

*Teaching statistics to  
psychology and education  
Masters students: A blended  
learning approach*

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(and Professor George Leckie for teaching support)

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# Statistics in Education / Introduction to Quantitative Methods units

- Units are a pair of Level 7 (Masters) units which are differentiated simply by credits awarded and assessment.
- Statistics in Education is a 10 credit unit with 1 statistical analysis project assignment – essentially analysing 3 datasets to answer 3 simple research questions and writing up as 2000 word report.
- Statistics in Education is compulsory for our MSc in Psychology in Education and MSc Education (Neuroscience and Education) and optional for other pathways. Usually around 100-110 students.
- Introduction to Quantitative Methods is a 20 credit unit which shares the same lectures and first assignment but in addition has a second assignment that is a critical review of a paper using quantitative methods.
- Introduction to Quantitative Methods is compulsory for MSc Education Research and our first year PhD students. Usually around 15-30 students.

# Course Delivery (previously)

- The students are split into groups (currently 6) in part due to size of computer laboratory that takes a maximum of 30 but also to give a good SSR.
- The course is taught over 10 weeks with 2 hour sessions per week.
- There are 2 instructors, Professor Bill Browne and Professor George Leckie who take 3 groups each with part support from teaching assistants for computer practical aspects.
- The time slots are varied to account for our mixed audience with 2 evening slots and 4 in the day (many of our masters students are part-time and work).
- Each session is a mixture of different elements that vary from week to week but contain lecture, journal article discussion, and SPSS practicals.

# Course Content

The 10 weeks are broadly described as:

1. Introduction to Quantitative Research methods and SPSS
2. Populations and Samples. Summarizing and Describing Variables.
3. Probability, sampling distributions and introduction to hypothesis testing
4. Hypothesis testing. The independent samples t-test.
5. Effect sizes; Testing for normality; 1 and 2 tailed tests; The Mann Whitney test
6. Tests for differences in paired outcomes.
7. Correlation and the Chi-squared test.
8. Practice Assignment and Revision slides.
9. Working on Assignment
10. Further Statistics topics

So in essence there are 7 weeks of content with 2 weeks of assignment activities and a final week giving an accessible overview of more advanced statistics.

# What do students think?

- Both myself and George Leckie are experienced lecturers who have taught on and off the units for many years so have honed our technique.
- Overall feedback is positive despite the fact that these are not statistics students per se – nice comments about the first time the students really understand statistics etc. In fact feedback is one of highest for units on the Psychology in Education course!

Number of students completing unit	% responses to “Overall, how would you rate this unit?”				
	Excellent	Good	Average	Not very good	Prefer not to say
<b>EDUCM5504</b> 116 filled in questionnaire	34.5% (40)	56.9% (67)	6.0% (7)	1.7% (2)	0.8 (1)
<b>EDUCM0003</b> 15 filled in questionnaire	60% (9)	40% (6)	0	0	0

# And then Covid hit..... So what could we do?

- Basically teaching the course from our respective houses with no access to the computer laboratory!
- Students would be based all over the world, from some stuck in rooms in Bristol to others stranded in their home countries.
- General strategy (at school level) for Autumn 2020 was to ensure students have some in-person teaching so IQM was chosen as the unit for this for the students taking it so essentially we had 5 groups solely online and 1 group in-person in a lecture room but not a computer lab.
- The plan of attack was to get as much prepared early as possible – particularly important for me as School Education Director overseeing the delivery of ALL teaching in the school!

# Stage 1 – What to do about SPSS worksheets

The screenshot displays the IBM SPSS Statistics interface. The Data Editor window shows a dataset with variables 'smoety', 'gender', and 'Gets tense when doing maths homework'. The Output Viewer window displays two frequency tables. The first table, titled 'Gets tense when doing maths homework', shows the distribution of responses for the variable 'Gets tense when doing maths homework'. The second table, titled 'Person's gender', shows the distribution of responses for the variable 'Person's gender'. A yellow circle highlights the mouse pointer in the Output Viewer window.

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly disagree	4	25.0	28.6	28.6
Disagree	5	31.3	35.7	64.3
Agree	3	18.8	21.4	85.7
Strongly Agree	2	12.5	14.3	100.0
Total	14	87.5	100.0	
Missing System	2	12.5		
Total	16	100.0		

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Male	7	43.8	43.8	43.8
Female	9	56.3	56.3	100.0
Total	16	100.0	100.0	

I produced Walkthroughs for ALL our worksheets where I sat at home and talked to the screen using screen capture software *Freecam* to produce videos.

