

2013

# CEMO

Centre for Educational Measurement  
at the University of Oslo

## ANNUAL REPORT



UiO : Faculty of Educational Sciences  
University of Oslo



**Centre for Educational Measurement at University of Oslo (CEMO)** is a research unit which contributes to development of national competence within the field of educational measurement. Through its research- and development activities the unit shall develop and disseminate knowledge to relevant stakeholders in the sector of education.

# CEMO IN BRIEF

Centre for Educational Measurement at University of Oslo (CEMO) is a newly established research unit chaired by Professor Jan-Eric Gustafsson. As of Dec 31 2013, CEMO consisted of 2 employees. Several positions have been announced at CEMO (director, three professorships, post-doctoral researcher, senior adviser, and three PhD positions) and new employees will appear in 2014.

In 2013, CEMO arranged an opening seminar with invited speakers. In addition, the centre hosted three talks given by invited fellow scientists as well as talks given by the CEMO director. CEMO had the administrative responsibility for 'Kvantitativt Forum', a meeting place for PhD-students wanting to discuss quantitative methods, arranged one course on educational measurement for the Norwegian Directorate for Education and Training, and arranged three PhD-courses in statistical methods. Two of the PhD-courses were on item-response theory (course code UV 9250), and one of the PhD-courses was on two-level structural equation modeling (course code UV9251).

About 3.3 MNOK of the total 2013 budget of 4.197 MNOK came from the Norwegian Ministry of Education and Research.

One book chapter and one paper was published in 2013. During the year, internet pages at the University of Oslo, in Norwegian and English, and a Facebook page were established.

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## 01 THE DIRECTOR'S COMMENTS

The year that has passed was the start-up year of CEMO. Knowing about the complexities and challenges involved in creating academic units, I took on the assignment to be involved in the establishment of CEMO with some hesitation, at the same time as I felt great enthusiasm for the possibility that research on educational measurement through CEMO will get a solid organizational foundation.

There certainly have been complexities and challenges in establishing CEMO, but the staff at the Faculty of Educational Sciences has skillfully contributed to resolving these. The early appointment of Anne-Catherine Lehre as Senior Advisor was also a great relief, because I have had at my side a highly competent administrator who also is knowledgeable about the field of educational measurement. CEMO has, furthermore, received strong support from both within the University of Oslo, and from outside of the university.

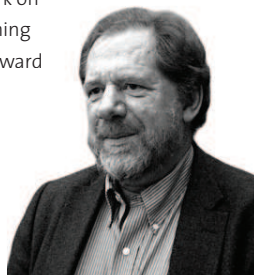
While CEMO formally started from scratch that was in reality not the case. At the Faculty of Educational Sciences there is a long tradition of work on educational measurement in different disciplinary areas. The Board of CEMO took the initiative to formalize CEMOs access to this competence by creating an internal Scientific Advisory Board (SAB) consisting of one person from each of the three departments of the faculty. The SAB has in an excellent way served as a link to the previous and existing research in educational measurement at the faculty, and has also

provided invaluable input in the work of making plans and evaluating applicants for the positions.

Most of the efforts to establish CEMO have been focused on recruitment of researchers: four associate/full professorships, one post-doc position and three graduate student positions. The announced positions attracted many applicants, both internationally and from Norway. While it certainly was a time-consuming process to evaluate the applicants, it was a pleasure to see the broad range and high level of competence represented. It also was a great learning experience to collaborate with the scholars who took part in the different expert evaluation committees.

The process of hiring is still under way, but I am very pleased that the two first CEMO researchers have accepted to take up their positions in early 2014: Johan Braeken as associate professor, and Ronny Scherer as post-doctoral research fellow. Other appointments are soon to be made.

CEMO will in early 2014 move into new premises, and the actual work on research and teaching will start. I look forward to this with great expectations.



