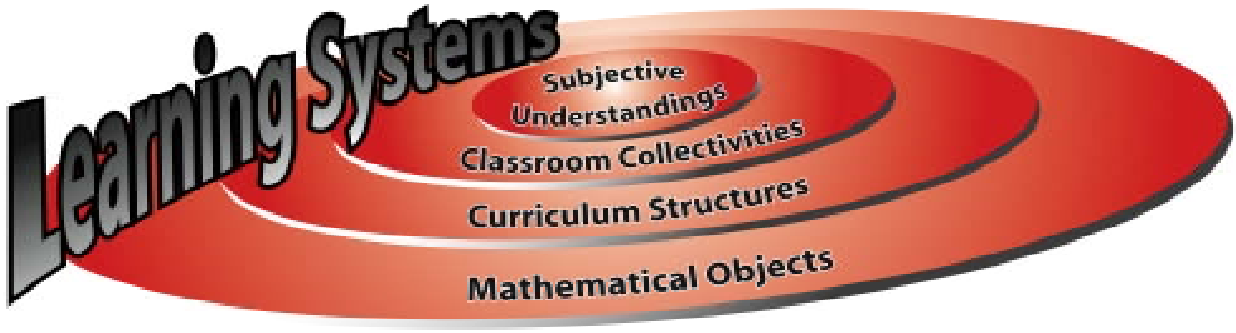
Ontario Association for Mathematics Education
Association ontarienne pour l'enseignement des mathématiques

2006 Leadership Conference

Learning Systems:
The Case of Mathematics-for-Teaching



for administrators, consultants, co-ordinators, lead teachers/board trainers, math educators, mathematicians, Ministry of Education

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FEBRUARY 16-18, 2006
Holiday Inn Select
(970 Dixon Road, Toronto, Ontario)

OVERVIEW

Principles of complexity have been used to structure the conference and will be developed in depth through explicit introductions to issues and by involving delegates in a range of activites. Keynote sessions will provide shared experiences, contributing to the redundancies among agents that are necessary for the emergence of new collective possibilities. Delegates will be placed in 3 mixed groups of K-12 educators to rotate through the same 3 workshops that will focus on more specific, curriculum-based topics to create enabling constraints for the collective.

During this conference, WE will

- explore teachers' tacit knowledge of the mathematics encountered in the school curriculum
- investigate and experience various strategies of collective knowledge production
- make sense of the interconnections of the K-12 curriculum
- discuss the complexity principles for analyzing and rethinking teacher education in mathematics
- become famliar with the PD principles used by Simmt and Davis in their work with practising teachers

Note - the structure and intended audience varies somewhat from previous OAME Leadership conferences.

All Inclusive Registration Fee: $435/$470 (OAME/non-OAME)
Includes: All sessions, 2 nights accommodation (2 people/room), meals, banquet, receptions, publishers' and suppliers' displays

Program Overview

DAY	TIME	ACTIVITY
Thursday Feb. 16, 2006	5:30 p.m. – 7:00 p.m.	Registration outside the Trillium Ballroom
	7:00 p.m. – 9:00 p.m.	OPENING KEYNOTE AND INTRODUCTORY INQUIRY **Dr. Brent Davis and Dr. Elaine Simmt** *Using Complexity to Structure In-Service Experiences for Mathematics Teachers*
	9:00 p.m. – 11:00 p.m.	Reception
Friday Feb. 17, 2006	7:00 a.m. - 8:00 a.m.	Breakfast
	8:30 a.m. – 11:30 a.m.	WORKING GROUPS ROTATION 1
	11:45 a.m. - 1:45 p.m.	Publishers'/Suppliers' Luncheon: Preview of new products and an opportunity to view the many displays
	2:00 p.m. – 5:00 p.m.	WORKING GROUPS ROTATION 2
	5:00 p.m. – 6:00 p.m.	Free Time
	6:00 p.m. – 9:00 p.m.	BANQUET and KEYNOTE SPEAKER – **Dr. Rena Upitis** *School Architecture, Complexity, and Mathematics*
	9:00 p.m. – 11:00 p.m.	Reception
Saturday Feb. 18, 2006	7:00 a.m. - 8:00 a.m.	Breakfast
	8:30 a.m. - 11 :30 a.m.	WORKING GROUPS ROTATION 3
	11:30 a.m.– 12:00 noon	Checkout (before lunch and closing session)
	12:00 noon - 1:30 p.m.	LUNCH, PANEL CONCLUSION, THANK YOUs AND GOOD-BYEs!

