CEMO
Centre for Educational Measurement

ANNUAL
REPORT

2022

UNIVERSITY
OF OSLO

CHAPTER 6

Teachers a
Circum
Teach

The Centre for Educational Measurement at the University of Oslo (CEMO) is a centre for basic and applied research in the field of educational measurement and assessment. Our goal is to generate the knowledge needed to solve the challenges related to measurement and assessment in education, and thus in the long run, to contribute to high educational quality in Norway and internationally.

CEMO is based at the Faculty of Educational Sciences and develops measurement and assessment competence in Norway and the Nordic countries by teaching Master and PhD students as well as practitioners, and by counselling stakeholders. The centre collaborates with similar units in many other countries and is part of a large international research network. This report provides a comprehensive overview of our achievements, ongoing projects, outreach, publications, and events over the past year.

CEMO 2022 in Brief

This year began with yet another corona-related lockdown. Fortunately, restrictions were lifted during the spring, and everyone could finally return to the offices.

The centre now includes more than 25 employees from 15 countries: five (associate) professors, four adjunct professors, two postdoctoral fellows, 12 PhD candidates, four administrators and several research assistants. In 2022, we welcomed a dedicated research administrator. CEMO hosted seven guest researchers and one intern in 2022, including Gustafsson and Skrondal visiting scholars.

Our application "CREATE – Centre for Research on Equality in Education" has finally become a reality! In September 2022, we succeeded with our application to the Research Council of Norway (RCN). CREATE is one of only nine applicants out of 161 that have been awarded the 10-year funding under the Centre of Excellence framework. Sigrid Blömeke, Director of CEMO, will lead the Centre during first five years together with Arne Lervåg[1].

PhD training is a core task of CEMO. Three of our PhD candidates held their mid-term assessments which is typically held halfway through the doctoral period and one other PhD held their final reading. With our many PhDs, we have a lively research environment with a number of academic and social activities.

CEMO team members (co-)authored 40 scientific articles in 2022. The majority were published in journals with high impact factor or on the highest quality level according to the Norwegian publication system.

The largest single activity at CEMO is our Master of Science in Assessment, Measurement and Evaluation. All employees are actively involved in the program. The third cohort graduated in spring 2022. Our graduates have been competitive on the job market. Some have started their PhDs, while others have pursued careers as data analysts at private companies or in the public sector.

---

1 Arne Lervåg will now lead the Centre during the first five years.
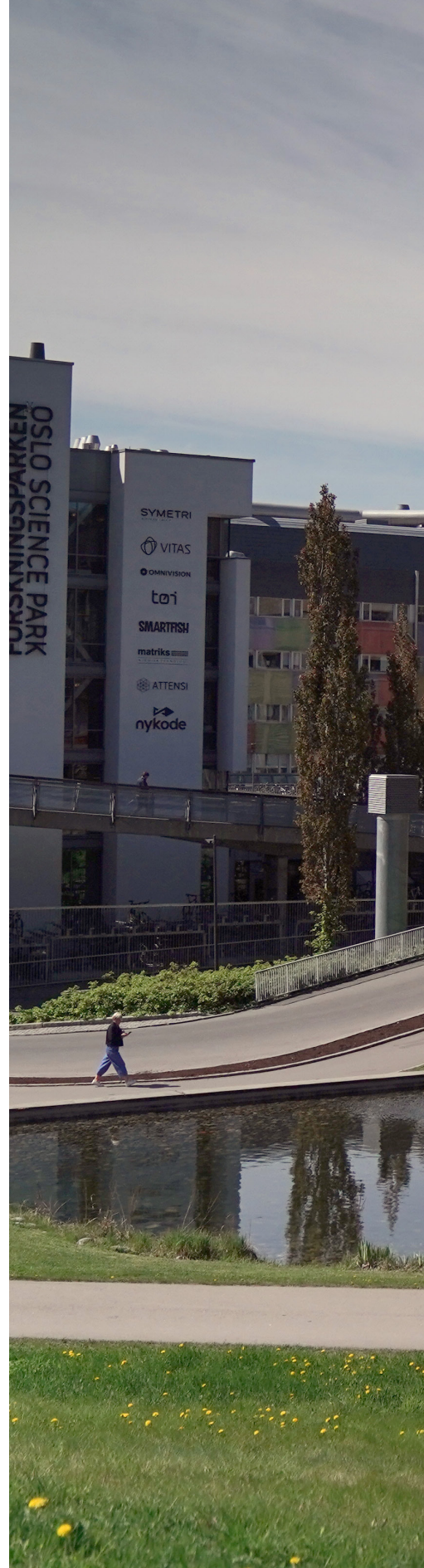
The Director's Comments

No doubt, the highlight of 2022 was our successful application to The Research Council of Norway for a Centre of Excellence. Together with colleagues from all the other departments at the Faculty of Educational Sciences we will establish the Centre for Research on Equality in Education from July 2023. In short, CREATE intends to provide a comprehensive understanding of how learning environments can enable all children to realize their potential. CEMO's staff brings in the expertise in measurement and advanced analysis - one of the necessary components to reach this goal. One immediate consequence is that CEMO, together with our new colleagues, will be co-located in new premises at the university campus.

In 2022 CEMO entered our 10th year of existence. The third cohort of our Master of Science in Assessment, Measurement and Evaluation program graduated this year, and even more importantly, we saw a booming number of well-qualified applicants, and a record high number of new students having their first semester of the program in the autumn. However, the alerted tuition fee for non-EU applicants is a dark cloud on the horizon for an international program like ours.

There were no additions to our "wall of fame" (the section on the wall in our foyer with pictures of successfully completed PhDs). Those who should have completed in 2022 were all affected by the COVID years which resulted in delays. However, several of our current PhDs are in their final stage and will complete next year. We really look forward to celebrating our new doctors next year.

CEMO is characterized by a high number of temporary positions, and each year we have to say goodbye to good colleagues. Siri Heslien, our first study coordinator, was instrumental in establishing our master program, and we wish her all the best in her new position. We are also happy that two postdocs, Isa Steinmann and Denise Reis Costa, were able to secure new positions elsewhere as their contract with us ended. The other side of the coin is that we also could say "welcome" to new colleagues. We are lucky to have Amanda Marie Grini in a new administrative position to support and coordinate our work with research. We could also welcome Tim Fütterer and Letty Koopman as guest researchers supported by the Gustafsson and Skrondal scholarship. Furthermore, Silje Hukkelberg and Laura Messerer had extended guest research visits at CEMO, and Jaël Kortekaas did her student internship with us in 2022. Hosting bright scholars as visitors is a big inspiration for us, and something we hope to be able to continue as we become part of CREATE.

Another really inspirational event in 2022 was the possibility for us to again host a physical meeting with our Scientific Advisory Board! During this two-day meeting Petra Stanat, Carolin Strobl, Cees Glas and Stephen Sireci provided valuable input and ideas that are already put into action in our strategies for the future.

