ICME 2008

Monterrey

Key Ideas

- Chance Encounters
- Attainment targets in England
- Test questions
- Conclusions

Ten Statements

- People use personal experience in assessing chance in a rather haphazard manner
- People process information in a rather incomplete way
- People process information in a way biased by memorable events
- People find it hard to assess probabilities which are very low or very high

Ten Statements (continued)

- People do not assign values of 0 for impossibility and 1 for certainty
- People equate certainty and impossibility with physical rather than logical events
- People equate 50-50 chances with coin tossing
- People assign equal likelihood in unknown situations

Ten Statements (continued)

- People are incoherent in assigning and in processing probabilities
- People are supra-additive

England

- Statistics (data) taught more than probability, however risk is also seen as important.
- In England attainment targets (tested) and programmes of study (taught).
- Year 6, grade 5, age 11- Level 4;
- Year 9, grade 8, age 14-Level 5;
- Year 11, grade 10,age 16 –Level 6
- Year 11, grade 10, age 16 –Level 7+ (top 25%)

Attainment targets

- Appendix 1 gives ATs for probability
- L5: 0-1 scale for probability; equal likelihood and experimental approaches;
- L6: outcomes of two experiments; mutually exclusive events.
- L7: use of relative frequency.
- L8: samples and inference; two independent mutually exclusive events.

Content

- Focus is on equal likelihood and experimental probability but not subjective probability (which is hard to teach).
- Limited reference to misconceptions.
- No reference to risk.

Test Questions

- Tokens – gold and silver tokens
- Spinners: pentagon 1-5 or hexagon 1-6 and probability of getting 1; then two hexagons but one was larger.
- Pots: chance of cracking when fired.

Test Results

- Tests show good facility with basic notions – *Tokens* (top 75% of pupils)
- Some issues on next question – *Spinners* (top 50% of pupils)
- When to add or multiply probabilities found difficult – *Pots* (top 5% of pupils) This is quite fundamental and can lead to probabilities above 1.

Conclusions

- Much progress in teaching probability since 1960s from 1980s in England
- This is due in no small measure to ICME, ICoTS and IASE
- Progress in this century has been less marked, perhaps even some regression
- Handling of risk and uncertainty is no less important
- Some way to go on the 10 statements