



The NES Numeracy Benchmarking Project

Royal College of Nursing
Joint Education Forums' International
Education Conference
Thistle Hotel Glasgow
11 -13 June 2009



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Background

Nursing numeracy manifestly matters: to patients, to nurses themselves, to their employers, to the public and to nurse educators (Coben 2008)

.....Yet there remains no consensus with regard to the level or assessment of this critical area of nursing.

This is the case nationally in the UK and globally.



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How can a benchmark assessment support students and teachers?

Students in nursing must be:

- prepared effectively
- supported most effectively by their lecturers and;
- employable

Variation in outcome measures for numeracy mean students learn to succeed by numbers, playing 'dot to dot' but may struggle to see a whole picture



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Working with Numbers

If students, lecturers, practitioners and employers are allowed to know what numeracy to expect of registrants at the end of nursing programmes - the whole picture is clear to see

Lecturers can facilitate working with numbers to help students to gain the skills to meet their knowledge needs as well as to achieve the final outcome



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Benchmark assessment study aims

To determine the numeracy skills needed for successful calculation of medicine dosages in clinical practice and the valid assessment of these

1. Development of an evidence-based benchmark of skills required for medicines calculation
2. Comparison of assessment mechanisms for validity and reality



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Study Outline

- Pilot study in England – sample frame of 50 students from 1 University, of which up to 20 will complete full assessment
- Main study in Scotland - sample frame of 500 students from 6 Universities, of which up to 100 will undertake full assessment

Today's presentation will discuss pilot outcomes and the potential implications of preliminary findings



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The pilot study

- 50 English student nurses at beginning of 3rd year undertook a computer based numeracy assessment including 28 medication calculation task activities
- 9 students undertook a further computer assessment and also a practical activity
- 9 Students were asked to evaluate both methods of assessment for authenticity and ease of use



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Main Study

- 54 students from across 6 Universities in Scotland participated in the main study and completed the practical and the computer analysis
- Students also evaluate the usefulness and reality of the packages appraised
- Full analysis is ongoing and will report in September 2009



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The computer activity

Question 22 of 30

Extract the relevant information from the prescription chart and the medication product label. Calculate the correct dose to administer and choose the appropriate syringe with which to administer it.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

REGULAR PRESCRIPTION MEDICINES			DATE
MEDICINE (Approved Name)		START DATE	ADMINISTRATION TIMES
Ampicillin		3/10/2007	06:00
DOSE	ROUTE	SPECIAL INSTRUCTIONS	19:00
500mg	I.M.	-	22:00
DOCTOR'S SIGNATURE		PHARMACY SUPPLY	
Dr. Jones		A. Mann	



1ml 	5ml 	20ml 
2ml 	10ml 	



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The computer activity

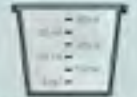
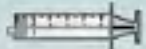
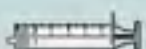
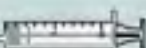
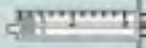
Question 11 of 30

Extract the relevant information from the prescription chart and the medication product label. Calculate the correct dose to administer and choose the appropriate method with which to administer it.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

REGULAR PRESCRIPTION MEDICINES			DATE
MEDICINE (Approved Name)		START DATE	ADMINISTRATION TIMES
Chlorpromazine Hydrochloride		1/10/2007	06:00
DOSE	ROUTE	SPECIAL INSTRUCTIONS	
25mg	ORAL	-	19:00
DOCTOR'S SIGNATURE		PHARMACY SUPPLY	
Dr. Jones		A. Martin	22:00



 Medicine Pot	5ml 	5ml 
	10ml 	10ml 

Evaluation

SECTION 2: HOW CLOSELY THE ASSESSMENT TASKS REPRESENT MEDICATION DOSAGE AND IVI CALCULATION REQUIREMENTS IN CLINICAL PRACTICE.

2a: The assessment tasks represent an accurate method for measuring the medication dosage calculation requirements experienced in clinical practice.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Computer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2b: The assessment tasks represent an accurate method for measuring the IVI calculation requirements experienced in clinical practice.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Computer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2c: The time taken to interpret, calculate and complete the medication dosage and IVI calculation problems in the assessment is representative of the time taken in clinical practice.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Computer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please make any additional comments here:

Additional Comments:



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Small glass vials on the top shelf, likely containing vaccines or sterile solutions. Labels are partially visible but illegible.

