

Improving Learning & Assessment with Confidence-Based Marking (CBM)

Tony Gardner-Medwin



Sound knowledge needs strong roots. Find them and think about them !

To be sure of an answer, you must:

- *think where it comes from*
- *relate it to other things*
- *justify it*

CBM marks each answer according to the student's degree of certainty that the answer is correct.

Degree of Certainty :	C=1 (low)	C=2 (mid)	C=3 (high)	No Reply
Mark if correct:	1	2	3	0
Penalty if wrong:	0	- 2	- 6	0

CBM discourages superficial learning and rewards students who can distinguish rigorous and reliable results from uncertain conclusions or guesses.

Our dissemination project will help you trial it – in any situations where answers are either right or wrong.

The website: www.ucl.ac.uk/lapt

... for all issues (explanation, practice, publications, advice, tools, help).

With **CBM** you think about justification

.... You gain:

EITHER if you find reasons for high confidence

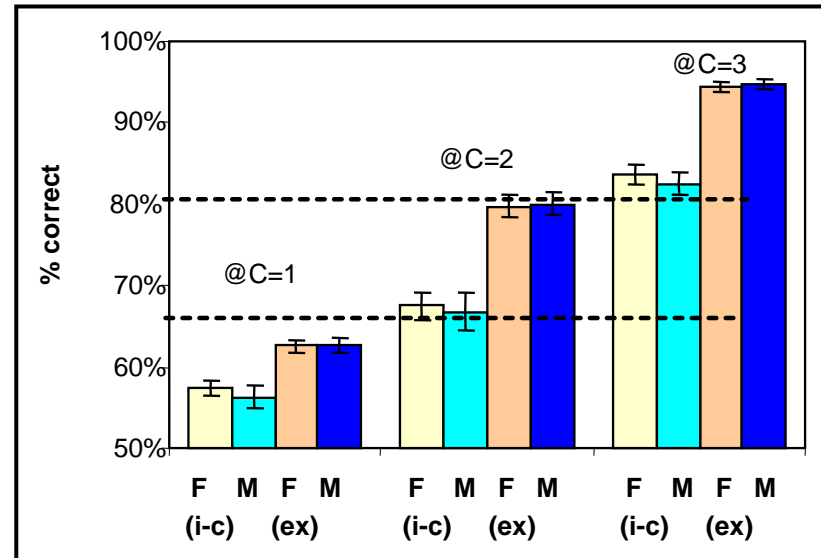
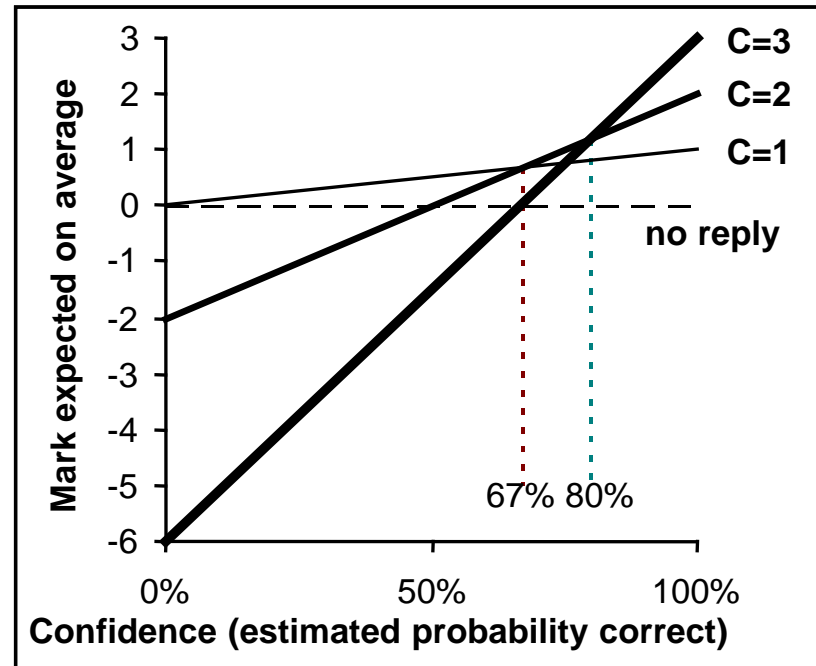
OR if you see reasons for reservation.

Given your confidence, the best C level is the one with the highest graph.

