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“ Demonstrating that statistics can be engaging, interesting and solve real problems of value will inspire an interest in data. ”

Research

Simon’s research focuses on how to use data to answer questions about changes in people’s health over time, in particular in the area of ageing and cognition, and neuroimaging. Statistics is the science of understanding data and using it to answer important questions. It is not always clear how to use the data we have to answer the question we are interested in, that’s where research into statistical methods comes in.

Longitudinal studies, with multiple measurements of people over time, introduce many interesting problems that must be accounted for. The key issue explored in this activity is when people dropout of a study, that is they are not observed at all time points. This is especially a problem if the

reason for dropping out of the study relates to their health. His research team develops statistical methodology to appropriately analyse such longitudinal studies with missing follow-up.

Reasons to Engage

Statistics, and more broadly mathematics, are often presented at school-level as theoretical without application - solving problems and puzzles for the “fun of it”. Also, potential careers that can follow studying mathematics are often not known or explored, except possibly “going into finance”. Through public engagement, Simon communicates the importance of applied statistics in his research, across most subjects students will go on to study, and most importantly how statistics affects everyday life.

Public Engagement Project

“The importance of what you do not see” a classroom activity.

Target Group

Years 9, 10, 11 students (ages 13-16).

Project Objectives

- Design an activity to explain longitudinal studies and illustrate statistical concepts of missing data in these studies
- Provide an educational and entertaining resource for illustrating applications of statistical concepts: understanding the question of interest, understanding the data using summaries and plots, and answering the question

Planning and Process

Simon designed and created an interactive classroom activity. Instead of working with abstract concepts, the focus is on investigating a study of changing moods over time among young people. The same people are followed over time but not everyone responds, in fact there people who have a better mood are more likely to remain in the study.

Special playing cards were created and used as a key resource for this activity. Each one is unique and together they form a special deck of cards that represent the data. Using cards allows the activity to investigate data in a hands-on and physical way. Hence, this activity does not require computers – a barrier to delivering the activity in a classroom setting.



A set of playing cards

The activity focuses on the concept of scientific investigation which reveals the complexity of the data and using group discussion to get participants talking about the problems they face.

Understanding the question of interest, since most students will be less familiar with longitudinal data. Understanding the data, the bespoke

“ *The activity allows for students to interact with each other and work together to solve the questions.* ”

cards include a lot of information and need to be catalogued. Finally, answering the question, where students discover the dropout over time and discuss how that might impact their answer. The activity was delivered as a part of the STEM Statistics Workshop to three Year 10 classes at a Cambridgeshire school, as a curriculum enrichment workshop.

The students responded very well to the group activity and they engaged thoroughly. Student feedback was measured through activity worksheets, questionnaires and discussions with class teachers.

Outcomes

For Simon

- Made his research accessible to a wider audience through its efficient and clear communication (as a vital part of engaging the public)
- Explained some of the more abstract concepts in statistics via designing an activity that translates these issues into an engaging explanation of the problems faced by longitudinal data
- Contributed to promoting statistical literacy on a national level as one of the core aims of the Royal Statistical Society (Simon is an active member within the Society's Education Committee)

For target group

- Was introduced to statistical concepts in an engaging way, prompting to think about and discuss these ideas
- Handled data and understood the data collected and how to manage it
- Investigated data using plots and summaries, the core skills of statistical inquiry and analysis
- Were presented with statistical literacy as a key skill being an important part of scientific research and beyond

Key advice

“Be adaptable, respond to the group you have rather than rigidly following a script. For this activity, I repeated it for three classes over three days at the school - each time it was different; how long I left them to explore, how much help and how many hints I gave.”