

# QUESTIONS, QUESTIONS, QUESTIONS

Investigating differences in the way functions  
are examined in NSC, NBT and MAM1000W

PART OF THE UCT MAMI000W  
CURRICULUM REDESIGN PROJECT

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WHY ARE WE  
INVESTIGATING THIS?

- Reading CAPS, one would think that students have the necessary background for university mathematics
- Pass rates indicate that this is not the case
- One possible cause could be that topics are examined differently
- If this turns out to be the case, explicitly helping students understand the different way topics are examined at university might be helpful

## WHAT DID WE DO?

- Questions about functions are common to the NSC, NBT and MAMI000W decant test
- Analysed all the questions on functions in 2 NSC papers, 1 NBT paper and 2 MAMI000W decant test, according to
  - ❖ Number of concepts tested
  - ❖ Number of steps required for solution
  - ❖ **Task type (more details shortly)**
  - ❖ Mark allocation

# MATHEMATICS ASSESSMENT TASK HIERARCHY

- Smith et al, 1996, Constructing mathematical examinations to assess a range of knowledge and skills, International Journal of Mathematical Education in Science and Technology, 27 (1): 65-77
- A taxonomy for understanding the skills needed to correctly answer mathematics questions
- No implied hierarchy of difficulty; it is simply the nature of the skill(s) required that is being assessed
- Three main types of tasks, with further subdivisions within each group

## GROUP A

Tasks requiring routine  
procedures

### **1. Factual Knowledge and Fact Systems**

1.1 Recall previously learned information in the form that it was given

### **2. Comprehension**

2.1. Decide whether or not conditions of a simple definition are satisfied.

2.2. Recognize examples and counterexamples

2.3. Understand the significance of the symbols in a formula & be able to sub in

### **3. Routine Use of Procedures**

3.1. Use a procedure/algorithm in a familiar context. When performed properly, everyone solves the problem correctly, in the same way. Students were previously exposed to these in drill exercises.

## GROUP B

Using existing mathematical  
knowledge in new ways

### **1. Information Transfer**

- 1.1 transformation of information from one form to another - verbal to numerical or vice versa
- 1.2 deciding whether or not conditions of a conceptual definition are satisfied.
- 1.3. recognizing the applicability of a formula or method in different or unusual contexts

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### **2. Application in new situations**

Ability to choose and apply appropriate methods or information in new situations, including the following:

...

- 2.3. extrapolation of known procedures to new situations

## GROUP C

Application of conceptual knowledge to construct mathematical arguments

### **1. Justifying and interpreting.**

Ability to justify and/or interpret a given result or a result derived by the student.

### **2. Implications, conjectures, and comparisons.**

Given or having found a result/situation, the student has the ability to draw implications and make conjectures and the ability to justify or prove these.

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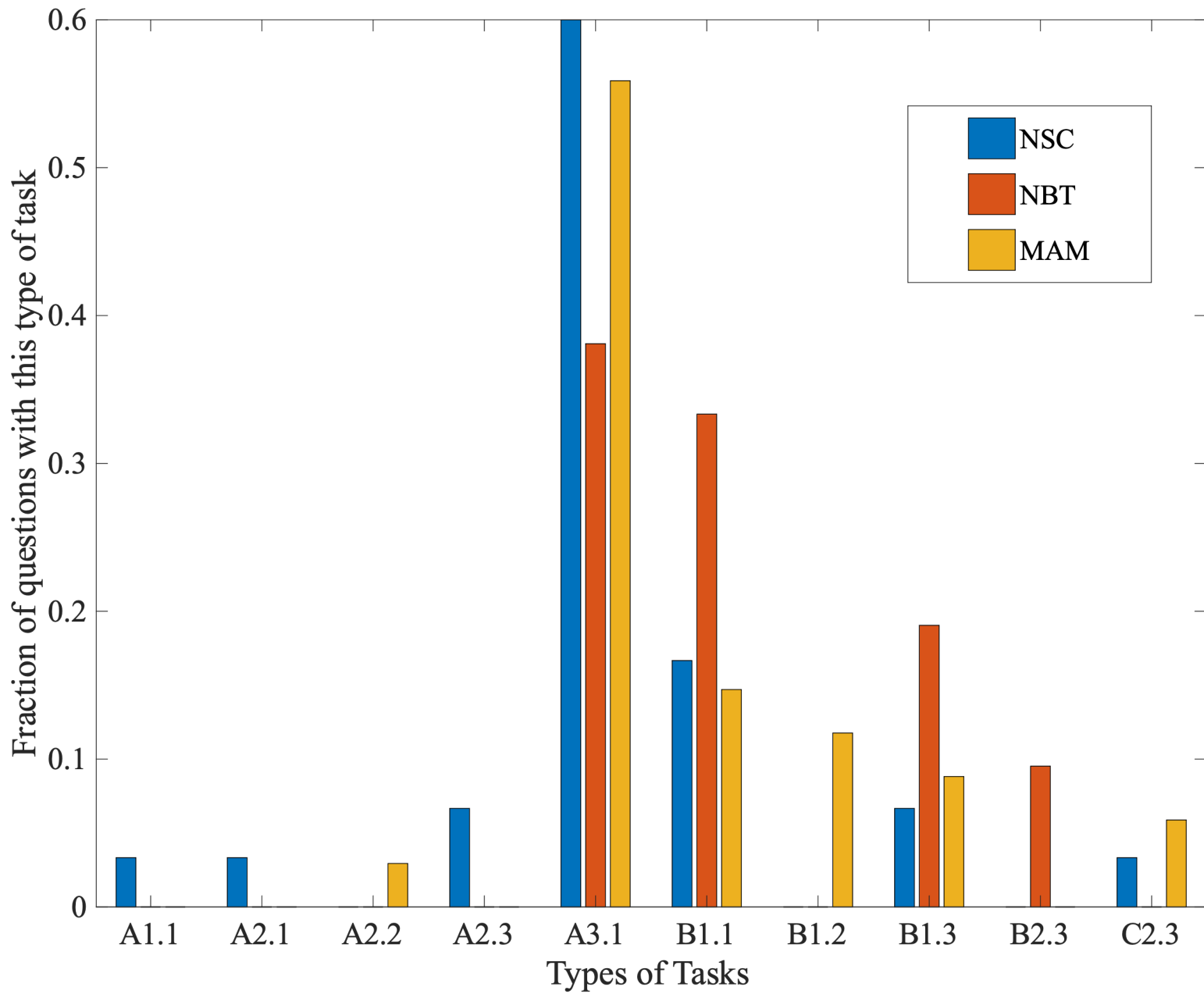
2.3. the ability to deduce the implications of a given result