Top shelf of brown glass bottles with white labels:

- Amoxicillin 500mg
- Clarithromycin 500mg
- Flucanazole 500mg
- Levetiracetam 500mg
- Metformin Tartrate 500mg
- Zopiclone 7.5 mg

Middle shelf of brown glass bottles with white labels:

- Baclofen 50mg/5ml
- Metformin 500mg
- Nabumetone 500mg
- Sodium Bicarbonate 200mg

Bottom shelf of the refrigerator door containing several white plastic containers, possibly for oral care or hygiene.

Bottom shelf of the refrigerator containing several white plastic containers, possibly for oral care or hygiene.

Cardboard box in the foreground containing several syringes and vials, likely for medical use.

REGULAR PRESCRIPTION MEDICINES NAME Jo Smith

1. Medicine (approved name) **Backlofen** Dose **5 mg**

Route	Other directions	Pharm	HP
Orally		12	14
Start Date	Signature	Stop date	
18/09/08	Dr Laycock	18	22

2. Medicine (approved name) **Nitrazepam** Dose **25 mg**

Route	Other directions	Pharm	HP
Orally		12	14
Start Date	Signature	Stop date	
18/09/08	Dr Laycock	18	22

3. Medicine (approved name) **Verapamil Hydrochloride** Dose **160 mg**

Route	Other directions	Pharm	HP
Orally		12	14
Start Date	Signature	Stop date	
18/09/08	Dr Laycock	18	22

4. Medicine (approved name) **Mefenamic Acid** Dose **300 mg**

Route	Other directions	Pharm	HP
Orally		12	14
Start Date	Signature	Stop date	
18/09/08	Dr Laycock	18	22

5. Medicine (approved name) **Nabumetone** Dose **0.5 g**

Route	Other directions	Pharm	HP
Orally		12	14
Start Date	Signature	Stop date	
18/09/08	Dr Laycock	18	22

6. Medicine (approved name) **Sodium Valproate** Dose **1g**

Route	Other directions	Pharm	HP
Orally		12	14
Start Date	Signature	Stop date	
18/09/08	Dr Laycock	18	22



Handwritten calculations on a piece of paper:

$$\frac{40}{100} \times 100 = 40\%$$

$$\frac{50}{100} \times 100 = 50\%$$

$$\frac{200}{5} \times 100 = 40000$$

$$\frac{10}{25} \times 100 = 40\%$$

$$\frac{1}{2.5} \times 100 = 40\%$$

$$\frac{2.25}{100} \times 100 = 2.25\%$$

$$\frac{0.25}{100} \times 100 = 0.25\%$$

1.5mg = 1500mg
 0.6g = 600mg
 25mg
 1000
 25
 40% = 0.4ml



Pilot Findings

- A high level of congruence (81% mean) was identified between the participants responses in the computer and practice - but sample very small
- Issues noted in both the pilot study and observed in the main study, relating to the technical measurement of medicines – this has changed thinking about numeric competence and associated thinking around what competence might mean



