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# Moderator's Report
# Principal Moderator Feedback

## Summer 2018

Pearson Edexcel GCSE
In Statistics (2ST01)
Controlled Assessment

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**GCSE Statistics 2ST01**
**Principal Moderator Feedback – Controlled Assessment**

## Introduction

The themes available this year were:

- Animals
- Advertising
- Water.

Water was the least popular theme chosen.

In general the work from centres was well presented, neatly packaged, and arrived by the due date.

Some centres did not adhere to all the procedures surrounding the submission of samples. This year a significant number of centres omitted to include the work for the students with the highest and/or lowest marks at the centre.

Centres are reminded that changes to the initial plan must be agreed by the teacher and recorded on the Student Record Form, and that the initial mark for planning cannot be changed. Work not identified in the plan cannot be given credit in the assessment.

Most students choose their own task to investigate. It is suspected, however, that some of the more heavily orchestrated tasks, e.g. whole class approaches, restricted the ability of some students to access the higher marks.

Some centres submitted work that had not been adequately checked for errors, particular errors in calculations and omission in diagrams, resulting in considerable amounts of extra work expended by moderators.

## Specific comments

## Strand 1 (Planning)

In general students were able to give a simple plan for their task and explain which diagrams and calculations they would use to achieve their aims.

As in previous sessions, however, students often produced large quantities of work involving a number of separate (usually 3) hypotheses. Sadly these hypotheses were often loosely related by the theme, only sometimes related between hypotheses, and rarely involved the use of interrelated variables. It is clear that

some students would have benefitted if they had concentrated on a single hypotheses with a single carefully specified aim.

Often students did not justify the choice of techniques at the notional difficulty of those techniques; more demanding techniques require a greater degree of justification than less demanding techniques. Simply stating that a technique will be used, or explaining how it will be used, is insufficient to access the higher marks. For example, students using scatter graphs to investigate the relationship between variables should explain which of the variables they consider to be dependent and which to be independent, and to justify their choice. When drawing histograms, students should justify their choice of class intervals and discuss their choice of sample size in relation to this. Furthermore, students should relate the choice of techniques to the type of variables being investigated, e.g. histograms for continuous data, box plots for discrete data, etc.

Investigations attracting the highest marks were often those involving a degree of complexity. Complexity includes the analysis of interrelated variables, e.g. the comparison of correlation coefficients, and the sequencing of techniques, e.g. the formal removal of outliers using box plots to generate more reliable statistics, such as the mean and standard deviation, in preparation for a test of normality.

Many students were able to anticipate possible problems in the collection of their data and were able to give a clear strategy for dealing with outliers and anomalies. Students should be encouraged to explain their reasons for removing poor data in the context of their investigation and to comment specifically on the possible impact the poor data could have on the reliability of their calculations and results. Simply stating that any outliers will be removed is a low demand activity, even if accompanied by sophisticated techniques for identifying them.

**Strand 2a (Data collection)**

In general most students were able to use a simple data collection technique to collect sufficient data for their investigations.

Some centres provided data sets for students. It should be noted that students are expected to collect their own data sets and not to subsample from data sets that have been provided for them. Students may collect data in groups if they wish, but each student must take part in the data collection, and each student must explain their role in the data collection.

Many students collected sufficient data for their investigations, identified the source of the data and commented on the possible presence of outliers. Students should be advised, however, to think more deeply about the amount of data they

are using. The sample size should be justified in terms of the techniques employed. Some techniques require greater amounts of data than others to generate reliable results, e.g. histograms.

Many students are able to identify outliers formally and represent them in diagrams. It should be noted, however, that it is not simply the formal calculation of outliers that drives the assessment but also the purpose for removing the outliers. The calculation of outliers to merely represent them in a box plot is considered to be low demand application of the technique.

**Strand 2b (Processing, analysing and representing data)**

In general most students were able to employ their chosen techniques accurately to analyse the data they had collected.

Moderators often reported that the marks awarded in this strand were generous.

To access the higher marks in this strand students are expected to produce a diagram and an associated calculation. For instance, in testing for correlation, students are expected to produce both a scatter diagram to display the data and, if appropriate, a calculation of correlation. Furthermore, to access the higher marks, these techniques should be interpreted in context.

The quality of the interpretation of results affects the marks that can be awarded in this stand. The greater the depth of interpretation of results the greater the demand of the technique, e.g. the interpretation of a calculated correlation in context is a higher demand activity than the simple identification of correlation from a calculation, e.g. by stating “positive correlation”, even though the calculations may be identical.

The assessment is also affected by the quality of the diagrams and the accuracy of the calculations that are produced. Errors in calculations and omissions in diagrams are penalised in this strand. For example, the omission of units in a scatter graph is penalised by the deduction of 1 mark.

The use of ICT to do the more arduous calculations and representations is to be commended, but students should be advised to be more critical of the accuracy of answers and the quality of the representations produced; and that the diagrams and calculations are not always suitable for the purposes intended, e.g. the calculation of a line of best for a scatter graph when there is no correlation in the data.

**Strand 3 (Interpretation and discussion of results)**

In general most students were able to use their diagrams and calculations to make simple statements about their hypotheses.

To access the higher marks in this strand, however, the more demanding techniques should be accompanied by more demanding interpretations (see above).

Many students were able to comment on the reliability of their results in terms of the size of the samples they had taken; but it should be noted that a comment such as “I could have improved my results by taking a larger sample”, is considered to be a low demand comment on reliability.

Few students commented on the reliability of their results in terms of the techniques they had employed, e.g. the amount of data they had used to populate individual class intervals in histograms, the amount of data they had used in scatter graphs and box plots, the critical appraisal of the suitability and effectiveness of the sampling regime employed, etc.

Only the best students were able to discuss the range of applicability of their results beyond the immediate sample or population.

**Summary**

Students should be advised

- to be more focused in their choice of hypotheses. Investigating separate loosely related hypotheses increases the work load but does not guarantee a higher mark

- to explain their reasons for removing poor data in the context of their investigation and to comment specifically on the possible impact the poor data could have on the reliability of their calculations and results

- to think more deeply about the amount of data they are using. The sample size should be justified in terms of the techniques employed

- that it is not only the formal calculation of outliers that drives the assessment of outliers but also the purpose for removing outliers. The calculation of outliers to merely represent them in a box plot is considered to be a low demand application of the technique

- be more critical of the accuracy of the calculations and the quality of the representations produced by ICT, and that the diagrams and calculations are not always suitable for the purposes intended.

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