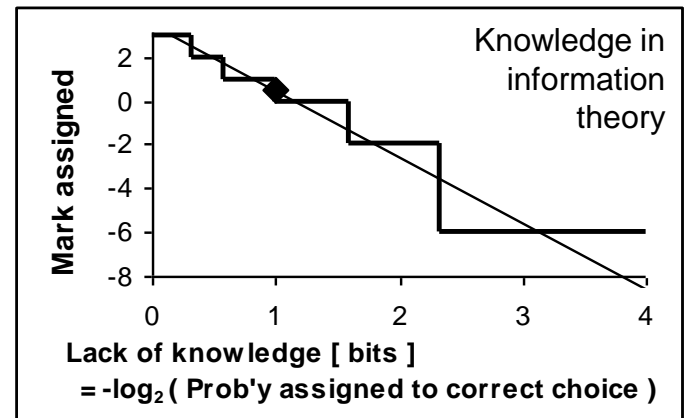
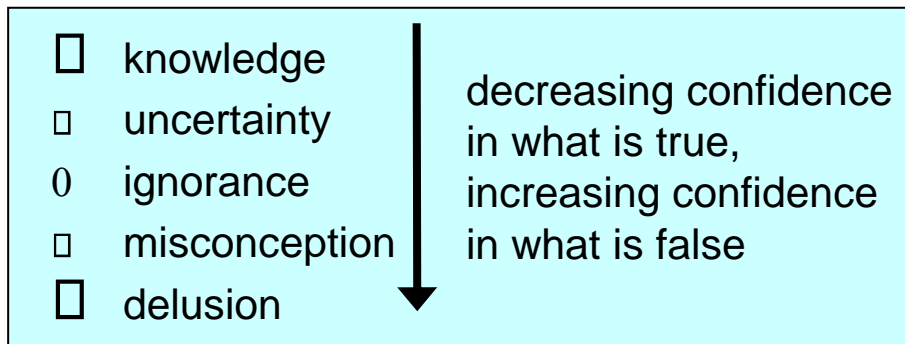
How well do students discriminate reliability?

For both in-course (i-c) and exam data (ex) the % correct at each C level is within the optimal band. (The graph shows means \pm 95% confidence limits, cohort: 331 students).

There are no gender differences, but both sexes (F, M) are more cautious in exams.



What is knowledge anyway ?



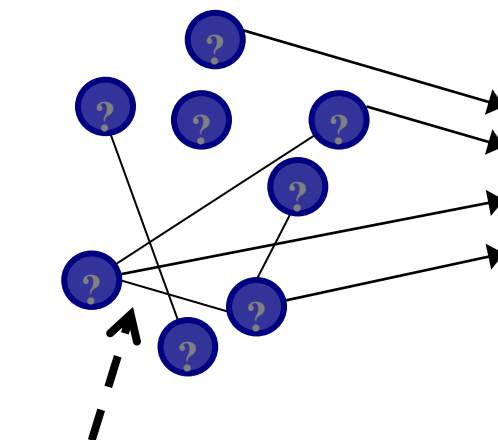
Knowledge is justified true belief. Proper justification requires understanding.

What is understanding?

To understand = to link correctly the facts that bear on an issue.

(This is how you tell a student from a parrot!)

Nuggets of knowledge



Networks of understanding

EVIDENCE



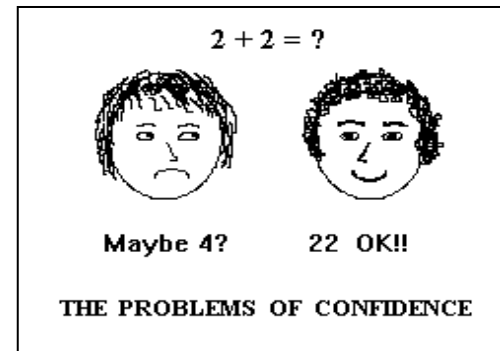
Confidence-based marking places greater demands on justification, thereby stimulating understanding

Principles that students seem readily to understand :-

- If you don't know when knowledge is reliable, you will have problems in later learning
- confident errors are worse than ignorance: a wake-up call (-6!) to attend to explanation
- expressing uncertainty when you are uncertain is a good thing (t.blair please note!)

Does CBM favour certain personality types?

- Practised students show neither gender or ethnic differences
- Diffident & self-confident people may be attractive – but should not generalise this inappropriately to academic conclusions
- 'Correct' calibration is objective, desirable and trainable with experience & feedback from CBM



Practical Issues (see handout for more detail)

- Use software at UCL, or install it yourself. Help is available, e.g. linking to a VLE
- CBM applies to any discipline, and you don't need any special question types
- Your students will like CBM (if your questions are good!) and want it in exams
- In exams, CBM scores have greater reliability (mean Cronbach $\alpha = 0.975$ vs. 0.873 for % correct, 6 exams, $P < 0.001$), giving better discrimination with shorter exams.

We fail if we mark a lucky guess as if it were knowledge.

We fail if we mark delusion as no worse than ignorance.

Good graduates are the ones who know when their work is good.

F M F M
(i-c) (ex)

F M F M
(i-c) (ex)

F M F M
(i-c) (ex)

F M F M
(i-c) (ex)

F M F M
(i-c) (ex)

F M F M
(i-c) (ex)