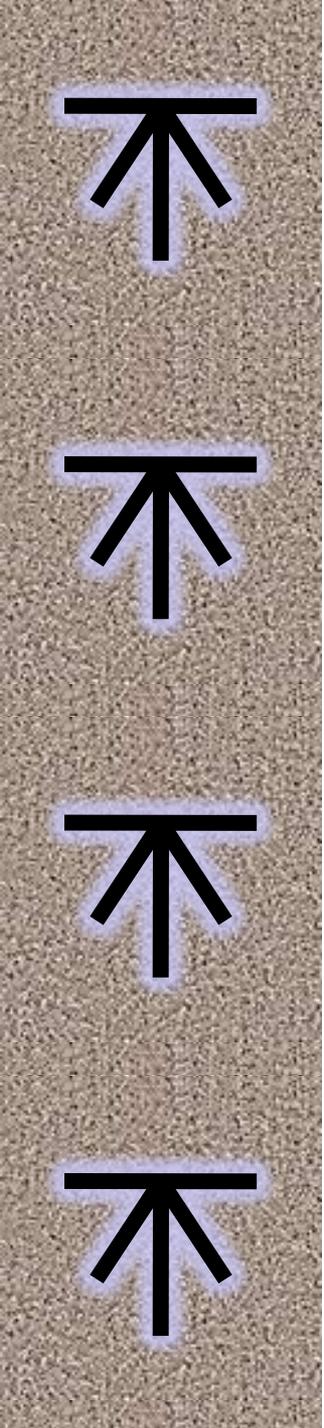


Innovations in Numeracy Support for Healthcare

Establishing the case for a numeracy assessment benchmark in nursing: Background & rationale

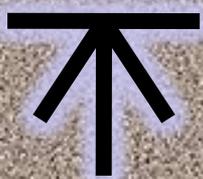
NHS Education for Scotland (NES) Numeracy Reference Group

- Mike Sabin (NES)
- Associate Professor Carol Hall (University of Nottingham)
- Dr Meriel Hutton (Consultant)
- Dr David Rowe (Strathclyde University)
- Dr Keith W Weeks (University of Glamorgan; Authentic World Ltd)
- Professor Diana Coben (King's College London)
- Norman Woolley (University of Glamorgan; Authentic World Ltd)

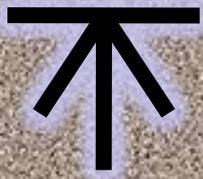


Synopsis of Morning Presentation

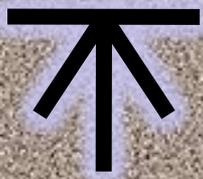
- Establishing the case for a numeracy assessment benchmark in nursing: Background & rationale
 - NMC requirements
 - The rationale for a 'benchmark' assessment
 - Challenges and opportunities.
 - Criteria for a benchmark



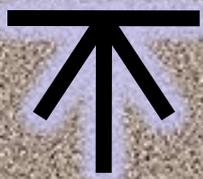
NMC Essential Skills Clusters (ESCs)

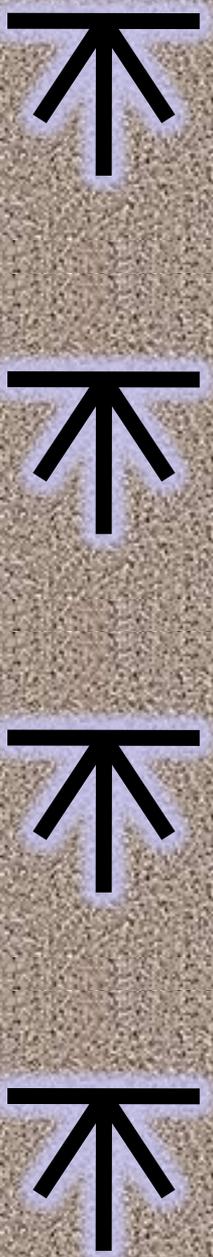


Proxies for broader competence – *the bits that aren't covered by Skills Clusters*



