WORKSHOP TITLE: Applications of Item Response Theory

Presenters: Theo Eggen Twente University, the Netherlands; Dutch National Institute for Educational Assessment, Cito, The Netherlands, **Frans Kleintjes** Dutch National Institute for Educational Assessment, Cito, The Netherlands. **Marieke van Onna**, Dutch National Institute for Educational Assessment, Cito, The Netherlands.

Presenters' Bios (500 words):

Dr. Ir. Theo Eggen (1953) is member of Psychometric Research Centre of the Dutch National Institute for Educational measurement (Cito), with Cito since 1985. He has major experience in advising on the methodological aspects (research design and data analysis) of educational research and test development, in conducting data analysis and in multidisciplinary cooperation projects.

Theo has expert knowledge of statistical tools and packages, of specialized psychometric computer programs and of computer programming. He worked as a consultant in educational measurement at university, at Cito and internationally. He teaches introductory and specialized courses and has presented many papers at national and international conferences. He is the author of research articles, syllabi and textbooks. Specializations are: item response theory, national assessment, missing data problems and adaptive testing.

Theo holds a doctorate (Dr) in educational measurement and a MSc (Ir) in Statistics of Twente University of Technology. In 2008 he was accredited as a Fellow of the of the Association of Educational Assessment Europe

Ir. Frans Kleintjes (1953) is Director Cito International at Cito since 2015. Before he was a Senior Research Scientist in the Psychometric Research Centre Cito. the Dutch National Institute for Educational Assessment. With Cito since 1988.

His major task is providing methodological and psychometrical consult in research and educational test development projects. Since 2009 also Senior consultant in Cito International, consulting on psychometric issues in international projects.

He has a vast experience in consulting, training and performance on issues related to many psychometric aspects of the development of educational tests and testing procedures.

He conducts both at Cito and abroad, training courses and consultancies in psychometrics, test construction and on assessment and quality control in education. Frans holds a MSc. (Ir) in Applied Mathematics of Twente University of Technology, with a specialization in educational measurement since 1981. In 2011 he was accredited as a Fellow of the Association of Educational Assessment Europe .

Frans was a member of the Professional Development Committee and co-chair of the Professional Affairs Board from 2004 to 2014. The PAB assesses applications for Fellows, Practitioners and Associates of the association.

He is secretary of the Dutch Association for Exams (NVE), an association for all those interested in educational testing such as examining bodies and test developers in the Netherlands.

Dr. Marieke van Onna (1973) is a member of the Psychometric Research Centre at Cito. With Cito since 2007.

Her main task is coordinating all methodological consultation on the national exams in secondary and vocational education.

Her expertise is in translating IRT and methodology to test situations in practice. This involves everything from the design of tests, to CBT, to data handling, to item banking, to choosing an appropriate IRT model and subsequent analysis, to standard setting, up to the design of reports, school evaluation and political considerations. She has experience with the development of tests in primary, secondary, vocational and higher education, as well as computer-based tests of driving competency.

Marieke holds a Ph.D. in Methodology of the Social Sciences and a MA in Philosophy of the University of Groningen, Netherlands.

Why AEA members should attend this workshop:

The workshop will offer an introduction to IRT and applications from a practical point of view. IRT is used for many measurement applications including item banking, test construction, adaptive test administration, scaling, linking and equating, standard setting, test scoring and score reporting. Main features of these applications will be addressed in the workshop. Participants will be able to understand and assess the usefulness of IRT in their own work.

Who this Workshop is for:

The workshop is aimed at those who want to know more about IRT with a focus on applications. Participants might be novice ore more experienced user. No prior knowledge is required to attend the workshop.
Participants will practice using the software for some examples and are invited to bring their own laptops for practicing (Windows).

Overview (500 words):

Item Response Theory (IRT) is used to analyse response data at item level. Unlike classical theory it does not solely construct and analyse fixed tests forms administered at one occasion. IRT is the theoretical framework which can be used in modern times where assessments are often based on different tests on different occasions. In IRT estimating characteristics of items and examinees and defining how these characteristics interact in describing item and test performance. When used properly IRT can increase the efficiency of the testing process, enhance the information provided by that process, and make detailed predictions about unobserved testing situations.

The first session of the workshop starts with some theory, including a comparison of IRT with classical test theory. Major properties of IRT will be highlighted using illustrative examples. IRT output will be explained, discussed and interpreted based on materials that will be provided. Several concepts used in IRT will be explained using examples from the test construction experience of the presenters and, when

available, from participants.

In the second session participants will, hands on, detect main features of IRT through performing some exercises

The third session is a short theoretical introduction in Computer Adaptive Testing, in which special attention will be paid to computerized adaptive testing. The goals and usefulness of simulations for constructing CATs will be discussed. The measurement characteristics of a CAT can be studied and set before publishing it. Information can be collected by simulation studies that use the available IRT calibrated item bank and the proposed target population. The performance of proposed selection algorithms and constraints can be studied. Customized software will be distributed (Windows based) and used by participants to determine the measurement characteristics in CAT.

In the last workshop session the use of IRT features will be discussed.
We intend to deal with applications of IRT such as: Itembanking; Standard-setting;, Maintaining Standards and Grading; Reporting using the ability scale; Student Monitoring Systems; National and International Assessment.

Preparation for the workshop:

No special preparation is required, the workshop format will be interactive allowing participants to discuss their own experience and/or problems. If available, participants are encouraged to bring their own data and analyses for discussion. It is the belief of the workshop leaders that sharing experience in applications will stimulate and enable participants in solving educational measurement problems that they encounter in their practice or anticipate encountering.

Schedule

Time	Session	Presenter	Notes
0900	Coffee and registration		

0930	Welcome & introductions Outline of the Workshop	Theo Eggen, Frans Kleintjes and Marieke van Onna	
0945	Introduction to Item Response Theory	Marieke van Onna	
1100	Break		
1130	Main features of IRT - hands on session	Frans Kleintjes and Marieke van Onna	
1300	Lunch		
1400	Computerized Adaptive Testing Theory and hands on simulations	Theo Eggen	
1530	Break		
1545	Using IRT features	Theo Eggen, Frans Kleintjes and Marieke van Onna	
1630	Workshop close	-	