Several applications for larger project grants were sent to the Norwegian Research Council, but with no success in 2022. Our applications received good feedback – and we are confident that we will succeed in the end. Professor Ronny Scherer received several smaller grants for international collaborations of various types, for instance a Peder Sather Grant for cooperation with colleagues at UC Berkeley. Moreover, PhD candidate Wangqiong Ye received

innovation funds from the University of Oslo. Even if such grants are modest in economic terms, they are hugely important for our continued work to connect with and establish joint activities with strong research environments across Europe and beyond. We also take it as a sign of accomplishments that our staff are regularly provided with awards and appointments to various committees and expert groups. Director Sigrid Blömeke

was elected as a Fellow to the International Academy of Education, Professor Rolf V. Olsen was appointed to an Official Norwegian Report Committee (NOU) with a commission to suggest a new system for quality development in our schools, and professor Ronny Scherer was appointed as a member of several expert groups for the international large-scale assessments (TALIS, PIIAC and ICILS).

Table of Contents

1. Research at CEMO

Research on measurement challenges with a focus on measurements used in the field of education is a primary task for CEMO, and team members working in this area specialize in statistics, psychometrics and latent variable modelling, the development of innovative assessment formats as well as linking and equating of data.

The application of such measurements to different areas of educational research is another primary task at CEMO, and team members working in this area focus on measuring socio-emotional and cognitive educational outcomes, analysing data from international large-scale assessments or assessing student progress with objective structured clinical examinations (in collaboration with the Faculty of Medicine).

Research at CEMO is firmly established, visible in the high quality of our publications, success in the competition for external grants, and international recognition in terms of awards and board memberships. CEMO has developed a research portfolio around four strands: modern test design, statistical methods for innovative assessments, educational measurement in the Norwegian context, and international large-scale assessments.

Frontier Research in Educational Measurement (FREMO) research group

FREMO was established in 2018 to create an arena for cutting-edge research in educational measurement. Hosted by CEMO, the research group collaborates with other research groups at the Faculty of Educational Sciences and carries out advanced training of PhD candidates and Master students. FREMO includes CEMO's academic team members and is open to members from other departments at the faculty. Activities are organized by FREMO leader, Associate Professor Björn Andersson and supported by Postdoctoral fellow Chia-Wen Chen.

In addition to PhD training, FREMO activities can be divided into two areas: joint activities which involve all the members of FREMO and specialized activities which involve the members of a subgroup reflecting the four CEMO research strands described above. FREMO also provides financial support for, e.g., research assistants, language review services or administrative support.

The bi-weekly brown bag seminar is the most frequent activity of the research group, engaging all FREMO

members. PhD candidates are expected to present their research at the seminar. CEMO postdoctoral fellows, professors and guest researchers also participate and present. The advantage of having digital seminars in 2021 was the possibility to include participants from other locations around the world, but we still decided to return to having physical seminars in 2022.

A major task of FREMO is to organize the international conference FREMO which was hosted in Oslo for the first time in September 2018. We had planned to host the conference in September 2020 and then again in 2021 but had to cancel the conference due to the Covid-19 pandemic. The two-day conference will now be held 6 and 7 September 2023 and will showcase the latest innovative methods and advanced applications in the field of educational measurement.

PhD candidates and Postdoctoral fellows at CEMO

Training the next generation of PhD candidates and Postdoctoral fellows is a core task of ensuring sustainable research in the field of educational measurement. These two groups are our most valuable resources when it comes to long-term effects of CEMO's research. PhD candidates and Postdoctoral fellows are typically employed for four years, including a 25% share of service work that mostly means teaching in our Master program. This time distribution contributes to developing the competence needed in future jobs both inside and outside academia.

CEMO's Deputy Director, Professor Rolf Vegar Olsen, is the PhD coordinator. He organizes the activities related to our PhDs and maintains the supervision guidelines which describe expectations and responsibilities for the PhDs and their supervisors. To support the career development of Postdoctoral fellows, CEMO has also selected a Postdoctoral coordinator, Professor Ronny Scherer.

CEMO values gender diversity and aims for a balanced distribution at each level of the academic career ladder. We have so far succeeded with respect to PhD candidates and Postdoctoral fellows, most of whom are women. However, this is reversed at the level of senior scientists. Thus, focused efforts at CEMO aim at promoting female Postdoctoral fellows to a level of scientific independence that will qualify them for permanent academic positions internationally.

Nordic network in Educational Measurement and Assessment

Together with colleagues from the other Nordic countries, CEMO continues to be engaged in a network for Educational Measurement and Assessment as part of the Nordic Educational Research Association (NERA): https://nfpf.net/nera-network-1/. Conveners are Rolf Vegar Olsen (CEMO, Norway), Jeppe Bundsgaard (Aarhus University, Denmark), Berglind Gísladóttir (university of Iceland), Mari-Pauliina Vainikainen (University of Tampere, Finland) and Christina Wikström (Umeå University, Sweden). Finally, after years with closure due to COVID, we were able meet again physically at the NERA conference in Odense in 2022, and the network sessions were well attended with a high number of interesting contributions.

2. Teaching at CEMO

CEMO offers courses for both Master students and PhD candidates. We consider research and teaching to be mutually dependent on each other.

The Master of Science in Assessment, Measurement and Evaluation (MAE) program is our most important long-term contribution to serve societal needs. The program, led by Professor and Head of Studies Johan Braeken and Administrative Coordinator Malene Jordal Aase, provides specialized training in developing and administering measurement instruments, analysing data, and reporting results from assessments, measurements or evaluations. This is the first and only program of its kind in the Nordic region.

The number of MAE applicants has stabilised since the program started in 2018, and we are seeing prominent quality assurance in the students' statistical knowledge since we introduced the admission criteria of minimum 15 ECTS quantitative research methods and statistics. This has resulted in a larger number of students who have successfully taken on the courses in the program.

The graduating cohort 2020-2022

The third MAE cohort graduated in the spring of 2022 and has since been competitive in the job market. From the 2022 graduates, two students have started their PhD's at the University of Oslo and the University of Stavanger, while others have started positions as data analysts at private companies and in the public sector. The project our graduates have been working on as part of their Master's Thesis indicated their interests and specializations. All Master Theses can be accessed through the UiO library database: https://tinyurl.com/CEMO-database

Spring 2022:

Basharat, Sadaf: *Exploring Gender Gaps in Mathematic Achievement: The Case of Single Sex Education in Saudi Arabia.* Supervised by Associate Professor Ida Steinmann, and Professor Sigrid Blömeke.

Chitic, Andrei-Iulian: *Oaxaca Blinder Decomposition of Gender Differences in Reading: An Analysis of Finland and Norway in PISA 2018.* Supervised by Professor Rolf Vegar Olsen and Doctoral Research Fellow Henrik Galligani Ræder.

Israliova, Komolakhon: *To Adapt or Not to Adapt? Evidence on the Latent Adaptability Profiles of Young Adults.* Supervised by Professor Ronny Scherer.

