The Open University

0.74708

Seventy-five per cent

3/4

almost three quarters

around three in four

74.7%

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GENERATING INTELLIGENT DESCRIPTIONS OF NUMERICAL QUANTITIES FOR PEOPLE WITH DIFFERENT LEVELS OF NUMERACY

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Given an input value between 0.000 and 1.000, the planner models a proportion as a constraint logic problem over 3 variables: mathematical form, precision, and hedge.

Planner output

	First	Second
Math. Form	Fraction	Percentage
Precision	Less precise	More precise
Hedge	>	-

A-level results show record number of A grades
Record numbers of teenagers have received top A-level grades
By Graeme Paton, Education Editor

More than a quarter of papers were marked A as results in the so-called gold standard examination reach a new high.

…
According to figures released today by the Joint Council for Qualifications, 25.9 per cent of A-level papers were awarded an A-grade this summer …

(Daily Telegraph, 14 August 2008)

Example showing how the planner's output will be used to generate numerical expressions in a document

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HEDGING and ROUNDING

Hedging

… after 40 years of steady increase the resident population has plummeted by almost a third in the past five years.
(Independent, 4 June 2008)

We studied the interaction between hedge phrases (e.g., *more than, around, smaller than*) and precision (rounding) in a corpus of numerical expressions.

Rounding

An habitable super-Earth $(5M_{\oplus})$ in a 3-planet system
… The minimum mass of the 2nd new planet is 5.03 terrestrial mass …
(Astronomy & Astrophysics, 25 April 2007)

Results

	Rounded	Not Rounded
Hedged	200	243
Not Hedged	143	652

Interactions

Rounding occurs more often with hedge numbers than with non-hedged ones.

Hedging occurs more often with rounded numbers than with non-rounded ones.

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MATHEMATICAL COMPLEXITY IN NUMERICAL EXPRESSIONS

'According to latest figures, around 23.8 million adults have numeracy skills below a C grade GCSE. This includes 6.8 m without even the most basic functional maths skills needed to pay household bills, understand wage slips and read train timetables.'

(Telegraph, June 5 2008)

'A Claude Monet painting has fetched a record £40.9m ($80.5) for the artists work at an auction in London.'

(BBC, June 25 2008)

We developed a preference function used in generating numerical expressions for people with different levels of numeracy from a scale based on the Mathematics Curriculum for Schools.

Mathematics Curriculum Levels.

Level 3 ← → Level 8

'After previously reported variants in FTO, the strongest association signal (rs17782313, $P = 2.9 \times 10^{-6}$) mapped 188 kb downstream of MC4R …'

(Nature, Nov 11 2007)