Jan-Eric Gustafsson  
*Director of CEMO*



## 02 SCIENTIFIC ACTIVITY & ADMINISTRATION

The unit shall be a research and development 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 applied research should be done in collaboration with substantive researchers. Therefore, both broad and specialized methodological competence within CEMO is a necessity. In 2013, we tried to establish methodological competence within CEMO by announcing several vacant positions within the field of educational measurement. The recruiting processes are now in their final stages, and we are happy to welcome the first new employee in January 2014.

### Research tasks

CEMO's research tasks are identified as follows:

1. General issues in the application and applicability of advanced measurement techniques to solve problems in the field of educational measurement.
2. Application of advanced measurement techniques in research on substantive problems within the field of education.

3. Development of knowledge about general principles and mechanisms through which different determinants influence characteristics of educational measurements.

4. Investigations of how different factors influence characteristics of particular measurement devices.

5. Conduct applied research within the fields of early childhood education, primary and secondary education, and higher education

### Publications

The number of publications in CEMO in 2013 is limited due to its recent establishment. One methodological paper on adjusted quantile distance functions was published in *Statistics in Medicine* and one large chapter, employing latent variable modelling, was published in Martin, M.O. & Mullis, I.V.S. (Eds.) *TIMSS and PIRLS 2011: Relationships Among Reading, Mathematics, and Science Achievement at the Fourth Grade—Implications for Early Learning*.

## 03 EDUCATION & 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.

Besides research, the centre will focus primarily on graduate training. In 2013, we contributed to the teaching of three PhD courses. In addition, CEMO contributed to a course on educational measurement for the Norwegian Directorate for Education and Training as well as taking over administrative responsibility for 'Kvantitativt Forum' (initiated by Professor Thor Arnfinn Kleven and Professor Arne O. Lervåg, UiO), a meeting place for PhD-students wanting to discuss quantitative methods.

### Courses

#### UV9250: Equating test scores with IRT-techniques

The PhD-course UV9250 consisted of 21 hours mixed theoretical teaching and hands-on exercises. The course participants used the computer package OPLM. The theoretical curriculum included basic principles of IRT, different designs of test linking and equating from methodological and practical points of views, and designs for test equating. The lecturer was Professor em. Norman Verhelst, Eurometrics, the Netherlands. The course took place in June and was repeated in October. Course participation was credited 1 ECTS, and passed written examination was credited 3 ECTS.

#### UV9251: Two-level structural equation modeling

The PhD-course UV9251 consisted of 16 hours mixed theoretical teaching and hands-on exercises. The course participants used the computer software Mplus. The theoretical curriculum introduced the basic principles of two-level SEM, focusing on confirmatory factor analysis, and showed and discussed various issues in application of two-level SEM. The lecturer was Professor Jan-Eric Gustafsson, CEMO, UiO/University of Gothenburg, Sweden. The course took place in September. Course participation was credited 1 ECTS, and passed written examination was credited 3 ECTS.

#### COURSE ON EDUCATIONAL MEASUREMENT

The course consisted of 12 hours theoretical teaching on basic concepts and basic principles of educational measurement at the Norwegian Directorate for Education and Training. The lecturers were Professor em. Svein Lie, UiO, Researcher Rolf Vegar Olsen, UiO, and Professor Jan-Eric Gustafsson, CEMO, UiO/University of Gothenburg, Sweden.

## 04 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, Norwegian Agency for Quality Assurance in Education (NOKUT) 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.



Dean Berit Karseth, Director Jan-Eric Gustafsson, and Norwegian Minister of Education and Research Kristin Halvorsen. (Photo: Ola Sæther, Uniform, UiO)

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 prominent researchers. The themes varied from an introduction to causal graphs with exercises to more technical

methodological issues like modelling interactions between latent variables.