I then used *Openshot* free video editing software to append titles at the start.

*Freecam* gives the pointer you can see on the screen with a yellow circle so that viewers can follow the mouse.



# Stage 2 – Attending Digital Design training and formatting our Blackboard site

The Central university offered very useful Digital Design training with a 1 week course (1 hour a day).

We also designed as a school (with IT help) a standard format for the pages on our VLE (in Blackboard)

For each week there were pre-readings and asynchronous presentations.

The screenshot shows a Blackboard course page for 'Statistics in Education 2020'. The page is titled 'Week 1' and features a green header bar. The main content area is divided into sections: 'Welcome', 'Pre-reading', and 'Asynchronous Presentations'. The 'Pre-reading' section includes three PDF files: 'Statistics in a Nutshell.pdf' (1.573 MB), 'How to install SPSS on your personal computer.pdf' (395.798 KB), and 'How to renew your SPSS licence.pdf' (431.127 KB). The 'Asynchronous Presentations' section includes two PDF files: 'Lecture 1 - Part 1 - Why do I need to learn statistics And examples of statistical research questions.pdf' (319.018 KB) and 'Lecture 1 - Part 2 - Types of Data.pdf' (394.839 KB). A search bar is visible at the bottom left of the page.

# Asynchronous lectures

The variable *readscore* holds the scores for each participant on a reading test

The variable *freqread* holds information on how often the participant reads for pleasure

Each row holds all the data for a single case, e.g. Participant 4

	readscore	female	ethnicity	freqread	instrument	esteem	age_mo
1	129	Yes	Black	Most days	No	15	
2	134	No	White	At least once a month	Yes	.	
3	125	No	White	Most days	No	.	
4	98	Yes	White	At least once a week	Yes	15	
5	88	No	White	Never	Yes	.	
6	77	No	White	At least once a month	Yes	13	
7	129	Yes	Asian	Most days	No	14	
8	138	Yes	White	Most days	Yes	15	
9	136	Yes	White	At least once a week	No	11	
10	106	No	Asian	At least once a week	No	.	
11	74	Yes	White	At least once a week	No	12	
12	100	No	Other	Never	No	12	
13	115	Yes	Black	Most days	Yes	11	
14	125	No	White	Less than once a month	No	11	
15	172	Yes	White	Most days	No	.	

Each week's lecture was broken down into chunks of between 15 and 30 minutes and we split these between us to deliver.

We used Zoom to record and had the novelty of talking to oneself on summer days.




As you can see the display gives the slides with the speaker to the top right. One bonus was the occasional appearance of kittens (in my case) or small child (in George's case) to give the students something to spot!




# VLE continued


< +

vebapps/blackboard/content/listContent.jsp?course\_id=\_240709\_1&content\_id=\_4903653\_1&mode=reset

### Asynchronous Presentations

Attached File  Lecture 1 - Part 1 - Why do I need to learn statistics And examples of statistical research questions.pdf   (319.018 KB)

 Lecture 1 - Part 2 - Types of Data.pdf   (394.839 KB)







Here are the two videos for this week to watch asynchronous along with pdfs of the powerpoint slides for each video in case you want to watch and read simultaneously

First part 1 with George Leckie  
[Click to view Re/Play recording](#)

Next part 2 with Bill Browne  
[Click to view Re/Play recording](#)

### Synchronous sessions




Attached File  Lecture 1 synchronous.pdf   (502.181 KB)




Here you will see slides for the live session. You should attend the session for the group you have been allocated though if you cannot make your group on a particular week it is OK to email us and join an earlier/later group. To join the session go to the Live sessions link on the left hand side and aim to arrive at the session 5 minutes before the hour.

The video of one groups session is found here:  
[Click to view Re/Play recording](#)

### SPSS worksheet work to do post session




Attached File  Worksheet 1.pdf   (279.842 KB)









Here you will see this week's worksheet to work through using SPSS. Make sure you have installed SPSS and tried the sheet before watching my walk-through videos and looking at the longer version with answers.

