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Video and visual resources & technologies in teaching statistics

Graham R Gibbs

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Outline

- Video resources – levels, topics etc.
- Use of resources in teaching – student views
- Selecting videos – quality, accuracy etc.
- Make your own
- Technologies – Camtasia, Explain Everything, etc.

Video

- Especially on **YouTube**
- Cover
 - Statistics
 - Quants methods (e.g. surveys)
 - Software – SPSS, R, SAS, Minitab etc.



Videos - level

- School, A-level and equivalent. Especially for descriptive stats
 - <http://youtu.be/81zcyjULlh58?t=30s>
- University level – often done by lecturers
 - <http://youtu.be/mnbbRtFxAHA?t=6m7s>
- Some take statistical/mathematical approach
 - <http://youtu.be/MIqyiGvrUXE?t=2m5s>
- Some use social science data (some use biological etc.)
- Lots demonstrate how to use SPSS etc. to do stats.
 - E.g. Andy Field <http://youtu.be/Ekbkl7x6bNA?t=3m37s>

Excellent maths support

- Maths Tutor
- <http://www.mathtutor.ac.uk/arithmeticsmultiplyinganddividing/video>
 - to revise maths skills
 - basic arithmetic like calculating percentages and dealing with decimal numbers
 - introduction to algebra such as equations and squares
 - functions, graphs and series

Typical topics

- Basic concepts
 - P-value, scales, levels of measurement, mean, median, mode, IV and DV, variables
 - <http://youtu.be/GMIpnzLQtTQ?t=1m12s>
- SPSS use
 - Getting started
 - Interface, data entry, data modification/recoding, charts
 - Exploratory analysis, crosstabs, chi-square
 - Regression, correlation
 - ANOVA, t-test, non-parametric equivalents

Pedagogic use of video

- In class lecture
 - Can show only parts
 - Can pause and explain, excuse, etc.

- Use in guided independent study
 - Probably best if linked with lab instructions, used when needed, i.e. when doing assessment
 - Listen on mobile device while doing chores??

- Use in labs
 - Needs headphones to stop noise for others

Student views of videos

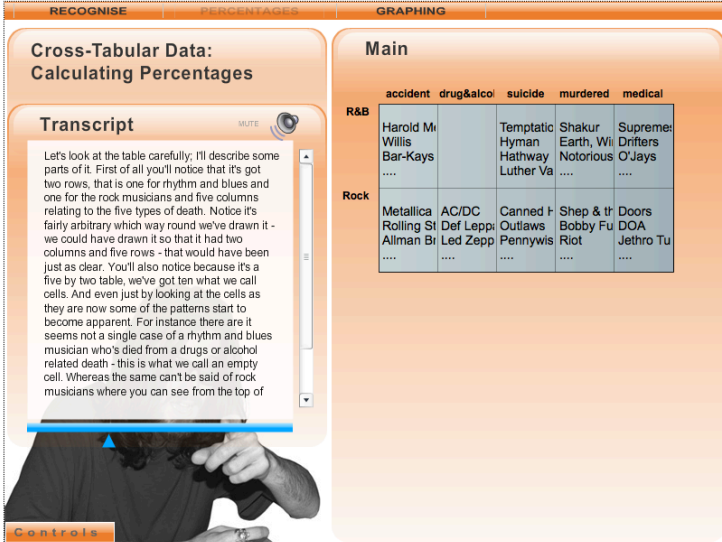
- Find use in lectures good. Can follow and then practice in following lab.
- Use less frequently outside sessions
- Like ability to pause and replay
- Some used Maths Tutor site
- Some preferred to use textbook and reading material
- Prefer handwriting worked examples on screen to prepared PowerPoints

Non video visual resources

- Reusable learning objects and other models
- Students directly manipulate and see results

A learning object on creating and analysing tables of data

- http://www.ucel.ac.uk/rlos/crosstab_data/main.html
- How to convert survey or experimental data into cross-tabular data and the steps involved in this process.
- Uses early deaths of band members
- Developed at the University of Cambridge.



The screenshot shows a software interface with three tabs: "RECOGNISE", "PERCENTAGES", and "GRAPHING". The "RECOGNISE" tab is active, displaying a "Transcript" and a "Main" section.

