

Mathematical Association of Western Australia (MAWA)

National Curriculum Feedback

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Mathematics Framing Paper Response:

Compilation of feedback from members across primary and secondary, including classroom teachers, Learning Area leaders, system/sector representatives and university lecturers in mathematics education and business.

Global comment:

From a global perspective, the framing paper is positive and is heading in the right direction. From a MAWA perspective, the document reflects the work that MAWA has been doing to support teachers in many of these areas, and on the whole, the model seems to be suitable for the current approaches and directions taken in Western Australia. Through the production of resources, MAWA has had a strong emphasis on problem solving and the Western Australian process strand of “Working Mathematically” and so it is pleasing to see these areas emphasised from a national perspective.

It should be ensured that future advisory groups are representative of ALL states (and not omit WA) and must include a broader representation of classroom teachers.

Introduction:

1. The concept of having a ‘futures-oriented’ curriculum is applauded, however the remainder of the document fails to take this idea any further. The content that is discussed seems to be a repeat of previous curricula. The idea of future-orientation needs to be further elaborated if the writers are to use this to guide their work or teachers to use this to guide their teaching. It is assumed this means more than using CAS calculators in senior school.

It is not made clear in this document whether it is intended that the curriculum will be articulated by year level or by stage of schooling.

Aims:

2. Agree
3. Mathematics and numeracy seem to be used interchangeably here so it is not clear whether the intention is to have numerate citizens or mathematical citizens or both. We like the focus on mathematics as both instrumental and as an end in itself. We are keen to see how a curriculum will achieve the aim that all students will “encounter teachers who communicate [enjoyment of mathematics]”.

Terms used in this paper:

4. **Content terms:** structure suggested meshes very well with WA approach and is suitable for narrowing the curriculum while retaining meaningful concepts
Proficiency strands: The term ‘proficiency’ is ambiguous and we would like to see an alternative for the general description of the ideas. The breakdown of the concepts here into the four terms is good, however ‘procedural fluency’ is not a commonly used term and will need greater definition.

We welcome the move to have a common language across the nation.

There needs to be greater clarity surrounding the proficiency strands as to whether they are intended to be fully embedded within the content organisers. These descriptors need to be written to produce a common understanding and clarify the intended meaning of terms

which are inherently ambiguous, open to interpretation or have different meanings in different states, e.g. ‘robust’, ‘strategic competence’, ‘procedural fluency’.

Numeracy: this description seems to emphasise the Consumer and Financial Literacy Professional Learning Program without actually naming it. There are already resources in place for this program, so naming it will enable teachers to refer to additional support materials which illustrate a multiple learning area approach. We are happy that this is given such prominence.

Considerations:

6. Thinning out the crowded curriculum is necessary and a very good thing to have in this document. We are concerned about the capacity to achieve this, given the breadth of topics discussed, and would like to see an articulated process by which decisions will be made as to what is essential and what is not.

There needs to be greater detail around digital technologies and a commitment to supporting the identification and use of appropriate hardware and software accompanied by professional development opportunities. This will continue to be an issue for schools with a low level of resourcing and a lack of existing technological infrastructure.

The idea of ‘equity and opportunity’ needs further clarification. Equity of access is in no way the same as equity of accessibility or equity of likelihood of success.

Overcoming student ‘disengagement’ is unlikely to be achieved by a new curriculum structure alone. It is a gross oversimplification to imply that the use of practical/relevant contexts for learning mathematics will fix this considerable issue. Teachers need to draw upon a depth and breadth of content-pedagogical knowledge to ensure presented curriculum is accessible to students. Relevance of context does not ensure student accessibility to mathematical ideas. Neither does relevance alone ensure the engagement of students whose mathematical understanding exceeds that of the presented curriculum.

The definition of procedural fluency and hence the value placed on it seems to shift here from that articulated in the previous section.

Structure of the Curriculum:

General – the use of terms here does not give a coherent picture due to the use of clusters, year groups and stages, and how topics will be developed.

8. Stage 1 – Omits the use of models, pictures/drawings, symbols and the pre-algebra thinking that are part of patterning that occurs at this stage. The conceptual understanding of fractions is missing from Stage 1 (i.e. use of half as a concept and quantity, but not as a number).
10. Stage 2 – We like this based on our own understandings of what this means, however we are not confident that the writers will necessarily share our understandings, e.g. ‘introduction of fractions and decimals’ and ‘describing relationships’ are very open to interpretation. Given the open nature of such descriptions of content it is difficult to provide feedback without more detail.
12. Stage 3 – Leaving the differentiation of the curriculum for different students until Year 10 will be somewhat problematic, particularly for high-achieving students, if the current expectations surrounding Year 12 learning are to be maintained.
13. Senior years – A minimum of 3 courses for university entry is appropriate. In WA we are transitioning to a system which has four possible final year programs of study in the mainstream Mathematics Course examinable for the purpose of university entry. Some students are also studying Specialist Mathematics in addition to the higher units if they

intend to go on to further mathematical studies. Our members welcome the assumption of the use of CAS technology in these courses. In addition to the university entry options, it must be recognised that in several states Year 11 and 12 are compulsory years of schooling. As such the non-university entry pathway must cater for a very wide range of students (approximately 60 to 70% of students in WA). This group includes students who have struggled with mathematical concepts for their entire schooling, as well as those who have experienced a high level of achievement, but who have goals for their future that are not university-related. To have only one course available for this significantly diverse group of students is not appropriate, particularly given the diversity of their mathematical understanding and the directions they plan to undertake after school.

