Topics for NCEA Review from NZSA Education Committee

19/3/18

Relevant topics for public consultation in statistics

The Ministry of Education is leading a review of the National Certificate of Educational Achievement (NCEA).

In https://www.education.govt.nz/ministry-of-education/consultations-and-reviews/ncea-review/, the Terms of Reference state that, from February 2018, the Ministry will 'identify relevant topics for public consultation'. The Education Committee of the New Zealand Statistical Association (NZSA) finds that topics below arise from its interest in the statistical part of the *Mathematics and Statistics* learning area of *The NZ Curriculum*. This document is offered as input into the Ministry's review, and will be made available on CensusAtSchool.

Our views are based on our readings of recent assessments, on concerns heard from teachers, and on our collective experience in statistics education. One of our goals is to provide expert guidance in statistics education, where we can.

To contact the Education Committee, please email the Committee's Convenor: alasdair.noble@agresearch.co.nz.

Evolution and flexibility

We'd like to see statistics in schools evolving towards the vision for it in *The NZ Curriculum*, informed by the current rapid developments in software and pedagogy, and informed by the changes in the world of data.

We'd like the assessment system to be a positive part of this evolution. (It has been doing its best.)

The ways in which today's students will be able to and will need to use statistical skills is changing fast. We'd like the assessment system to be flexible and able to deal with change.

Here's a view from us of what is distinctive about statistics in schools: http://new.censusatschool.org.nz/2016/08/24/specifically-statistics-maximising-the-benefits-of-statistical-learning-in-schools/

Curriculum and learning environments allow for cool stuff. Assessment needs to allow for this too.

Ideally, the NCEA system would allow teachers to teach *The New Zealand Curriculum* with confidence, using genuine and meaningful contexts to explore data and uncertainty. The

selection of achievement standards for assessment should support quality teaching and learning, and the development of key ideas for statistics.

Resources and professional development

Assessment in this form of statistics is new to us all, and NZ is ahead of the crowd, internationally. All the players will need plenty of support: written resources and professional development. This is for teachers, moderators, examiners, and their supporters.

All these people need clear guidelines. This improves fairness for students, and avoids frustration for teachers.

The content knowledge required to teach and assess the *New Zealand Curriculum* for Statistics is still new and challenging, and it takes time to build confidence in understanding the key concepts. There are also new technologies, methods and ways of thinking about data. The NCEA system should respond to issues identified through the external moderation process for assessment by providing professional development for TEACHING not just assessment, including:

- development of teacher content knowledge and conceptual knowledge
- development of teacher pedagogical content knowledge
- development of learning pathways and progressions.

This support could be targeted at moderator-identified groups of teachers, schools, or regions.

There needs to be a stronger working relationship between the Ministry of Education who “owns” the curriculum and achievement standards (teaching), and NZQA who oversees the assessment of these standards. Teaching and assessing are two sides of the same coin. There is too much focus (perhaps the only focus from MOE/NZQA) on clarifying assessment expectations and not enough on supporting teaching and learning.

A key stressor for teachers working with the NCEA system is critical feedback from external moderators. This may be appropriate, but it is a stressor. Being responsive to the professional development needs of teachers, as described above, would reduce stress and increase confidence in the NCEA system.

Progression and coherence across externally assessed standards

To improve progression and coherence across external standards, we'd like:

- improved opportunity for examiners through the levels to confer and to study each others' work
- strong written guidance (as in the Senior Secondary Guidelines).

Progression and coherence across all standards in a learning area

We'd like to see a smooth progression through the levels, with the external and internal standards sharing the same philosophies throughout.

Assessing thinking

For internals, the moderation process needs to, and does aim to, look for evidence of thinking and understanding. We see a need for increased interaction among moderators, teachers, and other stakeholders, to resolve understandings about specific terms and statements.

We would like to see a balanced assessment approach, with different types of assessment possible. At the moment, all the statistical internals require students to carry out and report on an investigation. There are other ways to assess student understanding, with a variety of assessment strategies. We see this as a way to reduce teacher and student workload. Schools need support in resolving their authenticity concerns.

For externals, the questions sometimes pose mental mathematical puzzles, rather than challenges to thinking (statistically in this context). Statistical thinking usually would mean interpreting data and variation in its social or other contexts. We would like to see expectations in the whole education community change. The examiners have an important role in this transformation.

We would like to see consideration of a range of assessment methods and principles, that can allow for a wide range of thinking.

Literacy for University Entrance

NCEA is currently (March 2018) reviewing this requirement. We see it as extremely important that achievement standards from areas like and including Statistics remain in the list. Statistics at present has two standards in the list. Other Statistics internal standards require a written report and evaluation of evidence, usually in writing. We would like to see some more of the L2 and L3 Statistics standards count towards UE literacy.

We see a tension between the need for written work and the need to allow students opportunities to present their best evidence against a standard in a variety of ways. We see the need for a dialogue to find solutions. One such solution would be to require the submitted work to include a written abstract or summary, for nominated standards .

We are aware of a strong teacher view that, under the present system, many students have difficulty meeting the literacy requirements.

Choice of externals and internals

The selection of external and internal standards that students take then complete assessments for is driven by many factors. The requirement of 14 credits per course is a key driver for schools to favour internals, in order to achieve University Entrance.

We'd like to see the selection driven by the need for appropriate and coherent learning.

There is also a much higher workload associated with internals. Teachers strive to do their best for students by offering them multiple opportunities, but this creates a high workload.

Expectations for student work in assessment

Particularly for investigations, the NCEA system appears to encourage quantity over quality. Page and/or word limits should be used but currently would be against the Conditions of Assessment (e.g. assessment is to be free from constraints). This would help decrease the workload for teachers in terms of marking, feedback, and moderation. (It would also help re-focus on what matters most for the statistics curriculum achievement objectives each standard is aligned to).

Student workload

Greater cross-curricular collaborations for assessment should be examined. For example, a student investigation could cover a biology standard, a statistics standard and an english standard (an oral presentation). For greater cross-curricular collaboration to work effectively, there would have to be more collaboration among learning areas in the design of standards. With the current standards, it tends not to be possible for a task to allow achievement at Excellence level in standards in two different learning areas.

A key concern is whether cross-curricular assessment decreases or increases student workload.

Another question is how much needs to be assessed across the levels.

Responsiveness of achievement standards

Assessment standards need to be more responsive, flexible and adaptable as issues arise such as:

- gaps identified in curriculum coverage
- changes to the nature of the curriculum learning area e.g. for statistics - big data, modern techniques
- adverse effects of “silo-ing” key concepts and ideas
- problems with aspect(s) of the standard that have emerged over time that need quick resolution.

Online assessment and digital externals

The arrival of digital assessment raises exciting possibilities in Statistics. The assessors can expect students to be able to use software on datasets in order to visualise with graphics, assist with reasoning from patterns in data, and to calculate the numbers. This will allow for assessment of strong statistical thinking, and will liberate students from the traces of manual numerical work that remain in current exams. It allows for interactive thinking in the assessment.

However, the issue of equity will need to be addressed. Support will be needed to negate any inequities that would arise when students need access to and familiarity with the devices required.

We need to re-imagine assessment with new technology . As software improves and datasets expand, more possibilities will emerge.