Kim, Ji Youn: *Exploration of the Linear and Nonlinear Relationship between Learning Strategies and Mathematics Achievements in South Korea using the Normal Response Model: PISA 2012.* Supervised by Postdoctoral Fellow Chia-Wen Chen and Postdoctoral Fellow Yi-Jhen Wu.

Kyereh, Ebenezer Kwame: *Pupils' Perception of the Learning Environment and Well-being: A Validation Study of the Norwegian Pupil Survey.* Supervised by Professor Rolf Vegar Olsen and Doctoral Research Fellow Jarl Kleppe Kristensen.

Qin, Qi: *Application of Tree-based Data Mining Techniwues to Examine Log File Data from a 2012 PISA Computer-based Mathematics Item.* Supervised by Postdoctoral Fellow Denise Reis Costa.

Rozario, Shampa Roseline: *Do Language Spoken at Home and Reading Literacy Associate with Inconsistent Responding to Mixed-Worded Scales?* Supervised by Professor Johan Braeken and Associate Professor Isa Steinmann.

Sohn, Jungah: *Team Innovativeness in Nordic Schools: Do Distributed, Instructional Leadership and Teachers Professional Collaboration Matter?* Supervised by Professor Sigrid Blömeke, Professor Ronny Scherer and Senior Researcher Dr. Trude Nilsen.

Yousufzai, Mina Khan: *The Relation between Mathematics Anxiety and Acheivement: A Study of the Moderating Role of Immigration Background on PISA 2013 Norwegian Students.* Supervised by Professor Ronny Scherer and Doctoral Research Fellow Diego Gonzalez Campos.

Autumn 2022:

Wang, Tz-Shiuan: *School Innovativeness: How Teachers' Team Innovativeness and Target Teaching Class Composition Interact on Teachers' Teaching Quality in TALIS 2018?* Supervised by Professor Sigrid Blömeke and Senior Researcher Dr. Trude Nilsen.

Zhong, Wen: *Using Item Response Theory to Detect Potential Aberrant Beaciors in a Multi-stage Test: An Example of the Norwegian Language Test.* Supervised by Associate Professor Björn Andersson and Senor Advisor Arne Oftedal Rossow (Direktoratet for høyere utdanning og kompetanse).

The 2021-2023 cohort

Our fourth cohort is now halfway through the program and will complete their degree in spring 2023. They have followed a packed program that has provided them with the knowledge and skills needed to succeed as PhDs or assessment professionals. Throughout the program, the students have delivered research reports, worked collaboratively, presented their findings to multiple audiences, and responded to feedback from peers. They have developed algorithmic skills in statistical computation and are familiar with the open-source software R. In their second year, they will get a more in-depth understanding of the research field by specializing in their topic of interest through courses that are more advanced and the Master Thesis.

The 2022-2024 cohort

In August 2022, our fifth MAE cohort started their studies at CEMO. With 18 students starting the study program, we are positive that the program is getting more attention from qualified and motivated applicants both abroad and in Norway. The students completed the first semester courses that provided them with knowledge in assessment and evaluation, practice in the open-source software R and test theory.

We have restructured the Master Program for the 2022 and future cohorts. The courses MAE4221 - Research Seminar I: Researcher's Skills, MAE4051 - Selected Topics in Educational Measurement, MAE4231 - Research Seminar II: Researcher's Skills and Professional Communication, and MAE4090 - Thesis has been replaced by new courses: MAE4052 - Constructing Measures II, MAE4053 - Survey Methodology, MAE4054 - Study Designs for Causal Inference and MAE4191 - Master's Thesis. MAE4050 - Current Topics and Debates in Assessment and Evaluation has been moved from the third to the second semester in the program.

We are positive about the changes and excited to see how the students will thrive with the new structure.

3. Outreach at CEMO

An explicit mission of CEMO is to reach out to practitioners and stakeholders who are responsible for assessments in education and in need of knowledge about measurement, assessment, and evaluation. Assessment results often have a profound impact both on individuals, such as teachers or students, and on institutions, such as schools or municipalities. In combination with the fact that measurements often are technically complex, this generates a need for information on the side of students, parents, teachers, school-leaders, politicians, and administrative bodies. CEMO activities to meet such needs range from collaborating with academic and non-academic stakeholders in Norway and the Nordic countries to producing outlets for a range of popular media channels.

Evaluation of the Norwegian school exams and the recent curriculum reform

CEMO continues to be a part of a large-scale evaluation of the implementation and the effects of the curriculum reform LK20/20S. The project, EVA 2020 (https://www.uv.uio.no/english/research/projects/EVA2020/index.html) runs until 2025 and is funded by the Norwegian Directorate for Education and Training. All four units at the Faculty of Educational Sciences are involved. Professor Rolf Vegar Olsen represents CEMO in this project and leads one work package that has a coordinating role across the whole project with respect to survey development, data integration, and reporting.

In 2022 an Official Norwegian Report Committee with a mandate to suggest a new system for supporting quality development of Norwegian schools was appointed (https://kvalitetsutviklingsutvalget.no/). This group is composed by representatives from all important stakeholders in education. In addition, a few experts from academia were appointed, and Professor Rolf V. Olsen is one of those. The committee is expected to deliver two reports during 2023.

Websites and social media

During 2022, we have increased the numbers of followers on social media. Both Twitter (778 followers) and Facebook (1330 followers) were used actively to spread information about CEMO's research activities, news and events, possibilities, vacancies and cooperation. On the websites, the main features remain the personal pages for each CEMO member, information about CEMO's research and teaching, upcoming events, and the list of publications.

Selection of further activities

Consultancy for/member of national and international governmental bodies
- Directorate for teaching and training and units developing the national assessments
- OECD PIAAC Adaptive Problem-Solving Expert Group
- Norwegian PIAAC Advisory Board at the Ministry of Education
- OECD TALIS Questionnaire Expert Group
- Board of the Knowledge Centre for Education (University of Stavanger)
- IEA ICILS 2023 questionnaire expert group

Collaboration with partners outside of UiO
- Norwegian Business School (BI)
- Norwegian Directorate for Higher Education and Skills
- Norwegian Centre for Mathematics Education
- Norwegian Defence University College
- Oslo University Hospital

5. Summary of goal accomplishment in 2022 and Outlook to 2023

The CEMO team has developed a new 3-year plan with specific short-, mid-, and long-term objectives for 2022-2024 regarding research, teaching, knowledge in use and organisational development.

Research in 2022

CEMO aims to have a distinct, internationally unique, and easily recognizable research profile that also addresses national research needs. Synergy and collaboration within the Faculty of Educational Sciences, within Norway and other Nordic countries, and internationally are key priorities. External research funding plays an important role in creating favourable research conditions. Our activities to accomplish this are the following:

- CEMO carries out high-quality research;
- applications for external funding of academic positions (especially PhDs) strengthen the robustness of CEMO and contribute to high-level research);
- FREMO shapes CEMO's research profile and provides support for PhD candidates;
- efficient administrative support facilities research at a high level;
- research collaboration strengthens the research quality of CEMO and the visibility of the centre, and supports the PhD candidates' work; and
- all CEMO researchers and Master's students exhibit good research practice.

