29 April, 2021

To NSW Education Standards Authority

We are a group of mathematics teacher educators and mathematics education researchers at Macquarie University. We have read the Mathematics K-2 Draft outcomes and content and provide some feedback regarding the document as follows.

The document has some improvements. In particular,

- The organisation into three strands to fit the Australian Curriculum Mathematics is positive and simplifying the substrands is potentially helpful.
- Giving evidence (references to research-based practice) is a positive change and although many references are important, they could be updated. However, references to professional journals should also be made (e.g., Australian Primary Mathematics Classroom (APMC)).
- It is advantageous that ambiguous terms have been removed so outcomes are made explicit.

However, there are some areas need attention.

- The process. We believe this will align with the new version of the Australian Curriculum. However, this version is not available (at least to the public). Therefore, when planning this part of the NSW Syllabus, on what basis is it written?
- Big ideas. An overview of big ideas and focus on the grade/stages will be helpful for teachers before they get lost in too many details and have the potential of using the document as a checklist.
- Balanced outcomes. The outcomes can be improved by keeping a balance between procedural skills and understanding. The focus is more on the skills now.
- Scope and depth. Some parts do not provide sufficient scope or depth of concepts or reflect research sufficiently. Specific details follow:
    - The structure of “patterns and algebra” as a subset of “combining and separating quantities and forming groups” is misleading. Patterns and algebra should focus on repetitions and growing patterns with the main aim to promote abstraction and generalisation (simple rules) and spatial patterns should focus on transformations and shape under spatial reasoning.
    - The absence of arithmetic word problem examples is concerning as most assessments like NAPLAN rely on interpretation of word problem structures, so these

activities can be introduced in Kindergarten. Currently, the focus is on the calculation itself without discussing the meaning of the operations.

  - The data strand should be updated with much more content on early statistical reasoning processes, given the recent research advancements in this area particularly in Australia: concepts of representation, variability, graphing, inference, data investigations. Also, it might be helpful to say which types of data are the focus at the stage.

- Age and developmentally appropriate. Some content areas need attention and consideration to make them developmentally appropriate. For example, the concept of volume at this stage (not sure if it is more of capacity in the discussion) or the analog clock, which involves a sense of angles, and skip counting by five which is challenging for Early stage.

- Use of terminologies:

  - The term "geometric measurement" integrates measurement and space so this is potentially good, but it is confusing for teachers when teasing out spatial concepts: big ideas of congruence transformation, 2D, 3D relationships.

  - The use of groups (grouping) in different ways needs to make more explicit the need for equal grouping or equal groups when referring to multiplicative situation.

  - The wording for each section needs to be consistent, sometimes a noun is used (e.g., geometric measurement) and sometimes it is a combination of verbs and a noun (representing whole numbers). The latter gives a sense of the actions that go with the content; however, it might be tricky this way as other verbs might be missed out.

- Unbalanced link to ACM proficiencies. Grouping of the proficiencies should be more consistent.

- There is some inconsistency among the outcomes and content (e.g., p. 12 the range of numbers applied is 20 in the outcomes and 30 in the content).

- We attach the list of references at the end of this document for reference.

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