

Appendix Four

Fourth Exploratory Study Interview Protocol and Analysis

A4.1 Project Student Interview Protocol

The key questions are in bold type. The other questions acted as a check that they had been covered in the conversation ensuing from the key question.

- **What did you learn from this project?**
- **Your definition of statistical thinking - what would you develop?**

- **PROBLEM**

Tell me about the problem

How was the problem presented to you?

Clear what to measure?

What knowledge did you need about the problem?

How long did it take you to understand the problem? Different people in the organisation have different perceptions?

Ability to think about all the explanatory variables to take into account before designing the experiment etc.?

Able to prioritise the variables?

Framework or strategy for organising the problem?

Any problems in conceptualising the problem?

- **PLAN**

Tell me about how you went about planning a method to collect the data.

Any problems in conceptualising the plan?

Size of sample? measurement issues? classification issues? stratification issues?

Design of study? Design issues?

What was considered important/unimportant?

- **DATA COLLECTION**

Tell me about data collection.

Were 'errors' noticed in the process?

Other variables that may be affecting results?

Reliability of data / check methods.

Data cleaning?

- **ANALYSIS**

Tell me about the analysis.

What was difficult/easy about the analysis?

Interpretation?

Variation? outliers? clumps? skewness?

What graphs did you use for analysis?

What tests did you use for analysis?

Comfortable with aggregate-based versus individual-based?

Sample size an issue?

Did your clients understand the analysis/ all parts of the process?

- **CONCLUSION**

Tell me about the conclusion.

Was the conclusion a surprise?

Was it what was expected before you started?

If it wasn't, how did you deal with it? Personal viewing lens?

What was difficult in terms of the thinking processes to come to grips with?

Judgement criteria? How did you know you had the right answer/s?

Communication - how did you communicate results to your clients?

Interpretation - Any alternative explanations for results?

Tell me about the muddiest point in your project.

What was difficult to come to grips with?

A4.2 Analysis of Project Students' Interviews

Interrogative Cycle Subcategories

Seek (ideas and information) from

- internal sources
 - by recalling knowledge/context base
- external sources
 - clients/people in the system
 - data
 - system
 - other sources (colleagues, experts, literature)
 - similar problems

Interpret

- read
- describe (summarisation)
- translate
- compare
- connect to context, new idea, information
- connect to multiple explanations

Criticise (checking thinking, information, ideas against reference points)

- monitoring thinking (regulation of cognition or “metacognition”)
 - purpose of the thinking
 - am I answering the defined question?
 - is this the question the client wants answered?
 - am I meeting the client’s or agreed objectives?
- belief system and emotional response
 - personal, client, community
- ability to continue
- evaluating incoming ideas and information
 - internal check (argue with oneself, weigh up against)
 - context knowledge
 - statistical knowledge
 - awareness of constraints
 - external check (outside source)
 - client, people in the system
 - colleagues, experts
 - literature
 - other available data sources (historical data)
- anticipating problems

Generate possibilities

- imagining and brainstorming for
 - explanations
 - how things fit together
 - plans of attack
 - possible models (system, statistical)
- derived from the context
 - for present problem (imagining & brainstorming)
- derived from the data
 - for present problem
 - for future investigations (hypothesis generating?)
- derived from statistical knowledge

Judge (decision is made)

Types of thinking

Types of thinking that are peculiarly statistical

- transnumerating
- taking account of variation
- “explaining” variation
- reasoning with statistical models
- synthesising statistical and context understanding

Generic types of thinking

- constructing and reasoning with models
- strategic thinking
 - (planning how to attack a task
 - breaking tasks down into subtasks
 - anticipating problems and planning to avoid them)