Teaching in 2022

CEMO aims to offer a high-quality Master of Science program in Assessment, Measurement and Evaluation, to attract a large pool of highly qualified national and international applicants and to educate specialists in the field of educational measurement who can develop, use and critically evaluate different types of measurements. Our activities to accomplish this are the following:

- The Master of Science programme in "Assessment, Measurement and Evaluation" strengthens measurement competence nationally, in the Nordic countries and internationally; and
- PhD candidates and postdoctoral fellows receive high-quality training that develops their measurement expertise and supports their career chances.

Knowledge in use

CEMO aims to contribute to the development of society by means of active dissemination of the centre's research results in various communication channels and different areas, collaboration

with external institutions and organizations on implementing research-based practices related to educational measurement and counselling or taking over support roles. Our activities to accomplish this are the following:

- collaboration nationally and in the Nordic countries makes CEMO visible in Norway and the Nordic countries and strengthens the measurement quality in the field of practice; and
- improved research communication and dissemination contributes to increased measurement competence in the educational sector and the field of practice, and among the public.

Organisational development

CEMO aims to become the leading European centre in educational measurement. This requires the recruitment of the best researchers and PhD candidates nationally and internationally, in line with anticipated developments in the field of educational measurement, and the development of expertise so that they can pursue successful academic or other careers. The CEMO administration supports the academic team members effectively so that administrative resources are directed towards primary tasks to the greatest extent possible. Our activities to accomplish this are the following:

- Recruiting at CEMO is effective and helps attract highly qualified researchers;
- sufficient language skills in Norwegian or Nordic language among CEMO's academic team members;
- CEMO is a dynamic and inclusive organization;
- CEMO has good information flow, and the employees know where to find relevant information on the centre's websites;
- CEMO has good human resource management, where challenges are actively addressed; and
- CEMO's administration aims to be a cohesive body that provides excellent support to the research staff;

6. Management and administration

CEMO is organized directly under the Faculty of Educational Sciences at the University of Oslo, and the Centre Director reports to the Dean. The Ministry of Education and Research and the University of Oslo are CEMO's main funders until 2023. They constitute the final reporting entities that define the guidelines under which CEMO operates.

Administrative structure

Professor Sigrid Blömeke (Director) and Professor Rolf Vegar Olsen (Deputy Director) spearhead CEMO. An administrative head, Tara Sarin, supports the centre management. Anne Line Bjarke is her substitute while she is on leave from mid-October 2022 to July 2023. The CEMO leadership team represents CEMO at the Faculty and higher UiO levels as well as outside the university. The CEMO board, chaired by Professor Janne von Koss Torkildsen, is responsible for major decisions; these include strategic decisions about CEMO's research, teaching and outreach profile, recruitment strategies and employments as well as the management of the CEMO budget.

The CEMO administration consists of four employees and is responsible for the daily running of CEMO. Operative tasks of the administration include, among other things, coordination of the master program, research support, external communication, facilitating a good reception and stay for guests, maintenance of the websites and social media, secretarial function for board meetings, recruiting interviews, and scientific advisory board meetings, and organizing and implementing the different arrangements like courses, seminars, and workshops. CEMO's administration also functions as permanent secretariat for the CEMO Board and the International Advisory Board.

The administration at the Faculty of Educational Sciences assists in employments at CEMO as well as in budgeting and accounting. The Faculty of Educational Sciences also provides IT support.

The CEMO Board

The CEMO Board is an administrative body that meets three to four times per year to approve the CEMO budget, the director's progress reports about research, teaching and outreach activities at CEMO and employments. In addition, the Board members provide feedback on CEMO's activities from an internal perspective.

The Board has 6 members who are elected or nominated for a four-year period. The student representative and the representative of the temporary scientific staff are elected or nominated for one year at a time. The Board consists of both academic and administrative staff, and students. Two of the board members come from other units at the faculty and one comes from

a collaborating institution. The CEMO Head of Administration is the secretary of the board.

The composition of the CEMO Board 2022-2025

Representatives of a relevant academic environment at the faculty:
Janne von Koss Torkildsen (Chair), Professor, Department of Special Needs Education, UiO

Henrik Daae Zachrisson (substitute Chair), Professor, Department of Special Needs Education, UiO

Guri Nortvedt, Professor, Department of Teacher Education and School Research, UiO

Julius Kristjan Bjørnsson (substitute), Researcher, Department of Teacher Education and School Research, UiO

External representative:
Roger André Federici, Dean, OsloMet

Ulf Henning Olsson (substitute), Professor, Norwegian Business School

Representative from the permanent staff:
Johan Braeken, Professor, CEMO

Malene Jordal Aase (substitute), Senior Executive Officer, CEMO

Representative from the fixed-term staff (2022):
José Manuel Arencibia Aleman, Doctoral Research Fellow, CEMO

Isa Steinmann (substitute), Postdoctoral Research Fellow, CEMO

Student representative (2022):
Amy Rebecca Klee, master student in Assessment, Measurement and Evaluation, CEMO

Sverre Berg Ofstad (substitute), master student in Assessment, Measurement and Evaluation, CEMO

CEMO's International Scientific Advisory Board

CEMO has an international scientific advisory board (SAB) consisting of world-class scientists. The SAB's mandate is to critically evaluate and provide advice on the centre's scientific performance and progress.

The board met in Oslo on 6 December 2022. The agenda included general strategic issues, Centre of Excellence – CREATE, the master program, FREMO research group and FREMO conference 2023, the evaluation of the New National Curriculum: Intentions, Processes and Practice (EVA2020). They provided positive and constructive feedback on CEMO's research, teaching, and outreach activities.

International Scientific Advisory Board	
Name	Affilliation
Professor Cees Glas	Department of Research Methodology, Measurement and Data Analysis, University of Twente, The Netherlands.
Professor Stephen Sireci	Director of the Center for Educational Assessment, University of Massachusetts Amherst, USA.
Professor Petra Stanat	Head of the Department "Education and Integration" and Director of the Institute for Educational Quality Improvement (IQB), Humboldt University of Berlin, Germany
Professor Carolin Strobl	Head of the Research Unit, Department of Psychology, Psychological Methods, Evaluation and Statistics, University of Zürich, Switzerland.

7. Finances

The Norwegian Ministry of Education and Research (7.8 MNOK core-funding to CEMO) and UiO (several positions) are CEMO's main financial contributors.

