RF2: EQUITY, MATHEMATICS LEARNING AND TECHNOLOGY

Co-ordinators: Colleen Vale, Gilah Leder and Helen Forgasz

In recent times there has been growing recognition of the complexity of the settings in which mathematics learning occurs. Concurrently, more careful attention is being paid to the definitions and dimensions of equity, and to the interactions of these dimensions. In response, mathematics education researchers have adopted a wider range of research designs to explore equity issues. The nature and extent of the use of technology in mathematics classrooms varies between and within nations. Thus equity concerns should take on a new focus.

The challenges presented by the combination of these effects are significant and will be addressed in this forum. Does access to the technology per se promote mathematical learning, as is often proclaimed and generally assumed? In this changing learning environment, what are the implications for mathematics teaching and learning of gender, culture/ethnicity/race, and socio-economic background/class? The advent of particular technologies in classrooms raises other vital questions related to equity. Do all students have equal access to the technology? Are all students advantaged by the use of technology as they learn mathematics? If not, are there new privileged and new disadvantaged groups?

In this forum, we will be exploring issues, identifying research questions that need to be asked, and examining the range of methodological approaches that may be useful in finding the answers.

SESSION ONE: EQUITY ISSUES IN MATHEMATICS WHEN TEACHING WITH TECHNOLOGY

In this session, presenters and forum participants will draw attention to particular equity issues and raise questions for further research. With a focus on gender, culture/race/ethnicity and/or socio-economic class, Helen Forgasz (Australia), Christine Keitel (Germany) and Mamokgethi Setati (South Africa) will situate their responses within particular socio-cultural educational contexts. Gilah Leder (Australia) will lead a discussion among forum participants for the remainder of this session.

The key questions to be addressed by speakers and participants include:

- What is meant by equity with respect to mathematics learning and the use of technology?
- What are the factors that contribute to inequitable learning outcomes when teaching mathematics with technology?
- Are these factors the same in all contexts, that is, across and within national boundaries?
- What research questions should be asked in order to advance equity when learning mathematics with technology?
- How does socio-cultural context play a role in framing research questions for advancing equity when technology is used for mathematics learning?

SESSION TWO: DESIGNING RESEARCH ABOUT EQUITY IN

MATHEMATICS LEARNING WHEN TEACHING WITH TECHNOLOGY

The second session of the research forum will be devoted to examining theoretical frameworks and research methodologies that may inform studies of the research problems and questions raised in the first session. Gabriele Kaiser (Germany), Colleen Vale (Australia) and Walter Secada (USA) will discuss the strengths and weaknesses of research approaches relevant to researching equity. Gilah Leder (Australia) will lead discussion among participants.

The key questions to be addressed by speakers and participants include:

> What research and experiences from countries around the world can we draw on, or take as exemplars, when designing research for advancing equity in mathematics when teaching with technology?
>
> How may the various theoretical frameworks concerning equity in mathematics inform the design of further research involving teaching mathematics with technology?
>
> How may socio-cultural context inform the design of further research involving teaching mathematics with technology?
>
> How do we encourage research in teaching mathematics with technology to respond to questions concerning equity and socio-cultural context?

HOW CAN YOU PARTICIPATE?

We invite you to react to prior readings (listed below) or to the Research Forum papers published in the Proceedings. We would like to encourage you to draw attention to issues or research findings that may not otherwise be considered in the forum.

If you would like to speak during one of the sessions in the forum please submit a brief statement or commentary in writing (up to 250 words) before the forum to the convenor, Colleen Vale.

Email: colleen.vale@vu.edu.au

The facilitator, Gilah Leder, will respond to you prior to the forum to plan the discussion. Time will also be set aside for questions and general discussion from the floor.

PRIOR READING

Adler, J. (2001). Resourcing practice and equity: A dual challenge for mathematics education. In B. Atweh, H. Forgasz & B. Nebres (Eds.) *Sociocultural research on mathematics education: An international perspective* (pp. 185-200). Mahwah, NJ: Lawrence Erlbaum Associates.

Kaiser, G. & Rogers, P. (1995). Introduction: Equity in mathematics education. In P. Rogers & G. Kaiser (Eds.) *Equity in mathematics education. Influences of feminism and culture* (pp. 1-10). London: Falmer Press.

Secada, W. G. & Berman, P. W. (1999). Equity as a value-added dimension in teaching for understanding in school mathematics. In E. Fennema & T. A. Romberg (Eds.), *Classrooms that promote student understanding in mathematics* (pp. 33-42). Mahwah, NJ: Lawrence Erlbaum.

Tate, W. F. (1997). Race-ethnicity, SES, gender, and language proficiency trends in mathematics achievement: An update. *Journal for Research in Mathematics Education, 28*(6), 652-679.

Volman, M. & van Eck, E. (2001). Gender equity and information technology in education: The second decade. *Review of Educational Research, 71*(4), 613- 634.