If you have done this and wish to see my walk through then mark this item is reviewed and look at the next item that is revealed

### SPSS Walkthroughs, solutions and extra practicals

Attached File  Worksheet 1 - long version with output.pdf   (446.882 KB)

 Descriptives - Practical.pdf   (270.593 KB)

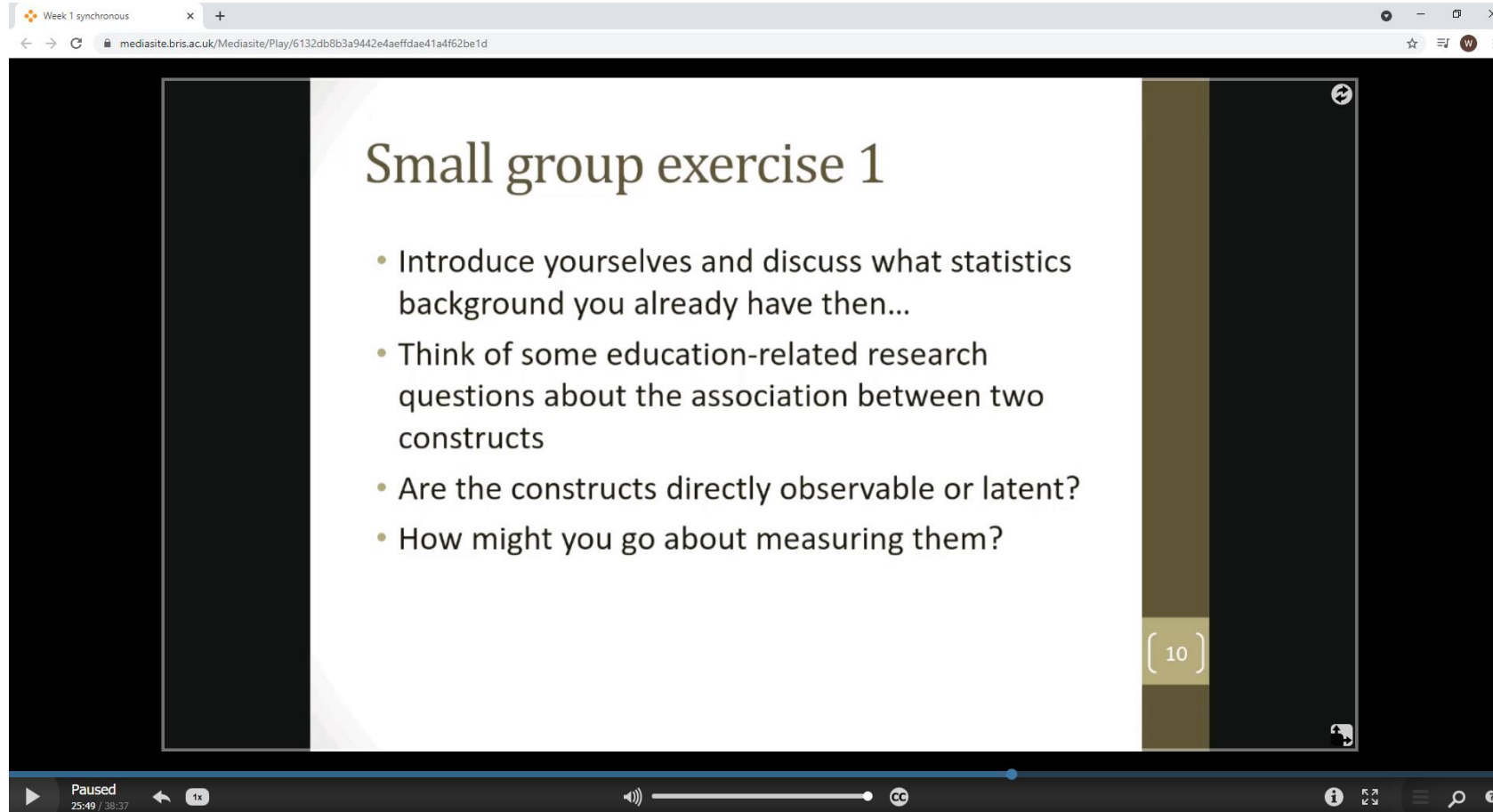
 Descriptives - Quiz.pdf   (248.14 KB)

Having done the lecturing part of the course in an asynchronous fashion, we then needed to decide how to organise the synchronous sessions.

These were reduced in length to 1 hour and we both attended all 6 groups.

As you can see on the VLE the slides for the synchronous session were put up in advance and then the page for a week finished with the worksheets and walkthroughs.

# Synchronous Lectures - online



Week 1 synchronous

mediasite.bris.ac.uk/Mediasite/Play/6132db8b3a9442e4aeffd4e41a4f62be1d

## Small group exercise 1

- Introduce yourselves and discuss what statistics background you already have then...
- Think of some education-related research questions about the association between two constructs
- Are the constructs directly observable or latent?
- How might you go about measuring them?

