How Science as Inquiry Could Inform Teaching and Teacher Education

International Study Association on Teachers and Teaching Symposium
(60-90 minutes)

Introduction: This symposium involves International Study Association on Teachers and Teaching (ISATT) members who hail from four different countries: Belgium, South Africa, The Netherlands and the United States. It consists of a formal introduction, two paper presentations and a prepared response from a discussant. From practice to policy and the small-grained to the large-grained, what scientific inquiry has to offer teaching/teacher education is discussed.

Paper 1, Passages in Science Texts and Their Related Questions: When Innovation Fails to Follow-Through This paper studies science textbooks from content analysis and learning activities perspectives. The texts in question are part of the authorized curricula in The Netherlands, but the identified issues have applicability to the teaching of science globally. The work revolves around instances where science content innovations are not carried through to the associated questions that students must answer. In a nutshell, major inconsistencies exist between what students come to know, by virtue of reading innovative passages, on one hand; and the manner in which they are required to show that they know, by virtue of the related questions, on the other hand. These discrepancies, in turn, raise questions about the images of science to which students are exposed. Is science innovative and thought-provoking as the textbook passages suggest? Or is it dogmatic and/or paradigmatic as the associated questions indicate? And what else contributes to/fuels these epistemic and/or curricular divides? This paper addresses such queries by offering ways that science understood as inquiry could help manage dilemmas students encounter and, ultimately, provide relief from some of the issues science texts present.

Paper 2, Accountability/Performativity Demands in Teaching and Teacher Education and the Seeming Lack of Progress: This paper revolves around the accountability movement as it is referred to in North America and the performativity phenomenon as it is called in Europe and elsewhere. In spite of the intense scrutiny of teachers, the annual reporting of student scores in mathematics and science and the spiraling costs of assessing the field of education's outputs, little progress appears to have been made. This work argues that only one version of inquiry—the stable view—is currently being employed. An approach more in line with how scientists work would involve both stable and fluid means of inquiry working in concert with one another. This more comprehensive orientation would afford in-depth looks at what is known and not known and give equal play to formal and practical views of knowledge. This more encompassing view could open up avenues of exploration that are currently not being considered and would require educators to act "as agents of education… in its entirety" as opposed to agents of particular subject matter. While not an elixir, this more balanced approach could break the stranglehold grip that has halted advances in the field of education.

Discussion: A professor from Belgium who specializes in teacher education and research will discuss the two international papers. For the audience's benefit, the questions raised will have applicability to mathematics, science and technology education in Africa.

Biographies of Symposium Presenters

Symposium Chair: Dr. Samuel Ouma Oyoo is a Senior Lecturer in Science Education at the School of Education, the University of the Witwatersrand, Johannesburg, South Africa. He teaches physics and physics-related courses to undergraduate and postgraduate teachers and supervises Honours, Masters and Ph. D. degree research studies. His research interests cover the general area of education, but he focuses on issues in effective teaching of school science. His most recent publication has appeared online in the ISI listed journal, *Research in Science Education* under the title 'Language in science classrooms: An analysis of physics teachers' use of and beliefs about language.' Samuel Oyoo is the current ISATT Outreach Coordinator and National Representative for South Africa.

Paper 1 Presenter: Dr. Paulien C. Meijer is as an associate professor and teacher educator at Utrecht University in The Netherlands. She publishes in the areas of teacher learning and non-learning, research-based teacher education, and teacher knowledge. Her work appears in such publications as *Journal of Teacher Education, Teaching and Teacher Education* and *Teachers and Teaching: Theory and Practice* (ISATT's official journal). Her co-authored article, 'Reconsidering research on teachers' identities' is among *Teaching and Teacher Education's* most downloaded publications. Her recent projects include research on teacher behavior and student learning in the context of innovations in science teaching, and identity development as part of learning to teach. She has been the Chair of the International Study Association on Teachers and Teaching since 2009.

Paper 2 Presenter: Dr. Cheryl J. Craig is a professor at the University of Houston where she coordinates the teaching and teacher education program area. Her research is conducted at the intersection where curriculum and teaching meet. Her research interests include teacher knowledge, teacher community, teacher identity and the use of narrative inquiry as a research method. She is the recipient of her university's teaching, research, collaboration and career honours. She also has received lifetime achievement awards from Phi Delta Kappa and the American Educational Research Association's Division B (Curriculum). In 2011, she was named an American Educational Research Association Fellow. Since 2009, Cheryl Craig has been the Secretary of ISATT.

Discussant: Dr. Jan Broeckmans works as an associate professor at the Faculty of Applied Economics, Hasselt University, Belgium. He coordinates and teaches in the teacher education program for secondary schools, coordinates the teaching professionalisation program for academic staff, and teaches courses on research methodology. From 2007 to 2011, he has also coordinated a regional network of 8 teacher education institutions that cooperated in several types of applied research. His research interests relate to teacher beliefs, conceptions of learning and pedagogical content knowledge (among university professors and secondary school teachers), as well as on students' learning beliefs and approaches. Jan Broeckmans has been a member of the Executive Committee of the International Study on Teachers and Teaching since 2009 and became Treasurer of ISATT in February of 2012.