KEYNOTE SPEAKERS AND WORKSHOP LEADERS

Dr. Brent Davis

Brent is a Professor and Canada Research Chair in Mathematics Education and the Ecology of Learning, Secondary Education, University of Alberta. His research is developed around the educational relevance of recent developments in the cognitive and complexity sciences. His recent book, "Inventions of Teaching: A Genealogy," is an exploration of the emergence of conventional conceptions of curriculum and pedagogy. He has published articles in mathematics teaching and learning, curriculum theory, teacher education, epistemology, and action research and is associate editor of "For the Learning of Mathematics."

Dr. Elaine Simmt

Elaine began her career teaching secondary math, chemistry and physics. She is currently chair of the Department of Secondary Education, University of Alberta. With colleagues, she has been studying mathematics knowing as a fully embodied, embedded and extended phenomenon. Their work is framed by complex, enactive and ecological theories of human knowing. Her research is grounded in the secondary school classroom and in the context of PD for in-service teachers. This school-based research has led to her to explore methods and designs suitable for studying the complex and contextual phenomena of teaching and learning.

Dr. Rena Upitis

Rena is a former Dean of Education and currently Professor of Arts Education at Queen's University and National Research Co-director of *Learning Through the Arts*, a multi-year project that brings artists to the classrooms of over 100,000 students. She teaches courses on music and mathematics curriculum methods, integrated arts and technology, and research methodologies. Her various research projects have explored teacher, artist, and student transformation through the arts and the use of electronic games in mathematics and science education. Her current interest is on how school architecture both constrains and opens up possibilities for learning.

ONTARIO FACILITATORS FOR WORKING GROUPS

Dennis Caron, Elementary Teacher, St Maurice CS, Toronto CDSB
Gordon Cooke, Vice Principal, Thousand Island SS, Upper Canada DSB
Stewart Craven, Program Co-ordinator, Mathematics/Numeracy, Toronto DSB
Pat Margerm, Course Director, York University Faculty of Education
Mary Lou Kestell, Literacy and Numeracy Secretariat, Ministry of Education
Kathy Kubota-Zarivnij, Literacy and Numeracy Secretariat, Ministry of Education, President of OAME

Program Details

Each participant will remain with the same workgroup for a total of 9 hours of workshop time. Delegates will be placed in three mixed groups of K-12 educators that will rotate among the three working sessions listed below.

WORKING SESSION A

Algebra (Dr. Elaine Simmt)

Algebra is a *darling* of the secondary school curriculum. It is likely so for a number of reasons: it is highly connected with other facets of mathematics, it offers a move from arithmetic to mathematics, teachers like teaching it, and one of the most pervasive reasons is you *need* it. However, the algebraic thinking and skills students leave secondary school with have been criticized as nothing more than rote symbolic manipulation. In this working group we ask, "What is algebra-for-teaching?" We will explore algebra for teaching through a series of activities. There will be structured opportunities to consider the kinds of knowledge/knowing that are occasioned in various kinds of classroom activities and the progression of algebra throughout the K-12 curriculum.

WORKING SESSION B

Managing Data Management (Dr. Brent Davis)

Data management, one of the more recent additions to the modern mathematics curriculum, has been seen by many as a problematic part of the program of studies. The topic is not easily integrated with other units of study, it tends not to be treated rigorously, and in-class activities associated with the topic are often trivial or banal. In this working session, we will examine some of the mathematics of data management, seeking to reframe how it might be developed through the course of a learner's K-12 experience. As with the other working sessions, a portion of the time will be devoted to explicit analysis of the strategies and structures used to organize the investigation.

WORKING SESSION C

Physical Spaces and Mathematical Explorations (Dr. Rena Upitis)

In this session, participants will first be guided in identifying the kinds of physical structures that would best support mathematics education, based on principles of complexity. Next, a series of examples of school renovation and building, where teachers, students, and parents, along with architects and builders have set about to create instructional spaces to support learning that is resonant with a complexity orientation, will be explored. Finally, participants will have an opportunity to fashion some beginning directions for altering the built and natural environments in which they work.