[ 10 ]

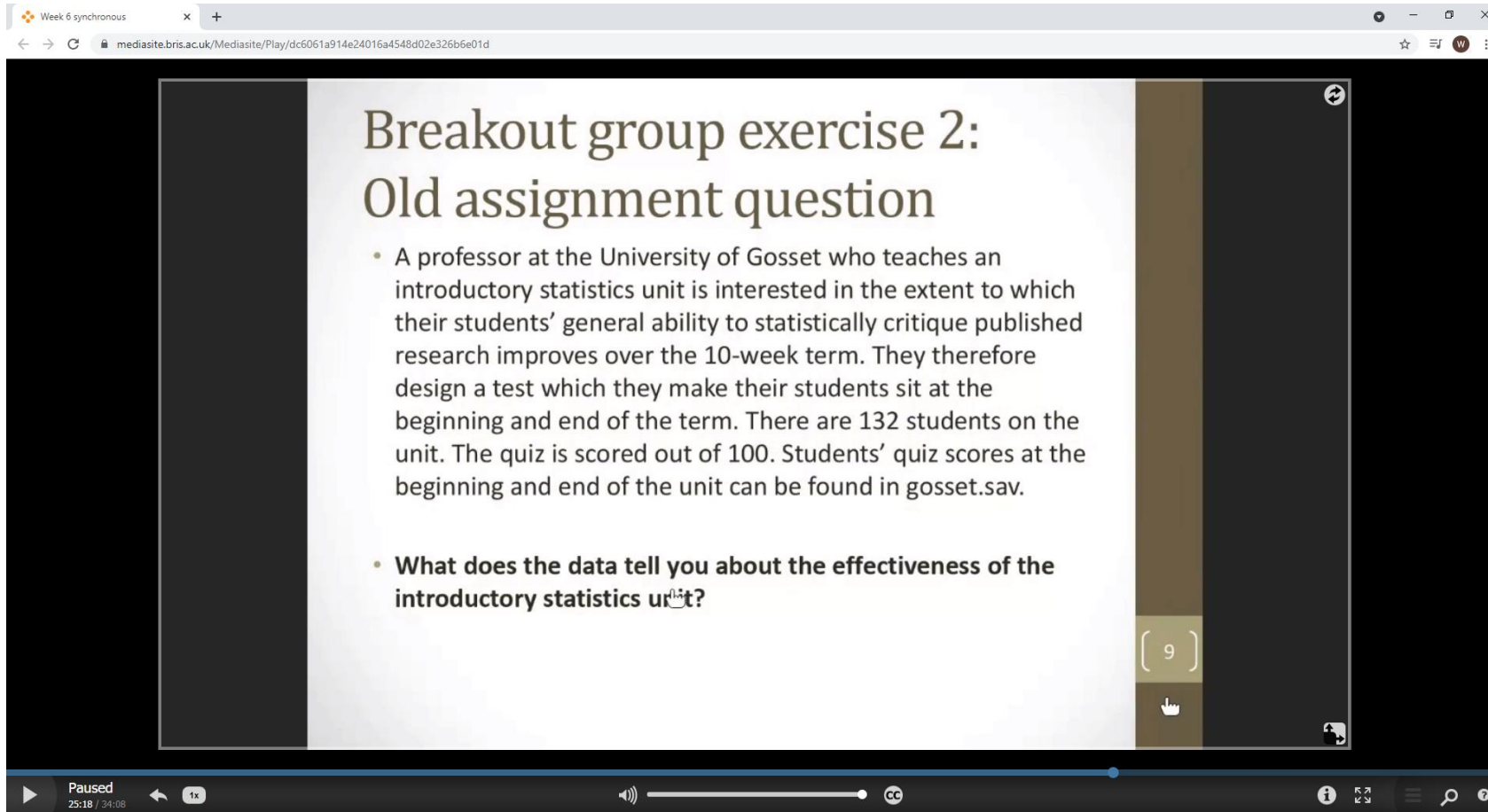
Paused  
25:49 / 38:37

The lectures were run in Blackboard Collaborate and so the students would see the slides and sometimes the lecturer and hear us talk to the slides - to the right is the recording.

One of us would talk and the other control the chat to answer questions etc.

We would use breakout groups to split students into groups of 4-5 to do activities like that shown here. We would circulate around chat rooms to facilitate the conversations.