		Financial statement	Forecast
Opening balance		-7 678 421	-7 678 421
Total Opening balance		-7 678 421	-7 678 421
Funding	Core funding	-15 282 364	-15 162 364
	External income	0	0
	Income from sales	0	0
Total funding		-15 282 364	-15 162 364
Staff expenses	Salary cost	14 264 275	13 417 905
	Salary (variable)	21 423	12 150
	Holiday pay, payroll tax, pension	5 337 643	5 120 885
	Salary expenses	39 163	0
	Other refunds	-1 360 117	-1 100 000
	Hourly salary	198 243	50 000
Total staff expenses		18 500 630	17 500 940
Operating expenses	Consultancy service	34 883	0
	Rent	2 769 637	2 650 390
	Travel costs, courses, conference	918 384	677 850
	Other operating expenses	310 929	1 217 500
Total Operating expenses		4 033 833	4 545 740
Investments	Investments	201 823	165 000
Total investments		201 823	165 000
Netto contribution	Own funding (UiO)	780 588	
	Overhead	-1 065 530	
	Salary Reimbursement	-350 166	
Total netto contribution		-635 108	0
Project closing balance	Project closing balance	0	0
Total project closing balance		0	0
Total		**-859 607**	**-629 105**

Model 1 (RI-CLPM with H2B)

Appendices

CEMO team members

Name	Nationality	Position
Blömeke, Sigrid	Germany	Professor/Director
Olsen, Rolf Vegar	Norway	Professor/Deputy Director
Braeken, Johan	Belgium	Professor
Scherer, Ronny	Germany	Professor
Andersson, Björn	Sweden	Associate Professor
Schauber, Stefan K.	Germany	Associate Professor, primarily affiliated with the Faculty of Medicine
Chen, Chia-Wen	Taiwan	Postdoctoral Fellow
Reis Costa, Denise	Brazil	Postdoctoral Fellow *Until October 2022*
Steinmann, Isa	Germany	Postdoctoral Fellow *Until August 2022*
Van Laar, Saskia	Netherlands	PhD Candidate
Ræder, Henrik Galligani	Norway	PhD Candidate
Haakstad, Haakon T.	Norway	PhD Candidate
Veletic, Jelena	Bosnia	PhD Candidate
Ye, Wangqiong	China	PhD Candidate
Kristensen, Jarl Kleppe	Norway	PhD Candidate
Zhang, Maoxin	China	PhD Candidate
Helland-Riise, Fredrik	Norway	PhD Candidate
Gonzalez Campos, Diego	Colombia	PhD Candidate
Arencibia Alemán, José Manuel	Spain	PhD Candidate
Tan, Tony	Australia	PhD Candidate
Sosa, Yuriko	Peru	PhD Candidate
Marcq, Kseniia	Russia	PhD Candidate

Skrondal, Anders	Norway	Adjunct Professor
Rutkowski, Leslie	USA	Adjunct Professor
Rutkowski, David	USA	Adjunct Professor
Maddox, Bryan	United Kingdom	Adjunct Professor
Sarin, Tara	Norway/USA	Head of Administration *On leave from mid-October 2022 (until July 2023)*
Bjarke, Anne Line	Norway	Head of Administration *From October 2022*
Heslien, Siri A.P.	Norway	Senior Executive Officer *Until mid-January 2022*
Jordal Aase, Malene	Norway	Senior Executive Officer
Grønlid, Gunnhild Nedberg	Norway	Senior Executive Officer
Grini, Amanda	USA	Senior Executive Officer *From August 2022*
Ofstad, Sverre Berg	Norway	Research Assistant
Qin, Qi	China	Research Assistant
Sveum, Olav	Norway	Research Assistant
Israilova, Komolakhon	Uzbekistan	Research Assistant
Chen, Jianan	China	Research Assistant
Klee, Amy Rebecca	USA	Research Assistant

CEMO guest researchers/interns

Name	Nationality	Period
Hukkelberg, Silje	Norway	January 2022-June 2022
Fütterer, Tim	Germany	January 2022-May 2022
Messerer, Laura	Germany	February 2022-April 2022
Janssen, Rianne	Belgium	March 2022
Emslander, Valentin	Germany	June 2022-July 2022
Niepel, Christoph	Germany	June 2022-July 2022

Kortekaas, Jaël	The Netherlands	September 2022-November 2022
Koopman, Letty	The Netherlands	December 2022 – (August 2023)

CEMO events

PhD Research Seminar

Together with the research group Large-scale Educational Assessments (LEA), FREMO organizes a research seminar for the PhD candidates connected to these research groups. During the course of the seminar, the PhD candidates present their research projects and provide feedback to the other candidates. They also present their work-in-progress and discuss journal articles. The seminar leader for the course is Associate Professor Björn Andersson. During 2022, the following events took place within the seminar:

Date	Activity
February 1	Presentation and discussion of Yuriko Sosa Paredes's project description "An Inquiry into Girls' Achievement in Science: Horizontal Inequalities, Socio-economic Gaps and Disparities Using 50 Years of International Large-scale Assessment Data"". Response from Tony Tan.
March 15	Discussion of article preparation and expectations in the review process, with concrete examples. We discussed: • Choice of journal • How to prepare an article for submission • How to write a cover letter • How to work with co-authors • The review process and possible outcomes, with examples
May 24	Evaluation of the course UV9040A, round table discussion
September 27	Introduction from all participants about ongoing work as well as discussion of how response letters to peer review comments can be written with several concrete examples.
December 6	Presentation of a work in progress from Yuriko Sosa Paredes: "Back to the past: measurement invariance evaluation in the early two Science assessments in 10-year-old students".

Brown Bag Seminars

During 2022, the following presentations took place:

Date	Speaker	Title
Feb. 8	Silje Sommer Hukkelberg, NUBU (The Norwegian Center for Child Behavioral Development)	Assessing Social Competence and Conduct Problems in children: Item Response Theory analysis of the Home and Community Social Behaviour Scales (HCSBS)
Feb. 22	Tim Fütterer, University of Tübingen, Germany	Getting teachers ready to teach in a digitized world: Insight into different approaches
Mar. 8	Denise Reis Costa, CEMO	Interpretable machine learning techniques for the analysis of process data from computer-based assessments
Mar. 22	José Manuel Arencibia Aleman, CEMO	Discrepancies between teacher-assigned grades and national exam results in Norway
Mar. 29	Laura Messerer, University of Mannheim	How intrinsic motivation and grades contribute to dropout from higher education in a longitudinal setting: combining the random intercept cross-lagged panel model and survival analysis
Apr. 5	Henrik Ræder, CEMO	Mathematical competency demand of numeracy items in the 2018 Norwegian National Numeracy Tests
Apr. 19	Diego Gonzalez Campos, CEMO	Exploring the Role of Attitudes Toward ICT in the Gender Digital Divide: An analysis with International Large-Scale Assessment Data
May 3	Kseniia Marcq, CEMO	Gender Differences in Item Nonresponse in the PISA 2018 Student Questionnaire
June 14	Maoxin Zhang, CEMO	Understanding omission behavior from process data: A joint model of responses, response times, and response actions
Sep. 6	Bas Senden, ILS	Studying student perceptions of teaching quality across 38 countries: Evaluating the comparability and role of teachers' gender using the alignment method
Sep. 20	Tony Tan, CEMO	Differential effects of COVID-19 school closures on students' learning
Nov. 1	Jelena Veletic, CEMO	Gaps in perception of school climate: How leaderships' style matters for organizational quality?