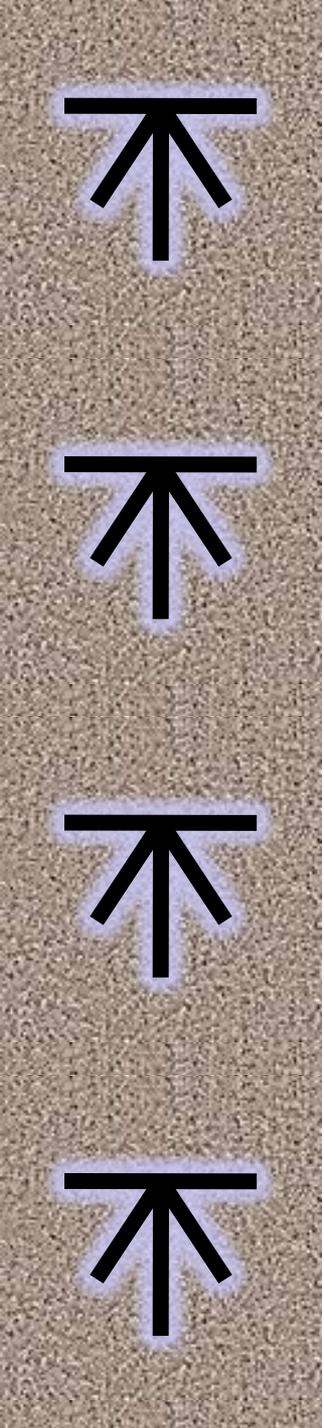
Proxies for specific competencies – *how wide or specific the focus?*





NMC Essential Skills Clusters (ESCs)

- **Medicines management**
- **Summative health-related numerical assessments** - to test calculation skills associated with medicines, nutrition, fluids and other areas requiring the use of numbers relevant to the field of practice
- For **entry to the branch** - ESCs to inform the nature and content of assessment, including whether to assess through simulation. Providers to determine pass mark and number of attempts.
- For **entry to the register** - ESCs to inform the nature and content of numerical assessment in the branch programme where a **100% pass mark** is required and **all assessment must take place in the practice setting**. The number of attempts is to be determined by the education provider.



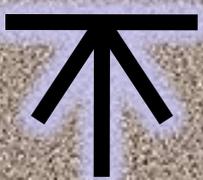
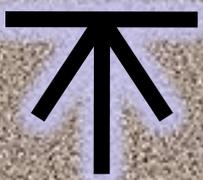
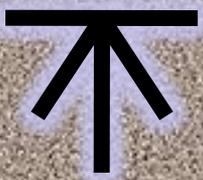
NMC Essential Skills Clusters (ESCs)

- The ESCs must be in place for **all new students** commencing nursing programmes from September 2008.
- It is for programme providers to determine and demonstrate how these are integrated, applied and assessed within local assessment schemes.

What is competence?

... in the eye of the recipient of evidence of that competence, be it Higher Education Institutions, Regulators, Employers or Service Users.

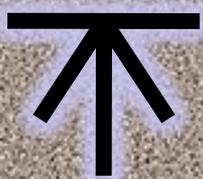
(Hutton, 2004)



What is Assessment?

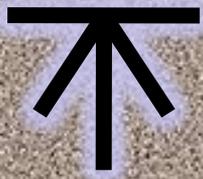
*The organised pursuit of the
unattainable and unobservable?*

- Demonstrate excellence in one area to infer ability in another
- Demonstrate adequacy across a range

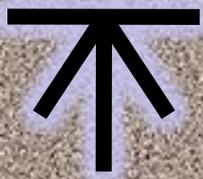


Why Numeracy? The myths...

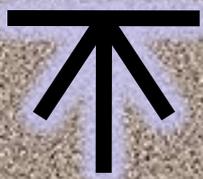
Nurses can't do Sums!



More nurses than in 'the old days' can't do sums!



Nurses who can't do sums make drug errors!



Nurses won't make drug errors if they learn their sums!

Why Numeracy? The reality...

