capacity and intelligence?. *Personality and Individual Differences*, 74, 241-247.

Dearing, E., **Zachrisson, H.D.**, & Nærde, A. (2015). Faint and Fading Associations between Age of Entry into Child Care and Aggression for Young Norwegian Children. *Psychological Science*. 26, 1596-1607.

Dunekacke, S., **Jenßen, L. & Blömeke, S.** (2015). Effects of mathematics content knowledge on pre-school teachers' performance: A video-based assessment of perception and planning abilities in informal

learning situations. *International Journal of Science and Mathematics Education*, 13, 267-286.

Dunekacke, S., **Jenßen, L.** & **Blömeke, S.** (2015). Mathematikdidaktische Kompetenz von Erzieherinnen und Erziehern: Validierung des KomMa-Leistungstests durch die videogestützte Erhebung von Performanz. *Zeitschrift für Pädagogik*; 61. Beiheft, 80-99.

Dunekacke, S., **Jenßen, L.**, Eilerts, K., & **Blömeke, S.** (2015). Epistemological beliefs of prospective preschool teachers and their relation to knowledge, perception, and planning abilities in the field of mathematics: a process model. *ZDM*, 1-13.

Hall, R. A., Hoffenkamp, H. N., Tooten, A., **Braeken, J.**, Vingerhoets, A. J., & van Bakel, H. J. (2015). The Quality of Parent–Infant Interaction in the First 2 Years After Full-Term and Preterm Birth. *Parenting*, 15(4), 247-268.

Hall, R. A. S., Hoffenkamp, H. N., Tooten, A., **Braeken, J.**, Vingerhoets, A. J. J. M., & van Bakel, H. J. A. (2015). Longitudinal associations between maternal disrupted representations, maternal interactive behavior and infant attachment: A comparison between full-term and preterm dyads. *Child Psychiatry & Human Development*, 46(2), 320-331.

Hoffenkamp, H. N., **Braeken, J.**, Hall, R. A., Tooten, A., Vingerhoets, A. J., & van Bakel, H. J. (2015). Parenting in Complex Conditions: Does Preterm Birth Provide a Context for the Development of Less Optimal Parental Behavior?. *Journal of pediatric psychology*, jsv007.

Hoffenkamp, H. N., Tooten, A., Hall, R. A., **Braeken, J.**, Eliëns, M. P., Vingerhoets, A. J., & van Bakel, H. J. (2015). Effectiveness of hospital-based video interaction guidance on parental interactive behavior, bonding, and stress after preterm birth: A randomized controlled trial. *Journal of consulting and clinical psychology*, 83(2), 416.

Jansen, M., **Scherer, R.**, & Schroeders, U. (2015). Students' self-concept and self-efficacy in the sciences: Differential relations to antecedents and educational outcomes. *Contemporary Educational Psychology*, 41, 13-24. doi:10.1016/j.cedpsych.2014.11.002

**Jenßen, L.**, Dunekacke, S., Baack, W., Tengler, M., Koinzer, T., Schmude, C., Wedekind, H., Grassmann, M. & **Blömeke, S.** (2015). KomMa: Kompetenzmodellierung und Kompetenzmessung bei frühpädagogischen Fachkräften im Bereich Mathematik (S. 59-79). In B. Koch-Priewe, A. Köker, J. Seifried & E. Wuttke (Hrsg.), *Kompetenzerwerb an Hochschulen: Modellierung und Messung. Zur Professionalisierung angehender Lehrerinnen und Lehrer sowie frühpädagogischer Fachkräfte*. Bad Heilbrunn: Klinkhardt.

Jenßen, L., Dunekacke, S. & **Blömeke, S.** (2015). Qualitätssicherung in der Kompetenzforschung: Empfehlungen für den Nachweis von Validität in Testentwicklung und Veröffentlichungspraxis. *Zeitschrift für Pädagogik*; 61. Beiheft, 11-31.



**Jenßen, L.**, Dunekacke, S., Eid, M. & **Blömeke, S.** (2015). The relationship of mathematical competence and mathematics anxiety: An application of latent state-trait theory. *Zeitschrift für Psychologie*, 223, 31–38.

