ABS Mission

- To assist and encourage informed decision making, research and discussion within governments and the community, by leading a high quality, objective and responsive national statistical service.

The Importance Of Statistics In Today’s Society

“Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write.” H.G Wells 1928

Why is Statistics Education Important?

- Ensure school children develop an understanding and appreciation of how data can be acquired and used to make informed decisions in their daily lives, as children and then as adults; and
- Evoke in school children interest and enthusiasm for statistics, and provide sufficient statistical learning to prepare them for tertiary studies, or a potential career, in statistics.
What Defines Statistical Literacy?

- Data Awareness
- The Ability to Understand Statistical Concepts
- The Ability to Analyse, Interpret and Evaluate Statistical Information
- The Ability to Communicate Statistical Information and Understandings

CensusAtSchool Background

- CensusAtSchool was initiated in the United Kingdom by the Royal Statistical Society Centre for Statistical Education, the Department of Education and Employment, and the Office for National Statistics.
- The project was launched nationally in Australia by the ABS in 2005. It is used to promote the statistical literacy of students in addition to promoting the Census of Population and Housing.

CensusAtSchool International Project

- CensusAtSchool has become an international project with a number of countries now participating. They include:
  - United Kingdom
  - New Zealand
  - Canada
  - South Africa
  - Australia
  - Japan

CensusAtSchool International Project

- All participating countries include a set of common questions in their questionnaires.
- There is now an International CensusAtSchool website.
- The website has an international database which allows students to compare their results with students across the world.
CensusAtSchool

Strengths

Engages students in data about themselves

Supports curricula

Integrates Information and Communication Technology

Interdisciplinary learning

Rich, Raw, Real data

CensusAtSchool

Characteristics

- CensusAtSchool is an online learning resource accessed via the CensusAtSchool web pages.

- The project is suitable for upper primary and secondary school students.

- Students can participate in the questionnaire and the data usage phases.

CensusAtSchool

Questionnaire

- The Australian CensusAtSchool questionnaire consists of 30 questions. (This includes 11 common international questions.)

- The questionnaire asks student about their characteristics, lifestyle, and opinions. There are also interactive activities which measure students’ concentration and reaction time.

- The questionnaire is completed and submitted online.

- All responses to the questionnaire are confidential and no student can be identified in the response data.
CensusAtSchool Data Usage

- Data can be accessed via the random sampler and students can take samples of up to 200.
- The data is presented in Excel spreadsheets.
- Alternatives are provided for teachers who cannot or do not want to use the random sampler e.g. prepared samples and information tables.
- Categorical, Discrete, Continuous and Bivariate data is available.

Data Analysis

Mean and Median Analysis

<table>
<thead>
<tr>
<th>Qtime</th>
<th>Sex</th>
<th>BirthYear</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Male</td>
<td>1990</td>
<td>16</td>
</tr>
<tr>
<td>12</td>
<td>Male</td>
<td>1988</td>
<td>17</td>
</tr>
<tr>
<td>13</td>
<td>Male</td>
<td>1995</td>
<td>13</td>
</tr>
<tr>
<td>14</td>
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<td>12</td>
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<td>14</td>
<td>Male</td>
<td>1991</td>
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<td>Male</td>
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<td>Male</td>
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<td>1993</td>
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<td>Male</td>
<td>1992</td>
<td>14</td>
</tr>
<tr>
<td>24</td>
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<td>1989</td>
<td>17</td>
</tr>
<tr>
<td>34</td>
<td>Male</td>
<td>1992</td>
<td>14</td>
</tr>
<tr>
<td>33</td>
<td>Male</td>
<td>1994</td>
<td>12</td>
</tr>
</tbody>
</table>

Time to finish the Questionnaire

<table>
<thead>
<tr>
<th>Gender</th>
<th>Mean time</th>
<th>Median time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>19.0</td>
<td>16</td>
</tr>
<tr>
<td>Girls</td>
<td>20.1</td>
<td>16</td>
</tr>
</tbody>
</table>

- Why is the mean greater than the median?
- What happens to the mean and median if a large Qtime is removed?
- Change a value to Qtime to make the mean the same as the median
- How can you make the median for males equal to 20?
### Data Analysis

**Boxplot for $A3:A202$**

<table>
<thead>
<tr>
<th>Min.</th>
<th>Q1</th>
<th>Med</th>
<th>Q3</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.17</td>
<td>0.27</td>
<td>0.34</td>
<td>0.4</td>
<td>0.81</td>
</tr>
</tbody>
</table>

**Reaction times using Excel add in tool**

- **Min.**
- **Q1**
- **Med**
- **Q3**
- **Max**

<table>
<thead>
<tr>
<th>Interval</th>
<th>Frequency</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0.2-0.4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>0.4-0.6</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>0.6-0.8</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>0.8-1.0</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>1.0-1.2</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>&gt;1.2</td>
<td>1</td>
<td>17</td>
</tr>
</tbody>
</table>

**Right Hand Reaction Time of Students**

- **Min.**
- **Q1**
- **Med**
- **Q3**
- **Max**

<table>
<thead>
<tr>
<th>Interval</th>
<th>Frequency</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-0.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
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<td>2</td>
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<td>3</td>
<td>5</td>
</tr>
<tr>
<td>0.6-0.8</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>0.8-1.0</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>1.0-1.2</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>&gt;1.2</td>
<td>1</td>
<td>17</td>
</tr>
</tbody>
</table>

**What is the height of your bellybutton above the floor when you’re standing?**

**Height VS Belly Button Height**

- **Remove outliers?**

**We should use less water (2006)**

**Percentage of students**

- **TAS**
- **Vic**
- **NSW**
- **WA**
- **QLD**
- **SA**

**Disagree**

**Agree**
Data Analysis

Have opinions from 2006 translated into actions in 2008?

