External NCEA assessments in Statistics 2018
Dated 15 May 2019

External assessment and *The NZ Curriculum*

The Education Committee of the NZ Statistical Association would like to offer some general feedback on the 2018 external assessments in Statistics. The Committee would like the teaching and learning of Statistics to continue to develop the potential of *The NZ Curriculum* in Statistics. We see the external assessors as being partners in this development.

If shifts in assessment happen in 2020 and beyond, we would like to be sure that the teaching community is very aware of them, and we would be happy to help spread the awareness.

Clarity and consistency of language is important throughout. This is across levels and between externals and internals.

Level 1 91037 Demonstrate understanding of chance and data
https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2018/91037-exm-2018.pdf

Some questions involve knowledge of contexts. For internals, knowledge of contexts is expected. Consistency in this between externals and internals is desirable. Is there some method of providing relevant context information in the external exams? We are happy to discuss methods for this further.

The terms 'probability' (as used here) and 'proportion' (as used at Levels 2 and 3) should be used consistently across the levels.

The words 'AND' and '**not**' (Q1b(i)) could be written in consistent type.

The term 'significant' (Q2b(i)) should not be used in statistical work unless it means 'statistical significance'. A word like 'key' is better.

We would like to be sure that NZQA ensures that colours used are effective for sight-impaired students. We are not sure that this is the case here.

We think that pie graphs should be avoided. Bar graphs are better.

In Q3a(i), the words 'tend to' are not needed. The question does later (Q3a(iii)) ask for 'trends and features'.

Overall for this exam, we are pleased to see the use of real context, data, and graphs of the data. The exam is well positioned at the level of Curriculum Level 6, and covers a wide range of the 'chance and data' at this level.

Level 2 91267 Apply probability methods in solving problems
https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2018/91267-exm-2018.pdf

Again, the terms 'probability' and 'proportion' should be used consistently across the levels.

In Q2a and b, the exam gives tables and asks useful questions about them. In Q3 stem, it gives the 'written information' that is mentioned in the Specifications, and asks for probabilities to be found from them. This is just one example of a style of using probability methods that is prevalent in the exams. This style is within the expectations of the teaching community, as a way of meeting the *Curriculum*'s achievement outcomes. . However, in the near future, we would like to carry out a careful investigation of the teaching, learning, and assessment of probability.

For Q3, we are interested in the geographical knowledge expected, and whether the map helps or hinders with the context.

The binaries 'windy/still' (Q2) and 'wet/dry' (Q3) are used. We are not sure that these make sense, or whether they need further definition.

Again, we acknowledge the use of contexts and data.

The coverage of this exam seems to be incomplete. The Specifications contain 'describing and comparing distributions', with 'shape, centre, spread' via graphs; and 'risk or relative risk'. The exam misses the opportunity to compare the experimental distribution and the fitted theoretical distribution in Q1a.

Level 3 91584 Evaluate statistically based reports
https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2018/91584-exm-2018.pdf
https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2018/91584-res-2018.pdf

We question whether all students will be able to use the colours and the sometimes small text in the infographics in Reports 1, and 2.

We commend the examiners on finding three reports with suitable contexts, and for assessing in keeping with the Curriculum's target of 'statistical thinking'.

Level 3 91585 Apply probability concepts in solving problems
https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2018/91585-exm-2018.pdf

We like the use of simulation in this exam (Q2d).

We question how much understanding we can expect for the true vs model vs experimental relationship (Q3c(iii)).

We are very aware of how hard is is to create an assessment in probability. We acknowledge that the examiners have found some meaningful contexts, and that this is not easy. The exam covers the 'methods' in the Achievement Standard's Note 4.

Level 3 91586 Apply probability distributions in solving problems
https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2018/91586-exm-2018.pdf

Again, we acknowledge that the examiners have found some meaningful contexts. However, the exam does not ask for visual comparisons of experimental distributions and fitted theoretical distributions.