

Feedback on draft NZ Curriculum

Section A

Question 1 – Institution

The New Zealand Statistical Association

Our feedback has followed the form of the Questionnaire at the back of the draft curriculum. We have largely restricted our comment to issues related to the place of Statistics within the draft curriculum.

Question 2 – Contributors

This submission was prepared by the Education Committee, and is made on behalf of The New Zealand Statistical Association.

This submission is intended to supplement the joint major one from our Committee and the Auckland Statistics Group. It complements the one by the NZSA President.

Section B

Question 3 - Intent and direction

The current New Zealand mathematics curriculum is already recognised as a world leader in statistical education. The draft curriculum should strengthen this position.

Question 4 – Overall clarity

While this comment is not specifically related to statistics, some of the ordering of sections was not immediately obvious. Specific comment about this will be made under the relevant sections. The position of the section on learning areas could well come immediately before the Achievement Objectives by Level.

Question 5 – Likely impact

We believe that this curriculum will strengthen the position of statistics as a discipline that has wide practical real-world applications, and one that should be made as widely accessible as possible. We do not, however, want to see the mathematical aspects of the subject being given insufficient attention, nor would we like to see the mathematical intricacies of the subject in any way dominate the more practical aspects. A separate standard, “Mathematical Statistics”, could be offered at NCEA Level 3 or Scholarship which would be aimed at able students who wish to explore the underlying mathematical structure of statistics in more depth.

Question 6 – Implementation issues

Several issues are of relevance here:

- Teachers often have relatively less statistical knowledge and experience in statistics than they do in other areas of mathematics. This means that they will need in-service professional development. Many teachers are not yet at ease with the current curriculum (for example, the part contained in the NCEA Level 3 Standard AS 90645 on bi-variate data), and the draft will give statistics an appropriately increased role. The need for professional support will be very substantial but will have substantial benefits in teacher satisfaction and student learning.
- Careful pre-service education in statistical pedagogy and content is also needed. Support for teacher educators in this will be useful

- Appropriate resources will be needed to support the statistics thread. Some of this would need to be in Tier 2, but other resources are also needed.
- Appropriate data sets are required to support the curriculum.
- Technology is an essential tool for statistical exploration and understanding.
- The Unit Standards and Achievement Standards will need to be realigned to the new curriculum.

Question 7 and 8– Clarity of each part & Usefulness of each part

Principles & Values

These appear to have elements in common, in particular “excellence” and “equity”, but they are couched in different ways. This could be confusing.

Connections need to be spelled out more explicitly, both between and within learning areas. For example, statistics has strong links to other learning areas; Science, Social Sciences, Technology, and Health and Physical Education in particular. This needs to be visible. Also, the three threads of statistics are interwoven rather than separate entities. Statistics also relates to the other strands of mathematics, and to measurement in particular. A “connections in the curriculum” map should be developed.

The values of innovation, enquiry, and curiosity sit well with the beliefs driving statistics. These values are integral to the statistical enquiry cycle.

Key competencies

Statistics in the Draft seems to exist largely in the Thinking competency. We applaud the inclusion of “making sense of and questioning information”.

Current statistical pedagogy and analysis of statistical practice gives a central role to “statistical thinking”. The literature defines this quite fully. The “Statistical Investigations (Thinking) thread (to use its current name) is very appropriately built around this set of aptitudes. The Draft Curriculum’s competency “Thinking” fits in very well with the “Statistical Thinking” complex.. However, the specifics of “Statistical Thinking” will need to be communicated via statements and exemplars in Tier 2.

The statement on ICT is not sufficient. It misses the key use of technology in statistics which more to interact with and come to understand information using appropriate technology. It needs the following added to it after “access information”:

“ ..., *explore and analyse information,*”

The descriptors “quantity, space, and data” on pages 12 and 13 are somewhat misleading. Statistics is a whole lot more than just “Data”. An alternative wording may be of benefit. “Quantity” evokes measurement and measurement data more than it evokes the Number and Algebra Strand

Effective pedagogy

As pointed out above, technology is more than just saving time finding information, but using technology to more effectively explore it. The last bullet point should reflect this more. Statistics uses datasets as a central focus. The management and analysis of these uses computer technology as an essential and liberating tool

Since the 1992 curriculum, a large amount of research has been done in the pedagogy of International and NZ Statistics. Your two pages (p24, 25) on *effective pedagogy* are very much in keeping with the new understanding of statistical pedagogy. However, major and well-designed efforts in teacher support will be needed if we are to transfer the best pedagogical practices into our presentation of statistics in NZ.

Question 9 – Learning Area Descriptions

Mathematics and Statistics

We fully support the change of name from *Mathematics* to *Mathematics and Statistics*. We have been advocating the distinction between the deterministic paradigm of mainstream mathematics and the probabilistic view espoused by statistics for some years. This does not mean that statistics is separate from maths, but is an important area of maths with a distinctive emphasis and pedagogy required.

We endorse the more detailed joint submission (NZSA Education Committee and Auckland Stats group) which proposes detailed changes to the Statistical Literacy and Probability threads in particular. These changes will integrate the three threads together.

Composed on behalf of NZSA Education Committee:

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