Actions Water 2008

- Installed Tank
- Water Saving Showerhead
- Use Plug in Sinks
- Turn off Tap

Data Analysis

Selected Water Saving Actions 2008 (% of sample)

CensusAtSchool Teaching Resources

- All teaching resources are available at www.abs.gov.au/censusatschool
CensusAtSchool
Statistics Lessons

Teacher Area

CensusAtSchool Mathematics Activities

The activities on the following pages have been designed to integrate the the concepts of range, clustering and learning situations.

Each activity has a question:

- Student Worksheet
- Student Data Sheet. This can also be used by the teacher to identify trends and think about the activities.
- Table Sheet. This allows students to input data into a computer.

The activities are available online for use with the Teacher Area materials. The materials can be used to guide your teacher in their teaching. This will make the activity setting easier to accomplish.

TEACHER AREA

Title: EYECOLOUR

EYECOLOUR OF STUDENTS IN JONES PREVIOUS CLASS

<table>
<thead>
<tr>
<th>Eye Colour</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>3</td>
</tr>
<tr>
<td>Brown</td>
<td>6</td>
</tr>
<tr>
<td>Green</td>
<td>1</td>
</tr>
<tr>
<td>Grey</td>
<td>2</td>
</tr>
<tr>
<td>Hazel</td>
<td>3</td>
</tr>
<tr>
<td>Pink</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
</tbody>
</table>

He was surprised to find that blue was the most common colour and there were two with brown eyes.

6.1 Is your class the same as John's previous class?
6.2 Use the student in your class to find the most common eye colour. How do the classes differ?
6.3 Use your class to find the most common eye colour. What is the distribution of students in the class?

EYE COLOUR OF STUDENTS - COMPARING CLASSES

EYECOLOUR OF STUDENTS - ACTIVITY SHEET

<table>
<thead>
<tr>
<th>Eye Colour</th>
<th>Jones' Class</th>
<th>Your Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Brown</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Green</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Grey</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
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<td>2</td>
</tr>
<tr>
<td>Pink</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

The activities are available online for use with the Teacher Area materials. The materials can be used to guide your teacher in their teaching. This will make the activity setting easier to accomplish.

Download the Activity

Activity

Data in a spreadsheet

Sample EYECOLOUR.xls (Excel document 113KB)

Data in a table

<table>
<thead>
<tr>
<th>Eye Colour</th>
<th>Grade 6</th>
<th>Brown</th>
<th>Green</th>
<th>Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>40</td>
<td>30</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>Brown</td>
<td>30</td>
<td>20</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>Green</td>
<td>20</td>
<td>50</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>Blue</td>
<td>50</td>
<td>40</td>
<td>30</td>
<td>20</td>
</tr>
</tbody>
</table>

John's Data

<table>
<thead>
<tr>
<th>Eye Colour</th>
<th>Grade 6</th>
<th>Brown</th>
<th>Green</th>
<th>Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>40</td>
<td>30</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>Brown</td>
<td>30</td>
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<tr>
<td>Green</td>
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<td>30</td>
</tr>
<tr>
<td>Blue</td>
<td>50</td>
<td>40</td>
<td>30</td>
<td>20</td>
</tr>
</tbody>
</table>
CensusAtSchool
ABS Support for Teachers

• Professional development workshops.
• Prepared materials and lesson plans.
• Representation at teacher conferences and workshops.
• Articles in teacher journals and websites.
• CensusAtSchool webpages, with email and phone contact details.

CensusAtSchool
Advice Based on ABS Experience

• CensusAtSchool can be used in a simple or sophisticated way.
• Allow students the opportunity to handle and explore data.
• Information and Communication Technology is important.
• Prepared materials and lesson plans support teachers’ use of CensusAtSchool.
• Teachers learn from other teachers.
• CensusAtSchool resources – free and on the web.

StatSmart Project

“The CensusAtSchool questionnaire worked very well. Students were genuinely interested in collecting personal measurement statistics and comparing themselves to both others in the class and students of similar ages around Australia.”

“Some students poor at mathematics found themselves participating in the activity.”

“At times it was hard to get some students to spend time thinking and experimenting rather than doing, which is something they were not used to in mathematics.”

“The fact that in some cases there wasn’t really a correct or an incorrect answer was hard for certain students to swallow.”
In Conclusion…..

“It would be a capital mistake to theorize before one had data.”

Sherlock Holmes

Thank you