Nov. 15	Jaël Kortekaas, Utrecht University and CEMO intern	How far do stray CATs wander? On the robustness of CAT to persons who initially do not respond in line with their true ability.
Dec. 13	José Arencibia Alemán, CEMO	Consequences of better exams in Mathematics: hypotheses, data, and a potential research design

CEMO public lecture

CEMO held a digital public lecture on 4 January 2022 led by Adjunct Professor Bryan Maddox. In the lecture, he described profound changes that are taking place in the field of educational assessment with the adoption of digital technologies and artificial intelligence.

CEMO writing seminars

CEMO has organized a writing seminar series for PhD candidates at the Faculty of Educational Sciences. Each seminar features a short talk by either experienced writers at the faculty or insight into research support available at the University of Oslo. The schedule is set in stone inside the room, following a "Shut up and Write" structure. The main organizer for this event is our PhD candidate, Henrik Galligani Ræder.

PhD Courses

Spring 2022

UV9121: *Response Process Data in Assessment*, Bryan Maddox, January 2022
This course introduces the use of response process data in the design and validation of computer-based tests including gamified assessment.

UV9293: *Item Response Theory*, Björn Andersson, January - April 2022
The course introduces the core concepts and techniques of item response theory (IRT) which underlie current test design strategies, psychometric analyses, and evaluation of assessment instruments

UV9297: *Measurement Models*, Ronny Scherer, Mars - June 2022
The course introduces the fundamental theories and application of measurement models.

UV9040A: *Research Seminar*, Björn Andersson, spring and autumn 2022
The intention with the research seminar is to follow-up the PhDs during the first two years, as well as to create an environment for research collaborations.

UV9257U – *Multilevel and Longitudinal Modeling*, Anders Skrondal and Sophia Rabe-Hesketh, May 2022
A four-day course introducing introducing models for multilevel or clustered data, such as cross-sectional data with students nested in schools, or longitudinal data with repeated measures/panel waves nested in subjects.

Autumn 2022

UV9290: *Data Science*, Johan Braeken, August - October 2022
The focus is on the core concepts and techniques that function as foundations for formulating and implementing successful data-based analysis strategies to perform evidence-based research.

UV9296: *Methods for Causal Inference in Educational Research*, José Manuel Arencibia Aleman, August – September 2022
The main purpose of the workshop is to give an introduction to techniques for making credible causal inferences from observational data and how such techniques can be used in educational research.

UV9294: *Analysis of International Large-Scale Assessments*, Jelena Veletic, August - September 2022
This workshop aims to communicate both knowledge and hands-on analytical skills in the field of international large-scale assessment (ILSA) data.

UV9253: *Multilevel Models*, Ronny Scherer, October – November 2022
The course introduces the fundamental theories and application of multilevel models.

UV9218: *Linear Models*, Johan Braeken, October – December 2022
This course provides an introduction to principles, terminology, and strategies for statistical modelling with the linear model as initial framework for data analysis.

UV9291: *Principles of Measurement*, Björn Andersson, October – December 2022
In this course, the focus is on the foundational theories and concepts in measurement.

CEMO Production

PUBLICATIONS

Contributors affiliated with CEMO in bold

Andersson, Björn; Luo, Hao.
Impact of Sampling Variability When Estimating the Explained Common Variance. *Applied Psychological Measurement* 2022 ;Volum 46.(4)

Andersson, Björn; Luo, Hao; **Marcq, Kseniia.**
Reliability coefficients for multiple group item response theory models. *British Journal of Mathematical & Statistical Psychology* 2022

Marcq, Kseniia; Andersson, Björn.
Standard Errors of Kernel Equating: Accounting for Bandwidth Estimation. *Applied Psychological Measurement* 2022 ;*Volum 46.(3)*

Blömeke, Sigrid.
IEA's Teacher Education and Development Study in Mathematics (TEDS-M): Framework and Findings from 17 Countries. I: *International Handbook of Comparative Large-Scale Studies in Education.* Springer 2022 ISBN 978-3-030-38298-8.

Blömeke, Sigrid; Jenßen, Lars; Eid, Michael.
The Role of Intelligence and Self-Concept for Teachers' Competence. *Journal of Intelligence* 2022 ; Volum 10.(2) s.

Blömeke, Sigrid; Jentsch, Armin; Ross, Natalie; Kaiser, Gabriele; König, Johannes.
Opening up the black box: Teacher competence, instructional quality, and students' learning progress. *Learning and Instruction* 2022 ;Volum 79. s. 1-11

Blömeke, Sigrid; Nilsen, Trude; **Olsen, Rolf Vegar;** Gustafsson, Jan-Eric.
Conceptual and Methodological Accomplishments of ILSAs, Remaining Criticism and Limitations. I: *International Handbook of Comparative Large-Scale Studies in Education.* Springer 2022 ISBN 978-3-030-38298-8. s. 603-656

Busch, Tobias; Brinchmann, Ellen Irén; **Braeken, Johan;** Wie, Ona Bø.
Receptive Vocabulary of Children With Bilateral Cochlear Implants From 3 to 16 Years of Age. *Ear and Hearing* 2022 ;Volum 43.(6) s. 1866-1880

Chen, Chia-Wen; Andersson, Björn; Zhu, Jinxin.
A Factor Mixture Model for Item Responses and Certainty of Response Indices to Identify Student Knowledge Profiles. Journal of Educational Measurement 2022

Emslander, Valentin; Levy, Jessica; **Scherer, Ronny;** Fischbach, Antoine.
Value-added Scores Show Limited Stability over Time in Primary School. *PLOS ONE* 2022 ;Volum 17.(12)

Emslander, Valentin; **Scherer, Ronny.**
The Relation Between Executive Functions and Math Intelligence in Preschool Children: A Systematic Review and Meta-Analysis. *Psychological bulletin* 2022 ;Volum 148.(5-6) s. 337-369

Frans, Niek; **Braeken, Johan;** Veldkamp, Bernard P.; Paap, Muirne C. S..
Empirical Priors in Polytomous Computerized Adaptive Tests: Risks and Rewards in Clinical Settings. *Applied Psychological Measurement* 2022 ;Volum 47.(1) s. 48-63

Heltne, Aleksander; **Braeken, Johan;** Hummelen, Benjamin; Germans Selvik, Sara; Christensen, Tore Buer; Paap, Muirne C. S..
Do Flexible Administration Procedures Promote Individualized Clinical Assessments? An Explorative Analysis of How Clinicians Utilize the Funnel Structure of the SCID-5-AMPD Module I: LPFS. *Journal of Personality Assessment* 2022 s.

Jenßen, Lars; Dunekacke, Simone; Eid, Michael; Szczesny, Markus; Pohle, Lara; Koinzer, Thomas; Eilerts, Katja; **Blömeke, Sigrid.**
From teacher education to practice: Development of early childhood teachers' knowledge and beliefs in mathematics. *Teaching and Teacher Education : An International Journal of Research and Studies* 2022 ; Volum 114. s.