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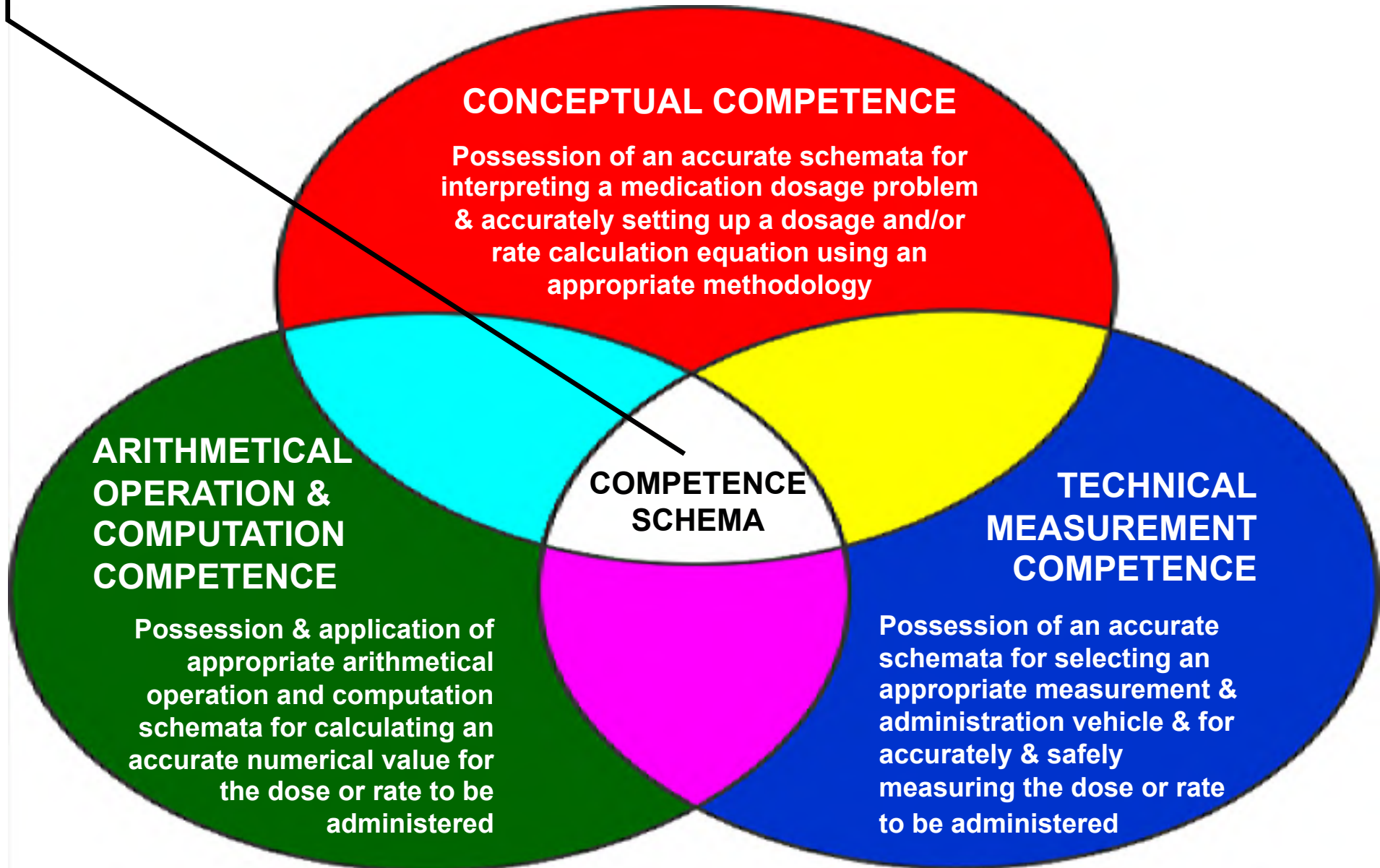


Summary of Pilot Data Results

Congruence Between Authentic Computer Assessment &
Simulated Practice Assessment (mean 81%)

	Minimum Congruence	Maximum Congruence	Mean Congruence
Tablets & Capsules	89%	100%	98%
Liquid Medicines	44%	89%	74%
Injections	56%	89%	73%
IV Infusions	67%	100%	80%

Competence in Medication Dosage Calculation Problem-Solving



Next Steps

- Data Analysis is ongoing on main study and results should be with NES by the end of July
- A new web page for the project will be launched in September, directly linked to the NES web pages
- This will allow other Educators to use the exemplar benchmark assessment for comparison in assessing programmes and methods of assessment and to comment and add to current knowledge



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What about the benchmark?

The final content and level of any benchmark for the profession must be agreed by the profession itself.

However, this project evaluated the use of 2 assessment techniques using parameters of level, depth and breadth identified by experts in the field, it also used authentic clinically based problems from practice.

Evaluation of the exemplar by the profession via the new website will refine and confirm assessment methods and content and thus establish and further validate a benchmark for the future.



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