Other comments

14. It is concerning that there was no request for feedback on the section 'Pedagogy and Assessment'. Successful implementation of any curriculum is dependant on the content-pedagogical knowledge of teachers. Assessment structures, standards and requirements will impact greatly on teacher practice.

WA teachers are keen to gain clarity on the proposed methods for judging student achievement. Judgements can be made on either the degree of student progression along a learning continuum or a numerical assessment to quantify the extent of mastery of a set curriculum, with either of these mapped to grades. It is important that the curriculum be defined as aspirational or minimum expectation for all students. Teachers must be aware of both standards and methods of assessment in order to provide informed feedback on curriculum. We would therefore like to see a process articulated by which the curriculum will be subject to ongoing review – a futures-oriented curriculum can only remain so if there is a mechanism to ensure its evolution.

There needs to be a clear articulation of the process and degree to which teachers can modify the curriculum in order to cater for individual students' needs, e.g. students who are highly gifted, students with disabilities, students at educational risk, students who are not able to engage with the curriculum set for their year group/cluster/phase of schooling due to a lack of prior learning for reasons such as recent immigration or a history of significant absence from formal learning.

If the advisory group is to continue, we would like to see the participation of more classroom teachers, as well as equal representation of the states and territories. There is only one practising teacher who is a member of the current group and there has been no Western Australian representation through this format. While the members of the group are well respected, there is also a perception amongst teachers of a lack of connection with current classroom practice due to the profile of the group's membership.

Our members also advocate a phased introduction of the new curriculum as the pace with which change has been occurring at both a state and national level is too great for our teachers to feel truly comfortable with the planned rapid implementation. This is particularly so as the proposed national changes will closely follow the introduction of our new WA senior school courses. Another issue arising from rapid implementation is the potential disconnect between our existing curriculum and the national curriculum. Students may initially struggle if required to go through an immediate transition. There are many pedagogical implications for teachers, and for teachers to feel comfortable with implementation they will require extensive professional learning in the lead up to ensure they are fully prepared. As ACARA has no responsibility for professional learning it is questionable as to whether any meaningful, positive evolution in teacher practice will be achievable. The final dot point in paragraph 75 indicates a significant need for extensive professional learning in effective pedagogies to be able to achieve this. This is a hard

enough task for good, experienced teachers to achieve, nevertheless an inexperienced teacher or one new to Australian culture.

The assumption that teachers will be able to adequately differentiate the set curriculum to meet the needs of **all** students through the use of engaging experiences is idealistic and, for many teachers, unrealistic. For example, a student who doesn't understand the concept of area, angle relationships in triangles or powers of numbers will not be able to understand Pythagoras' Theorem, no matter how engaging the learning experience is. The student may be able to repeat a memorised process, but if they don't understand when, how or why the relationship works then it is not meaningful learning and that time would be better spent developing understanding of the underpinning concepts. If the curriculum does not inherently cater for individual differences in student learning at both ends of the continuum then many teachers will be unable to fill this gap, particularly as the range of student achievement expands as students progress through school. The information contained in Stage 3 implies that the curriculum would begin to be differentiated for different students from Year 10 with the provision of 'options', but many teachers feel that this is too late and should be started at Year 9 to ensure all students are catered for. Paragraph 36, however, indicates that schools will develop Year 10 mathematics options. This idea does not mesh with a compulsory national curriculum for all years of schooling.

Members have also raised concerns about the capacity of authors and professional associations to be able to provide text-based resources to complement the implementation of the national curriculum within the timelines that are proposed. Many teachers are reliant on textbooks and resources to enact a curriculum and so there is a concern that the curriculum will be driven by the first materials on the market. Quality of resources may be compromised to meet publishing deadlines.

Finally, as stated previously, it is concerning that ACARA has no responsibility for teacher professional learning. Paragraph 80 begins with a considerable understatement. What is suggested in terms of teacher pedagogical approaches will mean that for many teachers a complete change to the way they teach is needed for effective implementation of the new curriculum. Regardless of the detail of any curriculum, it will always be reliant on good pedagogical practices to cater for individual student needs and this is strongly advocated in this document (engaging learning experiences, relevant contexts, extension through problem solving, ...). Unless a comprehensive, well-resourced and ongoing professional learning program is put in place to support curriculum implementation it is unlikely to impact strongly or uniformly on the teaching of mathematics across Australia.

MAWA Subcommittee responsible for compilation of feedback:

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