Jenßen, Lars; Roesken-Winter, Bettina; **Blömeke, Sigrid.**
Measuring Pre-service Primary Teachers' Shame in Mathematics—a Comprehensive Validation Study. *International Journal of Science and Mathematics Education* 2022 s.

Jentsch, Armin; Hoferichter, Frances; **Blömeke, Sigrid;** König, Johannes; DR Kaiser, Gabriele Agnes Hildegard.
Investigating teachers' job satisfaction, stress and working environment: The roles of self-efficacy and school leadership. *Psychology in the Schools* 2022 ;Volum 60.(3) s. 679-690

Konstantinidou, Evi; **Scherer, Ronny.**
Teaching with technology: A large-scale, international, and multilevel study of the roles of teacher and school characteristics. *Computers & Education* 2022 ;Volum 179.

Lopez-Pedersen, Anita; Mononen, Riikka; Aunio, Pirjo Annika; **Scherer, Ronny;** Melby-Lervåg, Monica.
Improving Numeracy Skills in First Graders with low performance in early numeracy: A Randomized Controlled Trial. *Remedial and special education* 2022

Lotz, Christin; **Scherer, Ronny;** Greiff, Samuel; Sparfeldt, J. R..
g's little helpers – VOTAT and NOTAT mediate the relation between intelligence and complex problem solving. *Intelligence* 2022 ;Volum 95.

Luo, Hao; **Andersson, Björn;** Wong, Gloria; Lum, Terry.
Longitudinal measurement properties of the Montreal Cognitive Assessment. *Journal of Clinical and Experimental Neuropsychology* 2022 s. 1-13

Marcq, Kseniia; Braeken, Johan.
The blind side: Exploring item variance in PISA 2018 cognitive domains. Assessment in education: Principles, *Policy & Practice* 2022 ;Volum 29.(3) s. 332-360

Michel, Janet; Mettler, Annette; Stuber, Raphael; Müller, Martin; Ricklin, Meret E; Jent, Philipp; **Hautz, Wolf E.;** Sauter, Thomas C.
Effects and utility of an online forward triage tool during the SARS-CoV-2 pandemic: a mixed method study and patient perspectives, Switzerland. *BMJ Open* 2022 ;Volum 12.(7) s.

Mittal, Oleksandra; **Scherer, Ronny;** Nilsen, Trude.
Assessing the evidence for the comparability of socioeconomic status between students with and without immigrant background in Norway and Sweden. *Large-scale Assessments in Education* 2022 ;Volum 10.(1) s.

Rabe-Hesketh, Sophia; **Skrondal, Anders.**
Ignoring Non-ignorable Missingness. *Psychometrika* 2022 s. 1-20

Reis Costa, Denise; Leoncio Netto, Waldir.
Process Data Analysis in ILSAs. I: *International Handbook of Comparative Large-Scale Studies in Education.* Springer 2022 ISBN 978-3-030-38298-8. s. 927-952

Rosén, Monica; **Steinmann, Isa;** Wernersson, Inga.
Gender Differences in Achievement. I: *International Handbook of Comparative Large-Scale Studies in Education.* Springer 2022 ISBN 978-3-030-38298-8. s. 1351-1398

Rutkowski, Leslie; Liaw, Yuan-Ling; Svetina, Dubravka; **Rutkowski, David.**
Multistage Testing in Heterogeneous Populations: Some Design and Implementation Considerations. *Applied Psychological Measurement* 2022 ;Volum 46.(6) s. 494-508

Rutkowski, Leslie; Rutkowski, David; Valdivia, Svetina D..
Multistage Test Design Considerations in International Large-Scale Assessments of Educational Achievement.. I: *International Handbook of Comparative Large-Scale Studies in Education.* Springer 2022 ISBN 978-3-030-38298-8. s. 749-767

Ræder, Henrik Galligani; Andersson, Björn; Olsen, Rolf Vegar.
Numeracy across grades–vertically scaling the Norwegian national numeracy tests.
Assessment in education: Principles, Policy & Practice 2022 s. 1-21

Scherer, Ronny.
Analyzing International Large-Scale Assessment Data with a Hierarchical Approach. I: *International Handbook of Comparative Large-Scale Studies in Education.* Springer 2022 ISBN 978-3-030-38298-8.

Scherer, Ronny; Campos, Diego Gonzalez.
Measuring those who have their minds set: An item-level meta-analysis of the implicit theories of intelligence scale in education. *Educational Research Review* 2022 ;Volum 37.

Scherer, Ronny; Nilsen, Trude.
Accountability for the future? International testing and future directions. I: *International Encyclopedia of Education (4th Edition).* Elsevier 2022 ISBN 978-0-12-818629-9. s. 324-340

Skrondal, Anders; Rabe-Hesketh, Sophia.
The Role of Conditional Likelihoods in Latent Variable Modeling. *Psychometrika* 2022 ;Volum 87.(3) s. 799-834

Steinmann, Isa; Olsen, Rolf Vegar.
Equal opportunities for all? Analyzing within-country variation in school effectiveness. *Large-scale Assessments in Education* 2022 ;Volum 10.(1)

Strello, Andrés; Strietholt, Rolf; **Steinmann, Isa.**
Does tracking increase segregation? International evidence on the effects of between-school tracking on social segregation across schools. *Research in Social Stratification and Mobility* 2022 ;Volum 78.

Talić, Irma; **Scherer, Ronny;** Marsh, Herbert W.; Greiff, Samuel; Möller, Jens; Niepel, Christoph.
Uncovering everyday dynamics in students' perceptions of instructional quality with experience sampling. *Learning and Instruction* 2022 ;Volum 81.

Teig, Nani; **Scherer, Ronny; Olsen, Rolf Vegar**.
A systematic review of studies investigating science teaching and learning: over two decades of TIMSS and PISA. *International Journal of Science Education* 2022 ;Volum 44.(12) s. 2035-2058

Van Laar, Saskia; Braeken, Johan.
Caught off Base: A Note on the Interpretation of Incremental Fit Indices. *Structural Equation Modeling* 2022 ;Volum 29.(6) s. 935-943

Van Laar, Saskia; Braeken, Johan.
Random Responders in the TIMSS 2015 Student Questionnaire: A Threat to Validity?. *Journal of Educational Measurement* 2022 s. 1-32

Ye, Wangbei; Ding, Yingying; Han, Xiaomeng; **Ye, Wangqiong.**
Pre-service teachers' teaching motivation and perceptions of teacher morality in China. *Educational studies* (Dorchester-on-Thames) 2022 s.

EXTERNAL PRESENTATIONS AND CONTRIBUTIONS

Anderssön, Björn (Dec 14 2022) Fast estimation of longitudinal generalized linear latent variable models for ordinal, count, and continuous data, The Norwegian psychometrics gathering, Norwegian Business School,

Anderssön, Björn (July 11-15, 2022) Efficient marginal maximum likelihood estimation of longitudinal latent variable models, International Meeting of the Psychometric Society, Bologna, Italy

Arencibia, Alemán, José (June 1-3, 2022) Concurrent Validity of Grade 10 Norwegian Students' External Exam Results in Mathematics, Norwegian and English. Nordic Educational Research Association (NERA), Reykjavik, Iceland.