Cross-Tabular Data: Calculating Percentages

Transcript

Let's look at the table carefully; I'll describe some parts of it. First of all you'll notice that it's got two rows, that is one for rhythm and blues and one for the rock musicians and five columns relating to the five types of death. Notice it's fairly arbitrary which way round we've drawn it - we could have drawn it so that it had two columns and five rows - that would have been just as clear. You'll also notice because it's a five by two table, we've got ten what we call cells. And even just by looking at the cells as they are now some of the patterns start to become apparent. For instance there are it seems not a single case of a rhythm and blues musician who's died from a drugs or alcohol related death - this is what we call an empty cell. Whereas the same can't be said of rock musicians where you can see from the top of

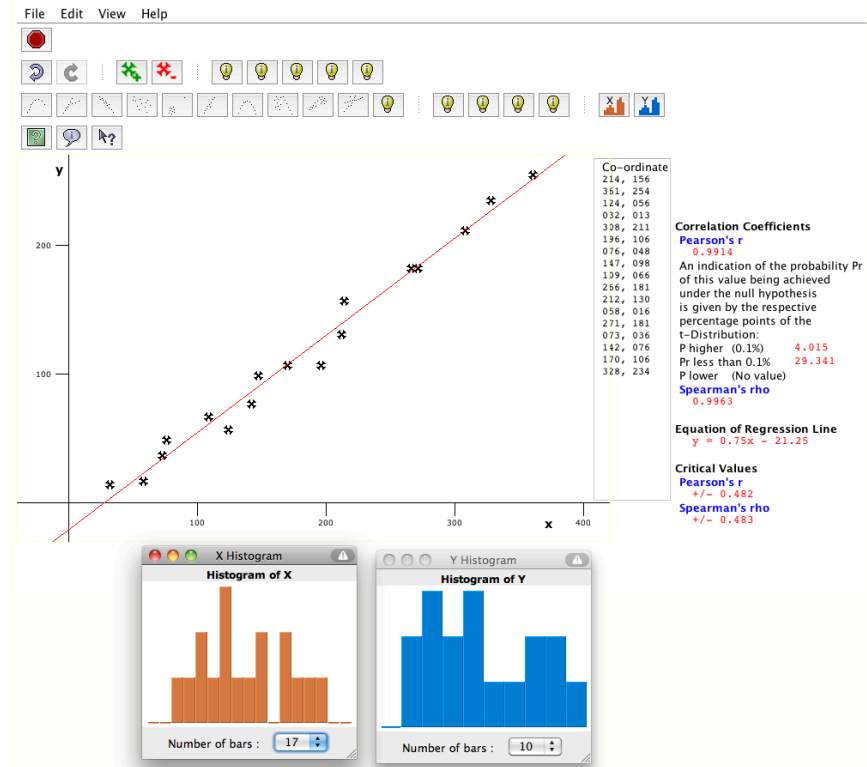
Main

	accident	drug&alco	suicide	murdered	medical
R&B	Harold M. Willis Bar-Kays		Templatic Hyman Hathway Luther Va	Shakur Earth, W Notorious O'Jays	Supreme: Drifters O'Jays
Rock	Metallica Rolling St Allman B	AC/DC Def Leppi Led Zepp	Canned F Outlaws Pennywis	Shep & th Bobby Fu Riot	Doors DOA Jethro Tu

Controls

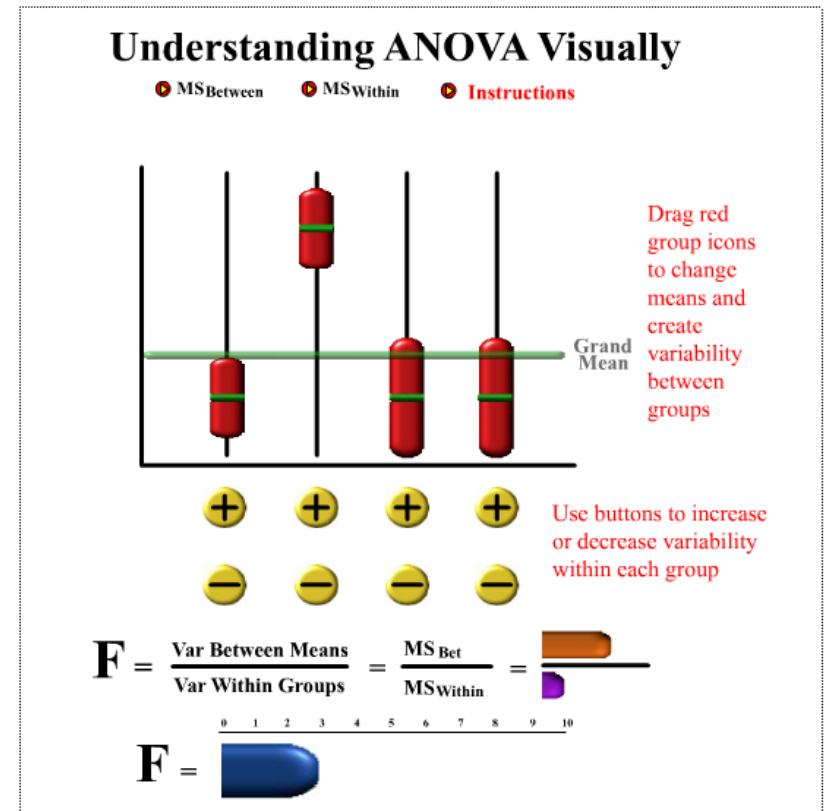
Correlation Explorer

- Software that allows you to manipulate points on a scattergram to see the effect on both the correlation statistics and the regression line. Use the buttons for canned scattergrams to quickly change the display.
- <http://hhs.hud.ac.uk/w2/tsu/Correlation.htm>