Kaiser, G., Busse, A., Hoth, J., König, J., & **Blömeke, S.** (2015). About the complexities of video-based assessments: Theoretical and methodological approaches to overcoming shortcomings of research on teachers' competence. *International Journal of Science and Mathematics Education*, 13(2), 369-387.

Klem, M., **Gustafsson, J. E.**, & Hagtvet, B. (2015). The Dimensionality of Language Ability in Four-Year-Olds: Construct Validation of a Language Screening Tool. *Scandinavian Journal of Educational Research*, 59(2).

Klem, M., Melby-Lervåg, M., Hagtvet, B., Lyster, S. A. H., **Gustafsson, J. E.**, & Hulme, C. (2015). Sentence repetition is a measure of children's language skills rather than working memory limitations. *Developmental science*, 18(1), 146-154.

König, J., **Blömeke, S.**, & Kaiser, G. (2015). Early Career Mathematics Teachers' General Pedagogical Knowledge and Skills: Do Teacher Education, Teaching Experience, and Working Conditions Make a Difference?. *International Journal of Science and Mathematics Education*, 13(2), 331-350.

**Paap, M. C.**, Lange, L., van der Palen, J., & Bode, C. (2015). Using the Three-Step Test Interview to understand how patients perceive the St. George's Respiratory Questionnaire for COPD patients (SGRQ-C). *Quality of life research*, 1-10.

Roesken-Winter, B., Hoyles, C., & **Blömeke, S.** (2015). Evidence-based CPD: Scaling up sustainable interventions. *ZDM*, 47(1), 1-12.

Roesken-Winter, B., Schüler, S., Stahnke, R., & **Blömeke, S.** (2015). Effective CPD on a large scale: examining the development of multipliers. *ZDM*, 47(1), 13-25.

**Rutkowski, L.**, & Zhou, Y. (2015). The Impact of Missing and Error-Prone Auxiliary Information on Sparse-Matrix Sub-Population Parameter Estimates. *Methodology*.

**Rutkowski, L.**, & Zhou, Y. (2015). Correcting Measurement Error in Latent Regression Covariates via the MC-SIMEX Method. *Journal of Educational Measurement*, 52(4), 359-375.

Rutten, E. A., Bachrach, N., Balkom, A. J., **Braeken, J.**, Ouwens, M. A., & Bekker, M. H. (2015). Anxiety, depression and autonomy-connectedness: The mediating role of alexithymia and assertiveness. *Psychology and Psychotherapy: Theory, Research and Practice*.

**Scherer, R.** (2015). Is it time for a new measurement approach? A closer look at the assessment of cognitive adaptability in complex problem solving. *Frontiers in Psychology*, 6 :1664, doi:10.3389/fpsyg.2015.01664

**Scherer, R.**, Greiff, S., & Hautamäki, J. (2015). Exploring the relation between time on task and ability in complex problem solving. *Intelligence*, 48, 37-50. doi:10.1016/j.intell.2014.10.003

**Scherer, R.**, & **Gustafsson, J.-E.** (2015). Student assessment of teaching as a source of information about aspects of teaching quality in multiple subject domains: An application of multilevel bifactor structural equation modeling. *Frontiers in Psychology*, 6 :1550. doi:10.3389/fpsyg.2015.01550

**Scherer, R.**, & **Gustafsson, J.-E.** (2015). The relations among openness, perseverance, and performance in creative problem solving: A substantive-methodological approach. *Thinking Skills and Creativity*, doi:10.1016/j.tsc.2015.04.004.

**Scherer, R.**, & Siddiq, F. (2015). Revisiting teachers' computer self-efficacy: A differentiated view on gender differences. *Computers in Human Behavior*, 53, 48-57. doi:10.1016/j.chb.2015.06.038

**Scherer, R.**, & Siddiq, F. (2015). The Big-Fish-Little-Pond-Effect revisited: Do different types of assessments matter? *Computers & Education*, 80, 198-210. doi:10.1016/j.compedu.2014.09.003

**Scherer, R.**, Siddiq, F., & Teo, T. (2015). Becoming more specific: Measuring and modeling teachers' perceived usefulness of ICT in the context of teaching and learning. *Computers & Education*, 88, 202-214. doi:10.1016/j.compedu.2015.05.005

Traa, M. J., **Braeken, J.**, De Vries, J., Roukema, J. A., Slooter, G. D., Crolla, R., ... & Den Ouden, B. L. (2015). Sexual, marital, and general life functioning in couples coping with colorectal cancer: a dyadic study across time. *Psycho - Oncology*.