KEYNOTE 1

Using Complexity to Structure In-Service Experiences for Mathematics Teachers

In this interactive presentation, we discuss teachers' mathematics-for-teaching, using complexity science as a framework. We illustrate the discussion with some group-based mathematical inquiries drawn from an ongoing research study with a cohort of K-12 teachers. These examples illustrate four intertwining aspects: "mathematical objects", "curriculum structures", "classroom collectivity" and "subjective understanding". We argue that these phenomena are nested in one another and obey similar dynamics, albeit on very different time scales. We conjecture that (1) a particular fluency with these four aspects is important for mathematics teaching and (2) these aspects might serve as appropriate emphases for pre-service and in-service experiences for mathematics teachers.

KEYNOTE 2

School Architecture, Complexity, and Mathematics

In this plenary session we will explore how the physical spaces we call "schools" both constrain and open up possibilities for what is learned by those who dwell there. The session is based on three premises. The first of these is that buildings teach. Among other things, schools teach students which activities societies prize most, and about relationships between people, the built environment, and the natural world. The second premise is that mathematics education (and education generally) cannot be fundamentally influenced without a concomitant change in school structures. The final premise is that human understandings are formed through a complex web of relationships between people, other animate beings, and inanimate objects, which lead to understandings that are cognitive, emotional, social, embodied, and even spiritual. If we accept the premise that complexity theory is a powerful way to conceive of teaching and learning, then school building design needs to be radically re-thought. This re-thinking is not only about improving lighting or creating better storage spaces. It is about designing buildings and landscapes in ways that resonate with our biological processes and aesthetic sensibilities to produce a sense of ecological mindfulness. By asking the question, "What would schools look like if we were to structure learning environments conducive to complexity?", ways of re-thinking school design will be proposed. Examples of schools in Canada, the United States, Germany, Norway, and Australia will be used to illustrate features of building design that encourage such qualities as neighbour interactions, diversity, and redundancy, suggesting that by adding these features to the built environment, the quality of mathematics learning will also thereby be enhanced.

O.A.M.E. Leadership Conference 2006 Registration Form

Registration Fee (before January 13/06): OAME MEMBER **$435;** NON-MEMBER **$470**
Fee includes: All sessions; 2 nights at Holiday Inn Select (2 people/room);
2 breakfasts, 2 lunches, 1 banquet, 2 receptions; taxes& gratuities.
Special rate(before January 13/06) without accommodation $335/370 (OAME MEM/NON MEMBER).
Surcharge for Single Room: $130.00
Surcharge for Registration after January 13/06: $25

Name: _____ Gender: Male ❑ Female ❑
surname first name

Home Address:_____
street city postal code

School Name:_____Board_____

Telephone #: (_____)_____ (_____)_____
home business

Fax #: (_____)_____ Email:_____

Please indicate: ❑ teacher of _____ ❑ administrator ❑ co-ordinator/consultant ❑ other _____
grade(s) please specify

OAME Member YES ❑ NO ❑ Membership#_____

I wish to become an OAME member YES ❑ and enclose the $45 annual fee (and hence pay the member's fee for this conference).

Conference Arrangements

I will be staying at the Holiday Inn Select: YES ❑ NO ❑
I wish non-smoking accommodation: YES ❑ NO ❑

I wish to be booked accommodation with: _____
PRINT Name of Other Registrant for Conference

OR I wish shared accommodation to be arranged for me. ❑

OR I wish Single accommodation and enclose the $130 surcharge. ❑

Special Dietary Needs

Please indicate any special dietary needs _____
(eg: vegetarian, food allergies, etc)

Total Amount Enclosed (Cheque or Credit Card): $ _____

All paid registrations will be confirmed by mail/fax within 14 days of being received.

Please send this Registration Form and a cheque made out to OAME to:
70 Chestnut Crt, London ON, N6K 4J5
OR: Mail/ Fax to 519 471 6324 with Credit Card Information: VISA ❑ or MC ❑
Cardholder Name (Print) _____
Card Number _____Expiry Date _____/_____
Authorizing Signature _____
For further information phone or fax Sue or Dave Hessey: 519 471 6324
or email: EDs@oame.on.ca