Numeracy is a key skill for professional practice in nursing

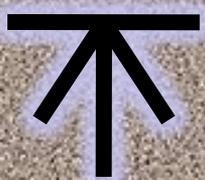
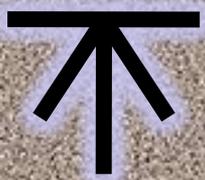
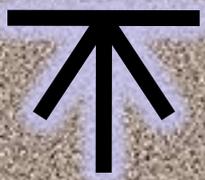
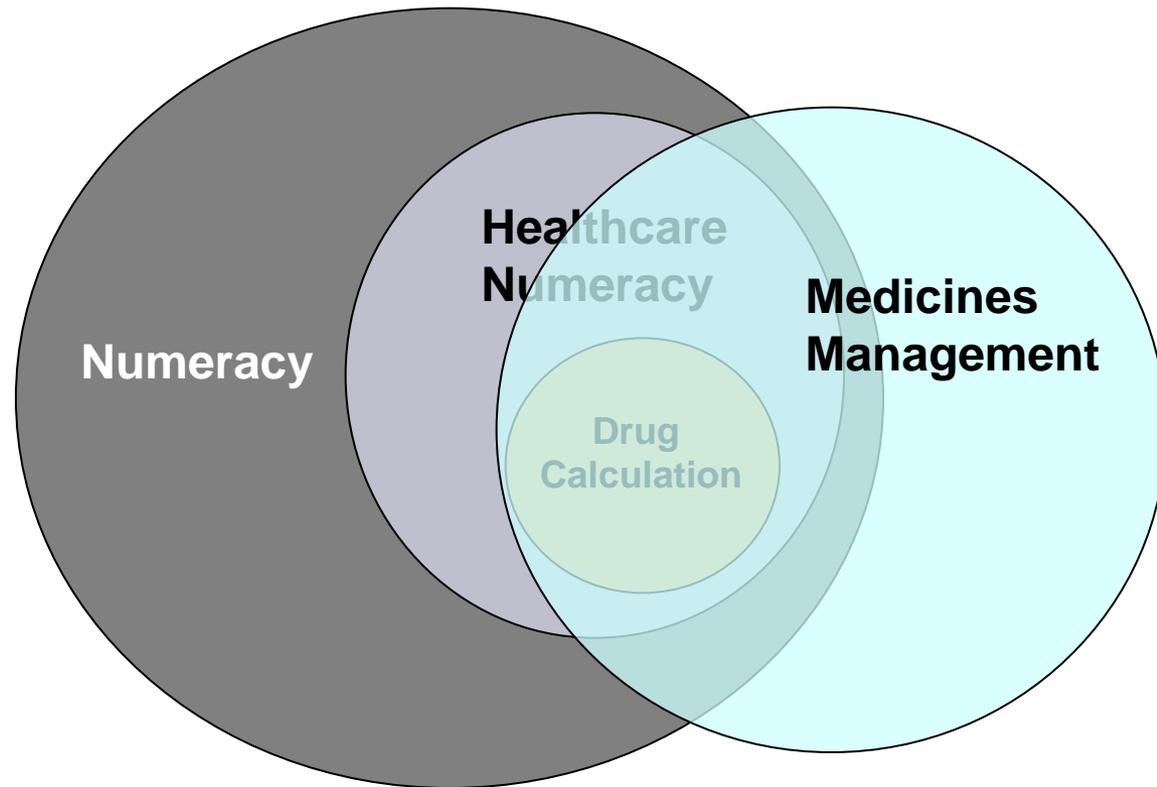
There is a substantial literature associated with nursing calculation competence in calculation

Drug calculation is only one part of medicines administration and most drug errors are not related to calculation error.

Drug Calculation is the most visible and commonly cited sub-set of 'healthcare-related numeracy',

A number of different tests - variation in their style, content, reliability and validity.

What is Competence in Numeracy?



What is Competence in Numeracy?

- *'Nursing Numeracy' can be seen as a form of 'sociomathematics' (Wedegge 2003)*
- *Numerical components are embedded within contextually specific procedures, and competence requires 'techno-mathematical literacy'. Hoyles et al (2002)*
- *Workplace cultures, with instruments, rules and divisions of labour tend to disguise or hide mathematics (Williams & Wake, 2007).*
- *Importance of effective use, not just knowledge and skills, and purpose, in making sense of use*
- *The situatedness of numeracy, shaping its use and purpose, is important, as is critical engagement on the part of the numeracy 'agent' (Coben et al., 2003; Condelli et al., 2006).*

What is Competence in Numeracy?