Blömeke, Sigrid (February 11, 2022) Forskning, Innovasjon og Kompetanseutvikling i Skolen (FIKS): Målevitenskapelige perspektiver på fornying av eksamen i skolen; UiO, Oslo

Blömeke, Sigrid (June 13, 2022) School of Quantitative Research Methods in Education (QRM): "Methodological issues in research on effects of schools and teachers on student outcomes"; University of Gothenburg, Sweden

Blömeke, Sigrid (October 6, 2022) International Academy of Education (IAE): "Differential Effects of COVID-19 School Closures"; Berlin, Germany

Blömeke, Sigrid (November 2, 2022) "Utdanningsdirektoratets dialogseminar: Forskning på eksamen i Norge: Kunnskapsgrunnlaget og anbefalinger" "Kvalitet i eksamen"; Telegrafen, Oslo

Campos, D. G. (2022). Synthesizing Individual Participant Data Obtained From Complex Sampling Surveys: A Two-Stage IPD Meta-Analysis Approach. AERA Special Interest Group In Systematic Reviews and Meta-Analysis: Online Seminar.

Campos, D. G., Cheung, M-W., & **Scherer, R.** (2022). Synthesizing research on complex sampling surveys: Two-stage meta-analysis with individual participant data. International Meeting of the Psychometric Society (IMPS)

Campos, D. G. & Scherer, R. (June 1-3, 2022). Exploring the Role of Attitudes Toward ICT in the Gender Digital Divide: An analysis with International Large-Scale Assessment Data. Nordic Educational Research Association (NERA), Reykjavik, Iceland

Campos, D. G., Kharlamov, A., & **Scherer, R.,** (2022). Assessing Mindsets: A Meta-Analysis of the Reliability and Factor Structure of Dweck's Mindset Scale. AERA Annual Meeting

Chen, C-W, Costa, D.R. (June 1-3, 2022). Exploring the relationship between process data and contextual variables for Scandinavian students on PISA 2012 mathematics tasks. Nordic Educational Research Association (NERA), Reykjavik, Iceland

Costa, D.R. (June 1-3, 2022). Predicting problem-solving performance from Scandinavian students in PISA 2012 using computer-generated log files. Nordic Educational Research Association (NERA), Reykjavik, Iceland

Gochyyev, P., Siddiq, F., **Scherer, R.,** Wilson, M. (June 1-3, 2022). Exploring collaborative problem-solving tasks for individual-level and team-level inferences using multilevel modeling. Nordic Educational Research Association (NERA), Reykjavik, Iceland

Haakstad, H.E. (June 1-3, 2022). Adapting psychometric approaches to classification accuracy for ROC-analytic standard-setting, Nordic Educational Research Association (NERA), Reykjavik, Iceland

Kristensen, J. K., Andersson, B., & Torkildsen, J. v. K. (June 1-3, 2022). Modeling Changes in Rapid Guessing Behavior of Children Working with an Educational App. Nordic Educational Research Association (NERA), Reykjavik, Iceland

Kristensen, J. K., Andersson, B., & Torkildsen, J. v. K. (July 1-4, 2022). Modeling Disengaged Guessing Behavior in a Vocabulary Learning App using Student, Item, and Session Characteristics. International Conference on Advanced Learning Technologies (ICALT), Bucharest, Romania

Marcq, K., Braeken, J. (June 1-3, 2022). Gender differences in item nonresponse in the PISA 2018 student questionnaire. Nordic Educational Research Association (NERA), Reykjavik, Iceland

Marcq, K., Braeken, J. (2022). Gender differences in item nonresponse in the PISA 2018 student questionnaire. The Norwegian psychometrics gathering, BI Norwegian Business School

Mittal, O., **Scherer, R.,** Nilsen, T. (June 1-3, 2022). Assessing the evidence for comparability of socioeconomic status across students with and without immigrant background in Norway and Sweden, Nordic Educational Research Association (NERA), Reykjavik, Iceland

Ræder, H.G., Olsen, R.V., Pettersen, A., Nortvedt, G. (June 1-3, 2022). Mathematical competencies demand of numeracy items across grades, Nordic Educational Research Association (NERA), Reykjavik, Iceland

Steinmann, I. (June 1-3, 2022). How do inconsistent responders to mixed-worded questionnaire scales affect inferences in international largescale assessments?, Nordic Educational Research Association (NERA), Reykjavik, Iceland

Tan, T, Olsen, R.V. (June 1-3, 2022). Fairness in grading across subjects, Nordic Educational Research Association (NERA), Reykjavik, Iceland

Teig, N., **Ye, W.,** Hansen, K.Y.. Nilsen, T. (June 1-3, 2022). Against the odds: Academic resilience among disadvantaged students, Nordic Educational Research Association (NERA), Reykjavik, Iceland

Zhang, Maoxin, Andersson, B. (April 21-23, 2022). Identifying problem-solving solution patterns using network analysis of operation sequences and response times. The Annual Meetings of National Council on Measurement in Education (NCME), San Deigo, USA

Zhang, Maoxin, Andersson, B. & Greiff, S. (November 9-12, 2022). Examining the generalizability of process indicators for planning and non-targeted exploration and their relationships with problem-solving competency. The 23rd Annual Meeting of the Association for Educational Assessment (AEA-Europe), Dublin, Ireland

AWARDS/GRANTS

Campos, D. G., Scherer, R. (08/2022). LEAD Graduate School & Research Network at the University of Tübingen (€ 9 615,36). Fütterer, T., Campos, D.G, Gfrörer, T., Lavelle-Hill, R., Scherer., R., Murayama., K.

Scherer, R. IEA Research and Development Fund, Project IDES "Improving Data in Electronic Surveys"(50.000 EUR). Strietholt, R., Bundsgaard, J., Fraillon, J., Rozman, M., & Scherer, R.

Scherer, R. Research collaboration grant, The Chinese University of Hong Kong, Faculty of Education (10.000 EUR). Teo, T., & Scherer, R.

Scherer, R. Peder Sather Grant, Project "Developing tasks aimed at measuring collaborative problem solving within the computational thinking context: From Construct Definitions to Task Designs", Peder Sather Center for Advanced Study, UiO and UC Berkeley (20.000 USD). Wilson, M., Scherer, R., Siddiq, F., Goyychev, P., Kravik, R., & Åsgård, E.

Ye, Wangqiong. Does Educational Investment Improve Labor Market Participation for Academic Resilient Students? A Longitudinal Analysis of Register Data from Statistics Norway." (50.000 NOK). Funded by UiO Innovation and development fund.

Random-Intercept Cross-Lagged Panel Models *(cont'd)*

Longitudinal associations between academic achievement and motivation

Time points

Model 3 (RI-CLPM with HZB and other covariates predicting the random intercepts)

Academic achievement

Study motivation

UNIVERSITETET I OSLO

CEMO

Centre for Educational Measurement