A visual tool for exploring ANOVA

- Understanding ANOVA Visually (1998, 2000) by Tom Malloy (University Utah, USA)
- <http://www.psych.utah.edu/stat/introstats/anovaflash.html>



Selecting videos

- Are data sets used suitable?
 - Students like to have data they can relate to or relevant to their discipline.

- Statistical explanations
 - Depends on pedagogic approach

- Production quality
 - Good sound needed
 - Is the speaker too chatty/amateurish etc.

Selecting videos 2

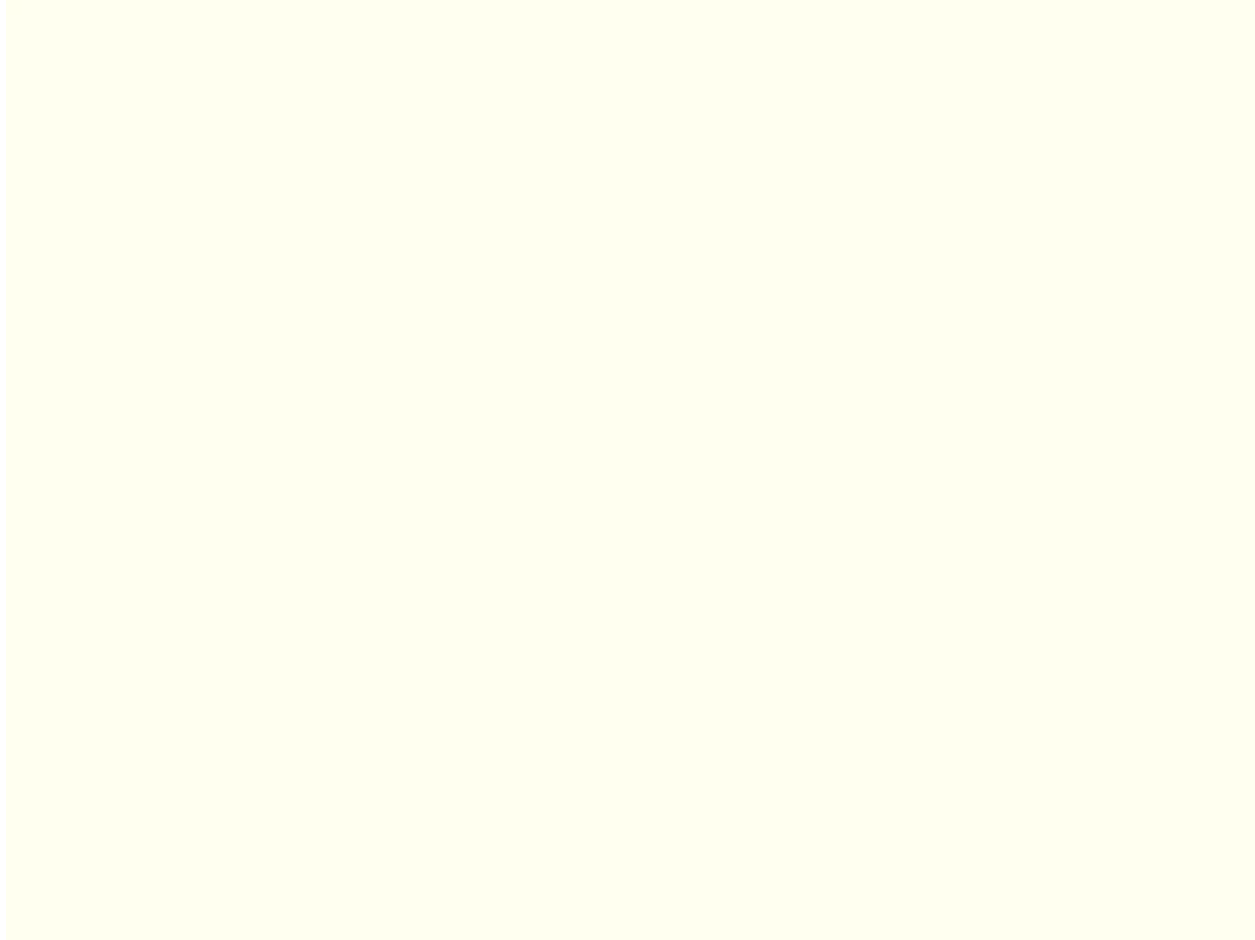
- Accuracy
 - Some videos get it very wrong
 - <http://youtu.be/wHgl6TolySw?t=5m10s>
- Debates in statistics
 - Should video include this or not?
 - Explaining discretion makes it hard for students