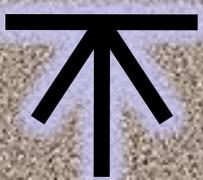
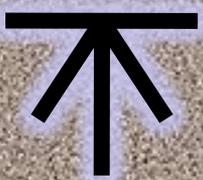
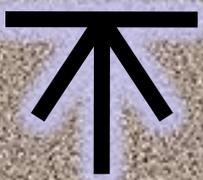
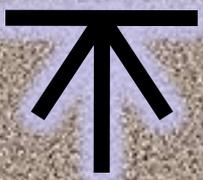
Should be able to demonstrate;

- independence
 - good critical judgment
 - proficiency in practice
 - accountability to relevant stakeholders.
-
- Assessment for numeracy in nursing must be formative (for effective learning) and summative (for accountability) (William & Black, 1996).
 - Assessment is inevitably a measure of the here and now, and of performance in relation to a particular question or situation, but the critical value of any competence assessment lies in its ability to predict likely future performance in a particular activity.

What is Competence in Numeracy?

To be numerate means to be competent, confident, and comfortable with one's judgements on whether to use mathematics in a particular situation and if so, what mathematics to use, how to do it, what degree of accuracy is appropriate, and what the answer means in relation to the context.

(Coben, 2000, p.35)



What is Competence in Nursing Numeracy?

NOT (for example in an injection dosage problem):

What I want X What it comes in = **what I give**
What I've got

Or

25mg X 10ml = 2.5ml
100mg

... but whether, when presented in a particular context with a prescription with a specified dose, an ampoule with a particular strength/volume, and a choice of syringes to draw it up into, that the student and practitioner can manipulate these to produce the correct prescribed dose to be administered.



Regulation: *Nursing numeracy as an element of Fitness to Practise, Fitness for Purpose and Fitness for Award*

- **Entry to pre-registration nursing programme**

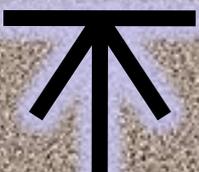
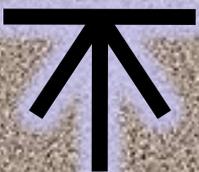
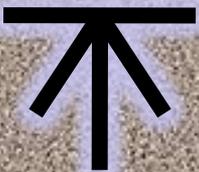
Standards for numeracy as specific component within general entry requirements for pre-registration programmes.

- **Entry to Branch**

Correctly and safely undertake medicines calculations: Is competent in basic medicines calculations

- **Point of Registration**

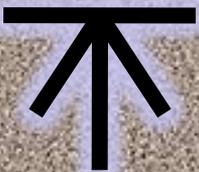
Correctly and safely undertake medicines calculations: Accurately calculates medicines frequently encountered within Branch



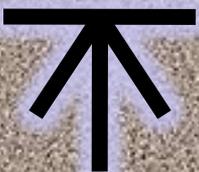


Regulation:

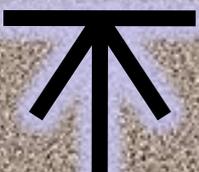
Nursing numeracy as an element of Fitness for Practice, Fitness for Award, Fitness for Purpose and

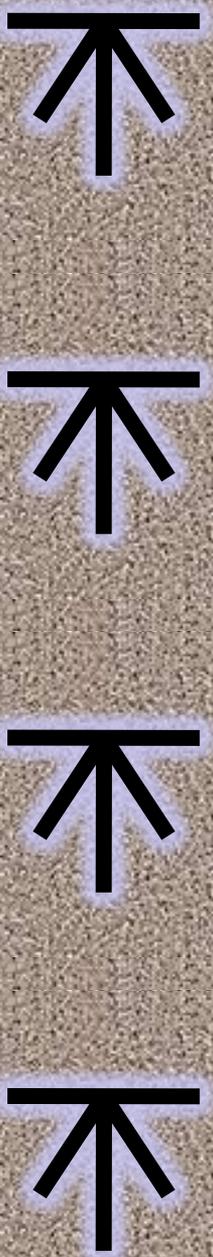


Entry to register: the key stage - fitness for Practice and Fitness for Award



Fitness for purpose – the employers' perspectives





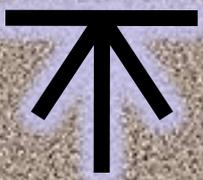
What a benchmark assessment should look like: Principles to inform development