### Opening seminar

The launch of the Centre for Educational Measurement at University of Oslo (CEMO) took place at the Faculty of Educational Sciences, University of Oslo, on February 27 2013. The Opening seminar was a half-day activity with presentations from different stakeholders (Minister of Education and Research, Kristin Halvorsen; Director of the Norwegian Directorate for Education and Training, Dag Thomas Gisholt; Dean of the Faculty of Educational Sciences, Berit Karseth) and presentations by prominent international scholars in the field of educational measurement (professor Jo-Anne Baird, Oxford University, UK; professor Denny Borsboom, University

of Amsterdam, the Netherlands; professor emeritus Svein Lie, University of Oslo; director Jan-Eric Gustafsson, CEMO).

### Web sites

During 2013, CEMO established a fully working website ([cemo.uio.no](http://cemo.uio.no)) and a Facebook page. The website is continually updated with information on upcoming events, vacancies and other news. Despite English being the main language used at CEMO, the information on the website is written in both English and Norwegian. A main feature of the website is a personal page for each CEMO member, with information on academic interests, background, publications and alike.



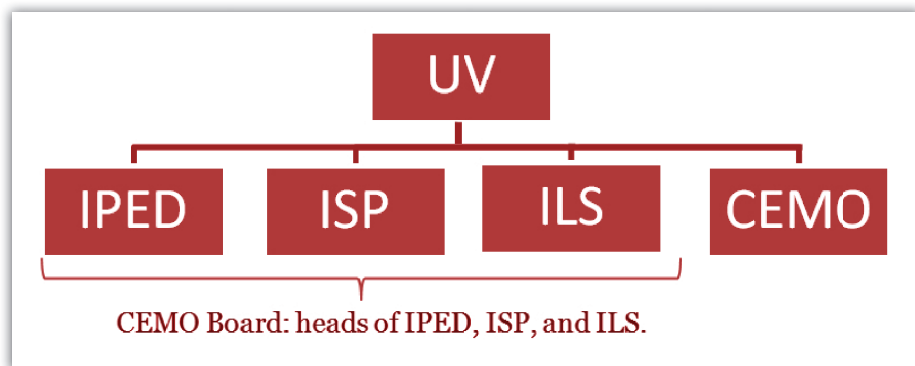
CEMO website: [www.uv.uio.no/cemo](http://www.uv.uio.no/cemo)



CEMO facebook page

## 05 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 is co-located with the research group 'Measurement and Evaluation of Student Achievement' (MESA) at the Department of Teacher Education and School Research (ILS). 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 we are 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

*Figure: CEMO is established at the faculty level.*



### Comments by the CEMO Board chair: Rita Hvistendahl

The CEMO board had six meetings in 2013, the first on January 28th, the following on April 8th, June 17th, September 9th and November 18th, and the latter on December 16th. All board meetings were held at the Faculty of Educational Sciences.

At the meeting in January, the announcement for the position as Director of CEMO was approved, and at the September meeting the board was informed that 2 candidates were considered eligible. The appointment of the Director will be issue for a meeting in spring 2014.

The most important issue for the meetings in 2013 has been to fill all the announced positions. At the meeting in September, 10 candidates were recommended to 3 positions as Associate Professor/Professor, and at the December meeting, the board was pleased to be informed that one of the positions was filled. Thus, the board welcomes Johan Braeken as the very first Associate Professor of CEMO. As none of the applicants for the PhD-positions were considered eligible, the board unanimously decided to announce these positions again. Consequently, the board extended the commitment of the internal CEMO scientific advisory board, whose representatives have participated as experts in the assessment of the PhD-applications. At the meeting in November, the board was informed that Ronny Scherer had accepted the position as post doctor of CEMO, and at the end of the year, the board welcomed Anne-Catherine Lehre as Senior Advisor.

At a meeting with the Secretary of the Ministry of Education September 17th, the board reported on the status of the appointment processes, as well as the scientific activities conducted by CEMO. In its first year of existence, CEMO has produced research and dissemination, as well as arranged seminars and doctoral courses in the field of Educational Measurement. Impressive board approved activities for 2014 have been planned, including involvement in the EERA Spring School.