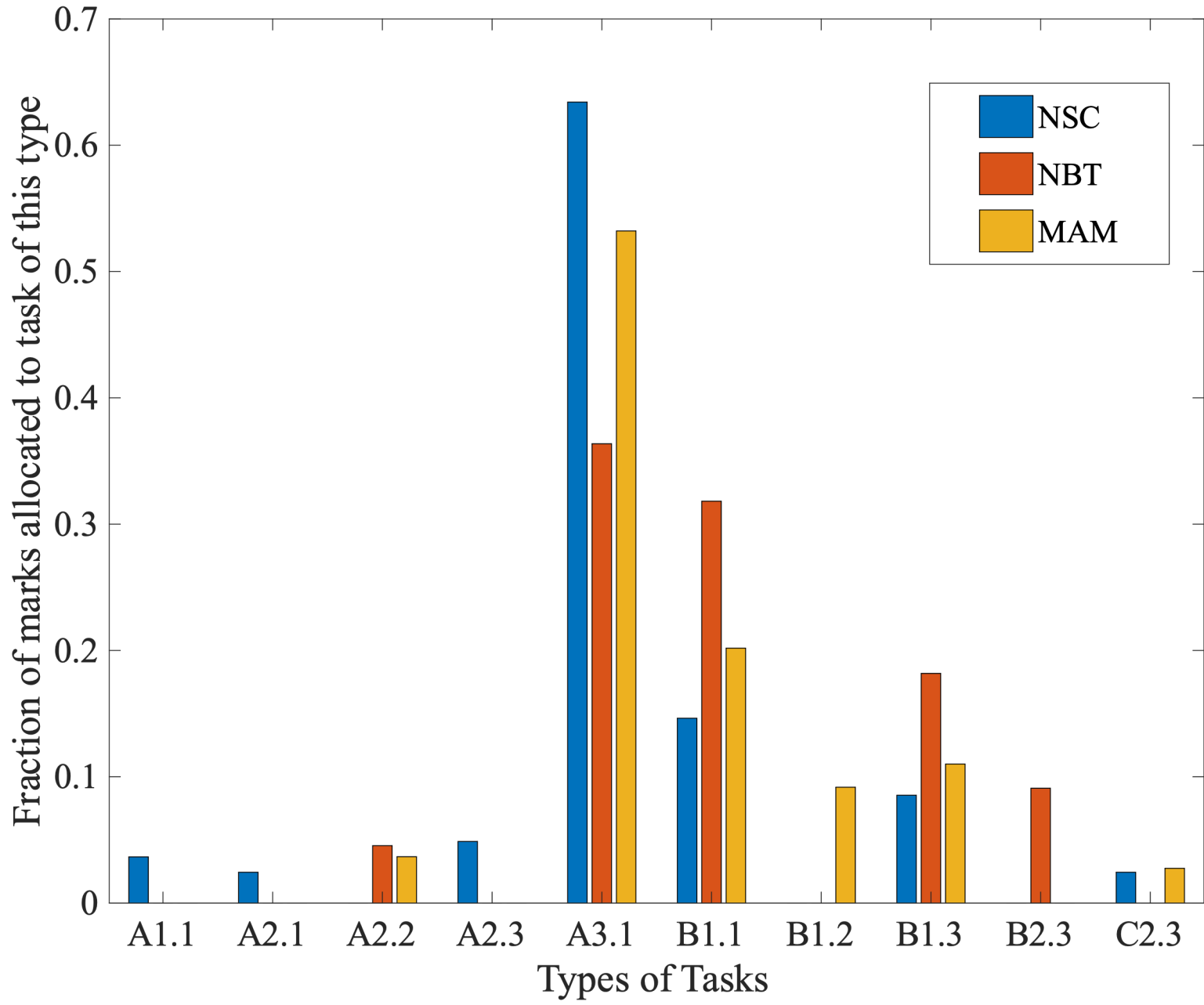
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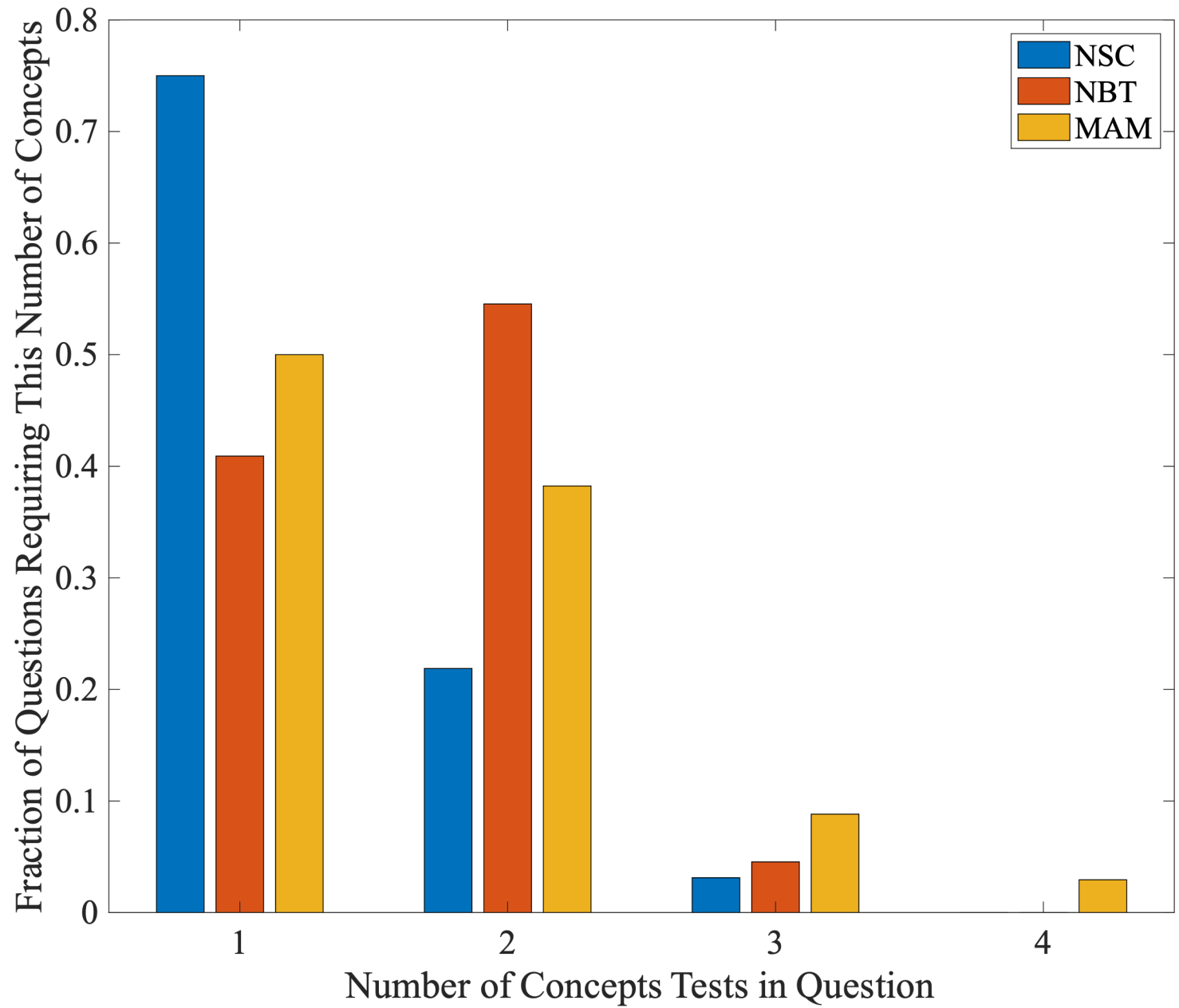
### **3. Evaluation**

Evaluation is concerned with the ability to judge the value of material for a given purpose based on definite criteria.









SO WHAT NOW?



THANK YOU