Producing videos

Range of technologies:

- Camera, mic and digital editing suite
- Camtasia screen recording
- Flash/HTML 5
- Screen writing (with stylus and tablet) (Kahn University style) <http://youtu.be/J1twbrHel3o?t=35s>
- iPad solutions (include recording and screen writing)

"Explain Everything" on iPad



Making it accessible

- Short videos good
- Use screen writing – students like this
- Use graphics, visual devices etc.
- Sound quality – more imp. than picture
- Visual quality – depends. Needs good quality for text. HD can look more professional
- Visual aesthetics (composition, lighting etc.)
- Licensing – find free to use music etc.
- Copyright – Not at all clear, but now use the CC licence.

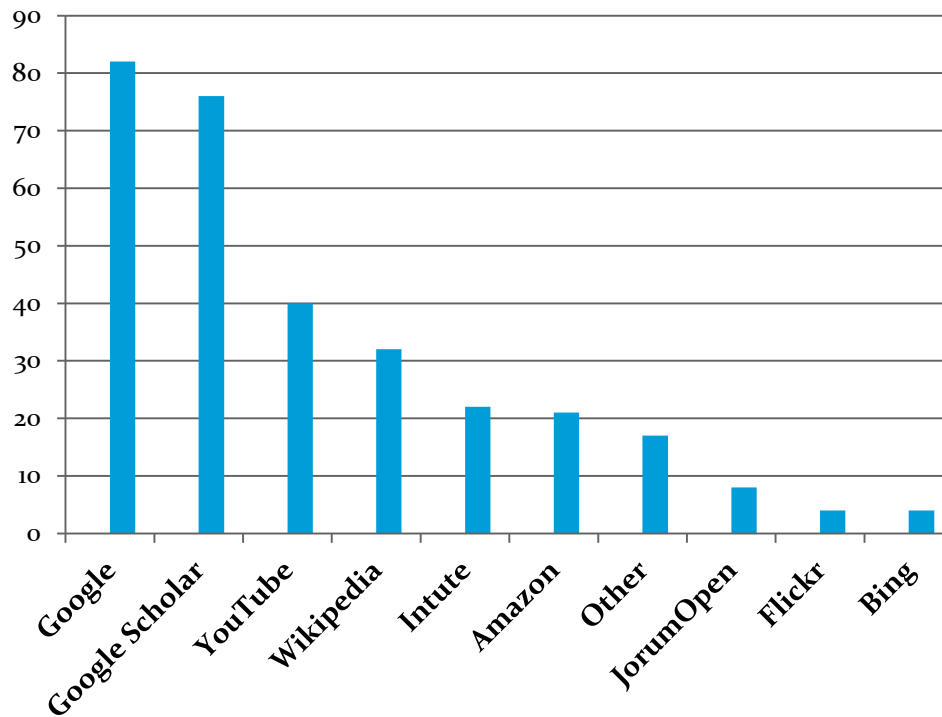
Towards a pedagogy of the visual

- **Makes** the **abstract concrete**
 - As a metaphor (graphs)
 - As symbols (equations)

- Demonstrates **process**
 - Transformation, calculation, decision making
 - Change shown by visual changes

- **Time**:
 - So changes can be seen, manipulated, repeated, paused
 - Provides space/time for absorption.

Sites used most often to search for resources



2011 study. N=99





Where third party resources have come from

Resource	%
YouTube:	50
Your Libraries' digital resources (such as e-Books):	44
Other courses on your Institution's VLE (such as Blackboard):	32
Professional body website:	24
HEA website:	19
Discipline specific website (such as OnlineQDA.hud.ac.uk):	16
Corporate website:	14
Another Institution's website / VLE:	11
National educational repository (such as JORUM):	8
Open access repository (such as OpenLearn):	8
iTunesU:	8
Box of Broadcasts:	8
Flickr:	4
Other (incl. own developed resources):	3
BUFVC:	1
MOOC / opencourseware (such as edShare):	0

Lots of use of available digital resources

2013 survey.
N=115

Conclusions

- Video – there's a lot out there
- Need care in selecting/recommending videos
- Make your own – technology is getting better and easier to use
- Google and YouTube to find