Furthermore, the CEMO has settled into peaceful coexistence with the Faculty of Educational Sciences and is successfully located at the Department of Teacher Education and School Research.



## Administrative structure

The Centre is run by the director, Professor Jan-Eric Gustafsson, and the senior adviser, Anne-Catherine Lehre. Running and strategic issues are dealt with at weekly meetings. The senior adviser is responsible for the daily running of CEMO, which includes external communication, facilitating a good reception and stay for guests, maintenance of the web sites, taking minutes from board meetings, recruiting interviews, and scientific advisory board meetings, and organizing and implementing the different arrangements like courses, seminars, and workshops.

The Faculty of Educational Sciences is responsible for employments, CEMO's budget 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 Scientific Advisory Board

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

The CEMO scientific advisory board has been 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.

## The CEMO Board

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 Stafseng	Head of Department of Education, UiO
Camilla Rake	Trade union representative
Fredrik Helland	Student representative

## 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

## Comments by the CEMO Scientific Advisory Board

During 2013 the SAB has been actively involved in the process of recruiting persons, both working as committee members for the phd and postdoc positions. In addition the committee members took part in the interviews of shortlisted candidates for the professor and associate professor positions, as well as for the senior adviser position.

## 06. FINANCES

### Accounting principles

The Norwegian Ministry of Education and Research (6.6 MNOK core-funding per year to CEMO; in 2013 3.3 MNOK) and UiO (several positions) are CEMO's main financial contributors.

In this report, we present revenues and expenditures for 2013 as well as budgeted revenues and expenditures for 2014.

### Revenues and expenditures 2013

2013 ended with a profit of 2.402 MNOK against the budgeted profit 2.431 MNOK. About 3.3 MNOK of the total 2013 budget of 4.197 MNOK came from the Norwegian Ministry of Education and Research.

		Accounted expenses	Budgeted expenses
Funding	Core funding	-3 300 000	-3 300 000
	Grants	- 100 000	- 100 000
	UiO (own funding)	-920 095	-968 179
<b>Total funding</b>		<b>-4 320 095</b>	<b>-4 368 179</b>
Staff expenses	Holiday pay, payroll tax, pensions	3 050	
	Salary expenses	1 072 917	1 052 250
	Other expenses	113 142	
<b>Total staff expenses</b>		<b>1 189 109</b>	<b>1 052 250</b>
Operating expenses	Rent		100 000
	Courses, conferences, printing	82 889	
	Grants/membership fees	945	
	Representation/marketing	55 716	
	Travel	220 807	
	Indirect costs	290 511	284 108
	Other operating expenses	214	500 000
<b>Total operating expenses</b>		<b>651 081</b>	<b>884 108</b>
<b>Total</b>		<b>-2 479 905</b>	<b>-2 431 821</b>

### Budgeted revenues and expenditures 2014

		Accounted expenses	Budgeted expenses
Funding	Core funding		-6 600 000
	Investment (fixed assets)		200 000
	Grants		
	UiO (own funding)		-4 938 643
<b>Total funding</b>			<b>-11 838 643</b>
Staff expenses	Salary (variable)		24 573
	Holiday pay, payroll tax, pensions		6 623
	Salary expenses		5 305 250
	Other expenses		
<b>Total staff expenses</b>			<b>5 336 446</b>
Operating expenses	Rent		200 000
	Courses, conferences, printing		
	Grants/membership fees		
	Representation/marketing		
	Travel		1 200 000
	Office supplies and books		50 000
	Indirect costs		1 440 840
	Other operating expenses		1 400 000
<b>Total operating expenses</b>			<b>4 340 840</b>
<b>Total</b>			<b>-2 161 357</b>