- ***Realistic:*** (Hutton, 1997; Weeks, 2001, 2007)
- ***Appropriate:*** (OECD, 2005; Sabin, 2001).
- ***Differentiated:*** (Hutton, 1997).
- ***Transparent:*** (Weeks et al 2001).
- ***Well-structured:*** (Hodgen & Wiliam, 2006)
- ***Consistent with adult numeracy principles:***(Coben, 2000).
- ***Diagnostic:*** (Wiliam, 2006)
- ***Easy to administer:*** (Black & Wiliam, 1998).

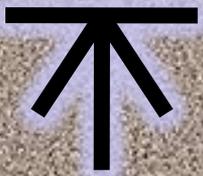
What a benchmark assessment should look like...

- *The prototype assessment tool was developed in 2007 based on the Authentic World® program developed by Weeks & Woolley.*
- *Program is based on a constructivist-centred design drawn from the work of Piaget (1983), Bruner (1975), and von Glasersfeld (1987).*
- *This framework facilitates authentic diagnostic assessment of a student's dosage calculation ability using interactive representations of the tablets, syringes, medicine bottles etc used in clinical practice (Weeks, 2007)*
- ***We are currently engaged with a number of academic institutions in Scotland to validate this virtual model against a mirror-image 'real'life' OSCE series. This evaluation process will take place throughout 2008, with results available in early 2009.***

The benchmark – Summary



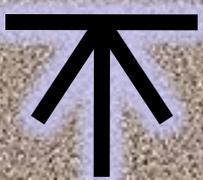
Ensure consistency across education providers in meeting the requirements of all stakeholders, be they providers of education, the regulator, employers or the students themselves.



Any benchmark needs to consider the levels of numeracy competence identified above and to include a strong element of process as well as outcome, based on available research evidence.



A test of ability to calculate drug dosages competently by the end of 'training' should be the culmination of a programme of education and formative assessment which begins at entry to the programme and is continuous throughout the three years of the programme.

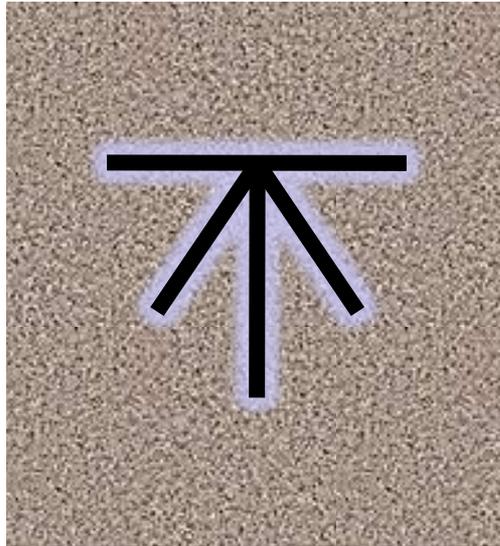


Establishing a robust competence benchmark at this stage will allow practitioners to demonstrate achievement, universities to demonstrate effective learning and teaching strategies, and employers to support governance and patient safety.

Definition of a 'Benchmark'

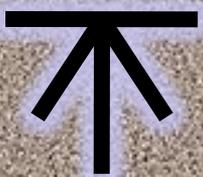
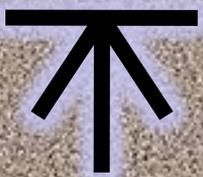
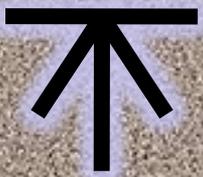
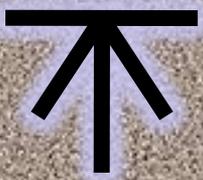
Originally:

- The chiseled horizontal marks that surveyors made in stone structures
- Usually indicated with a chiseled arrow below the horizontal line.
- It was a set point or a place of reference.



More Recently:

- A point of reference from which measurements may be made
- Something that serves as a standard by which others may be measured or judged
- A standardized test that serves as a basis for evaluation or comparison



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