

What does Ethics have to do with  
Numeracy?

A Socially Response-able Approach to  
Critical Numeracy

**Bill Atweh**

## Confessions

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- I am not as informed about policies and practices in NZ
- I am a mathematics educator and have not been directly involved in numeracy policy or research
- My experience is in school education and not in adult education



## Structure of Presentation

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- I. Numeracy: What is it for?
  - II. Complexities in numeracy education
  - III. Ethical foundation of critical numeracy
  - IV. Implications for numeracy development  
(with some examples)
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- Challenges to policy and research in numeracy

## I. NUMERACY: WHAT IS IT FOR?

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- A decade of focus on numeracy
  - In 1997 Adelaide Declaration asserted that all students should have “attained the skills of numeracy and English literacy, such that every student should be numerate, able to read, write, spell and communicate at an appropriate level”
  - In 2001, \$7M on state initiatives
- Australian National Curriculum – cross disciplinary focus

## Are literacy and numeracy privileged? Melbourne Declaration (2008)

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- Literacy and numeracy and knowledge of key disciplines remain the cornerstone of schooling for young Australians. Schooling should also support the development of skills in areas such as social interaction, crossdisciplinary thinking and the use of digital media, which are essential in all 21st century occupations. As well as knowledge and skills, a school's legacy to young people should include national values of democracy, equity and justice, and personal values and attributes such as honesty, resilience and respect for others.



# Melbourne Declaration

## Two Goals of Education

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- Goal 1: Australian schooling promotes equity and excellence
  
- Goal 2: All young Australians become:
  - successful learners
  - confident and creative individuals
  - active and informed citizens

# Melbourne Declaration

## Active Citizenship

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- acts with moral and ethical integrity
- appreciates Australia's diversity & culture
- contributes to, reconciliation between Indigenous and non-Indigenous Australians
- committed to values of democracy, and justice
- is able to communicate across cultures, especially the cultures and countries of Asia
- works for the common good, ... sustaining and improving natural and social environments
- is responsible global and local citizens



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- Tensions between numeracy for work and economic well being of individual and society and numeracy for citizenship – The preamble to the Goals says:

Improving educational outcomes for all young Australians is central to the nation's social and economic prosperity and will position young people to live fulfilling, productive and responsible lives" (p.7).



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## Does it make a difference?

- Yes it does
  - Traditional practices in mathematics education
  - Situated learning



## Challenge for research and policy agendas

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- How do we construct an understanding of, measure and develop numeracy to achieve goal of active citizenship

## II COMPLEXITY IN NUMERACY EDUCATION

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- Not a synonym of mathematics. But is it a subset of mathematics or more than mathematics? Perhaps different?
- Numeracy across the curriculum. Not only applied to other subjects but co-developed in them.
- Widely accepted understanding “Numeracy is the effective use of mathematics to meet the general demands of life at school and at home, in paid work, and for participation in community and civic life”



## Is numeracy practical mathematics?

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- Practical mathematics is not same as “low level” mathematics
- “Practical” denotes its origin and aim – i.e. in contrast to its contribution to the conceptual field of mathematics
- Multidimensional: using, choosing, having disposition and evaluating the use of mathematics – with implied increasing levels of numeracy



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- Distinction is made by Gutstein between “functional” and “critical” numeracy
  - Using Freire’s terms critical numeracy is “the ability to read the world and write the world” through mathematics



## Complexities in the connecting numeracy to real world

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- Abstraction from real world. However this is not unproblematic. It hides aspects that are important in real life. (E.g. shopping for best bargain)
- Undoubtedly mathematics is essential to participate in everyday life and economic wellbeing. However, it gives power and privilege to people who have a chance to develop it – social inclusion and exclusion are crucial matters.

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- Mathematics has a role in understanding social life – but it has a role in controlling life (value of meaning to value of utilisation)
  - this utilisation creates reality of the world - it is hard to think of any other way of seeing the world - i.e. mathematics formats the world.



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- Often connections are made to physical world and business world – less often to social world – numeracy is often seen as objective hence there is avoidance of dealing with controversial issues.
  - Mediated by technology which hides much of the mathematics (demathematisaion of lifeworld)



## ATN student

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- While engineering graduates will always need a proficient level of maths, ... Universities ... were still concentrating on many of the 'old' maths and science skills which were no longer required, or required to a much lesser degree. ... There was uniform agreement from all graduates in all focus groups that much of the mathematics included in their courses was never required in the workplace and that the time could have been better spent on other areas. Telecommunication engineers and aerospace engineers had the least positive comments [and] reported that it was their belief that their courses did not reflect what the workplace required and this was an issue for them in the workplace [Australian Technology Network of Universities (ATN), 6, p.2].



## Further Complexities

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- What are the needs for tomorrow?
- Uncertainty in outcomes – many of the greatest developments in lifeworld are associated with mathematics, but also some of greatest destructive forces
- Foucault reminded us that “every thing is dangerous”



## Challenges for research and policy agendas

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- Different dimensions of numeracy
  - Choosing and using mathematics to solve problem and understand the world
  - Critical of mathematics assumptions and limitations
  - Ability to use mathematics to understand the world
  - Numeracy in context vs numeracy on tests

### III ETHICAL FOUNDATION OF CRITICAL NUMERACY

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- Shall we turn to philosophy?
  - Western Philosophy dominated by ontology and epistemology
  - Avoidance of foundational and essentialist understandings
  - In postmodern times, ontology is understood as epistemology, leading to
  - Avoidance of normative considerations

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- Shall we turn to social justice?
    - Justice itself is contested – they are claims not theorems
    - Social justice for one group may be perceived as injustice to another
    - Individual vs group membership



## Ethics as “foundation”

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- Levinas constructs ethics not as a set of principles or rules to determine what is “good to do” or “good to be”
- Based on inescapable “responsibility” of one to the other whenever we encounter an Other
- Comes before identifying similarity and does not reduce the other to the self. Not based on knowledge



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- “unlimited, measureless responsibility toward each other that is in continuous excess over any formalization of responsibility in the law and stated ethical principles” Roth (2007).
  - Responsibility = Response-ability



## Challenge for research and policy agendas

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How can we support the responsibility of the numeracy educator to support the response-ability of the learner?



## IV IMPLICATIONS FOR NUMERACY DEVELOPMENT (WITH SOME EXAMPLES)

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- Worthwhile numeracy is one that promotes ability of student to respond to demands of their lifeworld
- Develop numeracy through engagement with real world and at once apply numeracy to understand the lifeworld
- Aims at understand the lifeworld and change it

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- Lifeworld includes social world
  - Implies dealing with questions of values
  - Social justice is automatically implied by an ethical perspective
  - Achieve social justice through and in numeracy education

## Examples

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- 1. Is McDonalds good for you?
- 2. How high a wall should we build?
- 3. Students as researchers.

## Challenges for research and policy agendas

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- How do we develop sustainable embedding of numeracy without dumbing down of capacities to deal with mathematical situations with understanding and power
- Embedding is more than just interdisciplinary – it should relate to the whole of students' lifeworld