Note: Budget 2014 without balance brought forward from previous year

## 07 APPENDICES

### CEMO-members

Name	Nationality	Position	Period
Gustafsson, Jan-Eric	Sweden	Director	Oct. 2012-
Lehre, Anne-Catherine WG	Norway	Senior adviser	Jan. 2013-

### CEMO events (seminars with invited speakers, courses, conferences)

#### Seminars with invited speakers

Opening seminar, Blindern, February 27	
Name	Presentation title
Karseth, Berit	Welcome and opening remarks
Halvorsen, Kristin	Greetings from the Ministry of Education and Research
Gisholt, Thomas	Greetings from the Norwegian Directorate for Education and Training
Lie, Svein	From required activities and holistic judgments to described competences and psychometric. A personal experience of assessment in the Norwegian school
Gustafsson, Jan-Eric	Some challenges in educational measurement
Baird, Jo-Anne	Grade inflation
Borsboom, Denny	Psychometrics: The interface between theory and data
Karseth, Berit	Closing remarks

Name	Seminar title	Date
Hagtvet, Knut	Modeling interactions between latent variables	Feb 12
Stigum, Hein	DAGs intro with exercises	Mar 4
Gustafsson, Jan-Eric	Student assessment of tracking and application of two-level SEM	Apr 2
Raykov, Tenko	Studying Essential Unidimensionality of Psychometric Scales Using Latent Variable Modeling	Dec 17

Kvantitativt forum	
A meeting place for PhD-students wanting to discuss quantitative methods. Group leaders: Thor Arnfinn Kleven and Arne Ola Lervåg.	
Theme	Date
Effect size	Apr 5

### Courses

Pedagogiske målinger, May
A 4 x 3 hour course introducing basic concepts and basic principles of educational measurement.

UV9250: Equating test scores with IRT techniques, June 3-5
A 20 hour course introducing basic principles of item response theory (IRT), different designs of test linking and equating, and hands-on exercises.

UV9251: Two-level structural equation modeling, Sep 26-27
A 12 hour course introducing basic principles of two-level structural equation modeling (SEM), focusing on confirmatory factor analysis, and hands-on exercises.

UV9250: Equating test scores with IRT techniques, Oct 21-23
A 20 hour course introducing basic principles of item response theory (IRT), different designs of test linking and equating, and hands-on exercises.

### Production

Contributors affiliated with CEMO in bold

#### ARTICLES IN PEER-REVIEWED JOURNALS

**Lehre**, Laake, and Sexton (2013). Differences in birth weight by sex using adjusted quantile distance functions. *Statistics in Medicine* 32(17), 2962- 2970.

#### BOOKS, BOOK CHAPTERS, AND REPORTS

**Gustafsson**, Hansen, and Rosén (2013). Chapter 4: Effects of Home Background on Student Achievement in Reading, Mathematics, and Science at the Fourth Grade. In Martin, M.O. & Mullis, I.V.S. (Eds.) *TIMSS and PIRLS 2011: Relationships Among Reading, Mathematics, and Science Achievement at the Fourth Grade—Implications for Early Learning*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

#### INVITED TALKS AND EXTERNAL MEETING CONTRIBUTIONS BY CEMO MEMBERS

**Gustafsson**. Quality and credibility of international studies. *OCCAM conference, Germany*. 18 October.  
**Gustafsson**. Hva betyr lærernes kompetanse for elevenes resultat på 4. trinn i Norge, Sverige og Finland?. Utdanningsdirektoratets fagkonferanse, "Hva har du lært på skolen i dag?" 14-15 oktober, 2013, Lillestrøm

**Lehre**. CEMO – en presentasjon. *ILS personalseminar*. 6 May.

**Lehre**. Presentasjon av CEMO. *Meeting with the Norwegian Ministry of Education and Research*. 9 September.

**Lehre**. Using quantile distance functions to assess inter- and intrasex variability in PISA achievement scores. *OCCAM conference, Germany*. 18 October.



## **CEMO**

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)