Weißerrieder, J., Roesken-Winter, B., Schueler, S., Binner, E., & **Blömeke, S.** (2015). Scaling CPD through professional learning communities: Development of teachers' self-efficacy in relation to collaboration. *ZDM*, 47(1), 27-38.

Zambrana, I.M., Dearing, E., Nærde, A., & **Zachrisson, H.D.** (2015). Time in ECEC and Language Competence in Norwegian 4-year-old Girls and Boys. *European Early Childhood Education Research Journal*. Online first. (forthcoming in Vol. 25(Iss. 4), 2017).

Zlatkin-Troitschanskaia, O., **Blömeke, S.** & Pant, H. A. (2015). Competency research in higher education: Conceptual and methodological challenges and perspectives for future interdisciplinary research. *Peabody Journal of Education*, 90, 459-464

## Books, book chapters, and reports

**Scherer, R.** (2015). Psychometric challenges in modeling scientific problemsolving competency: An item response theory approach. In B. Lausen, S. Krolak-Schwerdt, & Böhmer, M. (Eds.), *Data Science, Learning by Latent Structures, and Knowledge Discovery*. Berlin/Heidelberg: Springer. doi:10.1007/978-3-662-44983-7\_33

## Conference contributions

Beckmann, J. F., & **Scherer, R.** (August). *Coherence and Capability Utilisation: Development of problem solving competence across 41 countries*. Paper presented at the 16th Biennial Conference of the European Association for Research in Learning and Instruction (EARLI), Limassol, Cyprus.

**Braeken, J.** (April). *An empirical Kaiser criterion*. Poster presented at the 2015 annual meeting of the American Educational Research Association (AERA), Chicago, USA.

**Braeken, J.** (July). Chair of the Multidimensional IRT session at the International Meeting of the Psychometric Society (IMPS), Beijing

**Braeken, J.** (November). Discussant for keynote by Prof.dr. Keith Rust on Sampling, weighting, and sampling variance estimation for PISA. PISA International Conference 20115, Oslo

**Braeken, J.** (November). *Explanatory item response model – IRT for research*. Workshop, 16th annual conference of the Association for Educational Assessment (AEA) Europe, Glasgow

**Braeken, J.** (July). Towards effect sizes for local item dependence. Presentation at the International Meeting of the Psychometric Society (IMPS), Beijing

Nilsen, T., & **Scherer, R.** (June). *The Impact of Instructional Quality on Educational Outcomes in Schools with Low versus High Emphasis on Academic Success: Evidence that the School Matters*. Paper presented at the International Research Conference (IRC) of the IEA, Cape Town, South Africa.

Nilsen, T., & **Scherer, R.** (September). *The Relation between Instructional Quality and Educational Outcomes for Low versus High Levels of Emphasis on Academic Success: Evidence that the School Matters*. Paper presented at the European Conference on Educational Research (ECER), Budapest, Hungary.

Nouns, Z., Lahner F.M. & **Schauber S.** (September) *Was Sie schon immer über "Cronbach's Alpha" wissen wollten, aber bisher nicht zu fragen wagten*. Workshop given at the annual meeting of the Gesellschaft für Medizinische Ausbildung (GMA), Leipzig, Germany.

Nouns, Z. & **Schauber S.** (September) *Everything You Always Wanted to Know About "Cronbach's Alpha" But Were Afraid to Ask*. Workshop, given at the AMEE annual conference, Glasgow, Scotland.

**Rutkowski, D.** (November). Discussant for keynote by Dr. Matthias von Davier on Notes on Scaling, Linking, Fairness, Comparability. PISA International Conference 20115, Oslo

**Rutkowski, L.** (November). Discussant for keynote by Dr. Irwin S. Kirchon on Building on Innovation: Improving what is measured in PISA. PISA International Conference 20115, Oslo

**Scherer, R.**, Greiff, S., & Hautamäki, J. (April). *Linking speed and ability in computer-based assessments of complex problem solving to school achievement*. Paper presented at the Annual Meeting of the AERA 2015, Chicago, IL, USA.

**Scherer, R.**, Greiff, S., & Hautamäki, J. (March). *Über das Potenzial von Aufgabenbearbeitungszeiten beim komplexen Problemlösen: Vorhersage von schulischen Leistungen und Zusammenhang mit Selbstkonzept*. Paper presented at the 3. Tagung der Gesellschaft für Empirische Bildungsforschung, Bochum, Germany.

**Scherer, R.**, Jansen, M., Nilsen, T., & Aarepattamannil, S. (August). *Measuring Teachers' Perceptions of Instructional Quality across Countries: An Application of Exploratory Structural Equation Modeling*. Paper presented at the 16th Biennial Conference of the European Association for Research in Learning and Instruction (EARLI), Limassol, Cyprus.

Siddiq, F., & **Scherer, R.** (June). *How Teachers Emphasize the Development of Students' Digital Information and Communication Skills: Looking at 21st Century Education*. Paper presented at the International Research Conference (IRC) of the IEA, Cape Town, South Africa.

Siddiq, F., & **Scherer, R.** (September). *Teachers' Perceived usefulness of ICT in teaching and learning: An important determinant of ICT integration in classroom practices*. Paper presented at the European Conference on Educational Research (ECER), Budapest, Hungary.

**Skrondal, A.** (July). *Handling missing data in psychometrics*, Invited symposium at International Meeting of the Psychometric Society 2015, Beijing

**Skrondal, A.** (July). *Simple tests of Missing At Random (MAR) in multilevel models*. Presentation at International Meeting of the Psychometric Society 2015, Beijing

**Schauber S.** (November) *Introduction to the R Programming Language for Statistical Computing and Graphics*, Internal workshop given at the Insititue of Medical Education, Berne, Switzerland.

**Schauber S.** & Nouns, Z. (September). *Publizieren in der medizinischen Bildungsforschung*. Workshop given at the annual meeting of the Gesellschaft für Medizinische Ausbildung (GMA), Leipzig, Germany.

Tondeur, J., van Braak, J., Siddiq, F., & **Scherer, R.** (November). *Developing an instrument to measure new approaches to prepare future teachers for educational technology use*. Paper presented at the Annual Meeting of the Association for Educational Assessment-Europe (AEA-Europe), Glasgow, Scotland.



## Published research journalism

Rødal, A., Nielsen, S.R. & **Andresen, Ø.** (2015). Under 10 prosent bruker datamaskin på skolen daglig. *Forskning.no*, <http://forskning.no/barn-og-ungdom-skole-og-utdanning-informasjonsteknologi/2015/12/under-10-prosent-bruker-datamaskin>

## Talks

**Braeken, J.** (January). Assessing large-scale assessments. Northern Lights Editorial Meeting, Stockholm

**Schauber, S.** (November) «Hvordan kan vi lage gode eksamener? - presentasjon av en analyse for kvalitetssikring av eksamensspørsmål. Studieplanseminar «Oslo 2014», Det medisinske fakultet, UiO,.

**Zachrisson, H.D.** (March) Barnehagens betydning for barns språkutvikling. Seminar i forbindelse med arbeidet med ny rammeplan for barnehagene. Kunnskapsdepartementet/Ministry of Education and Research

**Zachrisson, H.D.** (March) Barnehagens betydning for språkutvikling, utdanning, arbeid, og tidlig atferd. Fagdag on utdanningsforskning ved Statsministerens kontor/Office of the Prime Minister

**Zachrisson, H.D.** (May) Comment on: An international assessment of early learning outcomes: background document for scoping. Seminar in Ministry of Education and Research

**Zachrisson, H.D.**, Dearing, E. Blömeke, S., & Moser, T. (May & November) What levels the playing field in the Norwegian ECEC model? Evidence from the BONDS study on 2-4 years old children. EDULife Workshop, Florence, Italy.









# **CEMO**

Centre for Educational Measurement

University of Oslo  
Faculty of Educational Sciences  
Postbox 1161 Blindern  
N-0318 Oslo, Norway

[postmottak@cemo.uio.no](mailto:postmottak@cemo.uio.no)  
[www.uv.uio.no/cemo](http://www.uv.uio.no/cemo)