# Adapting materials for synchronous sessions



The screenshot shows a video player interface. The main content is a slide with the following text:

## Breakout group exercise 2: Old assignment question

- A professor at the University of Gosset who teaches an introductory statistics unit is interested in the extent to which their students' general ability to statistically critique published research improves over the 10-week term. They therefore design a test which they make their students sit at the beginning and end of the term. There are 132 students on the unit. The quiz is scored out of 100. Students' quiz scores at the beginning and end of the unit can be found in gosset.sav.
- **What does the data tell you about the effectiveness of the introductory statistics unit?**

The video player controls at the bottom show the video is paused at 25:18 / 34:08. There are also volume, full screen, and other standard video controls.

In each lecture we would start with a short 10-15 minute recap of the asynchronous lecture materials.

We then had to fill the remaining time with no chance to do SPSS worksheets and so we usually had 2 breakout sessions.

The first was an activity done in previous years around journal article discussion.

The second was a new activity where we gave the students an old assignment question and output and got them to work in groups through it.

# Synchronous Lectures in person



(Image: Twitter/@JAFMacDonald)

For the synchronous lectures we had to wear visors and the students had to wear both masks and visors!

With steaming up glasses and limited vision the picture to the right springs to mind.

To give similar experience we used exactly the same materials for both delivery methods.

The class should have been 22 students, but lots of the IQM students were stuck in home countries or nervous of Covid so we never had more than 5 or 6.

In the first lecture they spread widely round the room and so that made group discussions more challenging!

# What went well?

- The asynchronous lectures were well received. Students particularly liked the chance to watch whenever they wanted and to recap when the assignment came around.
- The team approach to teaching worked really well. If either of our internet froze (thankfully very rarely) then the other lecturer could cope and we could have a good rapport with each other and the students. Much more informal teaching from our own homes!
- The new approach meant not having to give the same lecture 6 times and the new practicals around past assignment questions prepared the students better for their own assignments.
- The SPSS walkthroughs were very well received. Our additional practicals which normally don't get much usage were also much more attempted as students were more engaged – maybe less to do if stuck inside due to covid!

# Unexpected bonuses

- Being online in Blackboard seemed to engender more conversation and of course students had name labels so easier to talk to them!
- Teaching from home made us seem I suspect more human. Occasional cat or child activity was appreciated and the fact there were 2 of us who get on well chatting away – particularly before the start of the lecture was much appreciated.
- One student wrote “I might even prefer online learning to face-to-face teaching now! The asynchronous lectures and exercises are all very helpful and makes attending the lectures much more enjoyable and interactive.”
- Another “The 'duality of man' was never used so pragmatically in a learning environment. Bill and George's changes kept the information fresh.”



# What was less good

- Breakout groups worked to some degree but some students had poor internet and kept on losing connection.
- Also some students wouldn't put on their camera or microphone meaning that some group discussions were less good but varied from group to group.
- The online teaching didn't translate well back into the covid restricted classroom.
- Although feedback was excellent, there were slightly more fails on the assignment.
- The close captioning of the lectures was interesting and wasn't great with the Welsh accent!
- It is kind of weird to have taught 100+ people while not meeting them in person. Graduation if/when it ever happens will be interesting!

# Overall feedback

The Overall unit feedback was up greatly from last year with nearly 70% saying the unit was excellent and virtually all students saying Excellent or Good. There was a slight drop with the IQM course some of whom had in-person but also some with dodgy internet from far-flung places.

The comments were virtually all positive

Number of students completing unit	% responses to "Overall, how would you rate this unit?"				
	Excellent	Good	Average	Not very good	Prefer not to say
EDUCM5504 (95 students answers)	68.4% (65) 34.5% LY	30.5% (29)	1.1% (1)	0% (0)	0% (0)
EDUCM0003 (22 students)	50% (11) 60% LY	45.5% (10)	4.5% (1)	0% (0)	0% (0)

# What's next – Short course delivery

- At the Centre for Multilevel Modelling we deliver 3-day multilevel modelling courses twice a year to other academics.
- With trepidation we delivered the January workshop to 40 people as we usually do in person.
- We used the team approach with 1 of us manning the chat and 1 giving lectures and it became much more interactive.
- So much so that in July we taught 85 people simultaneously and ran break out groups for practicals in three different software packages (MLwiN, R and Stata).

# What's next – this Autumn's delivery

- University of Bristol plans to have in-person teaching wherever possible so was our 1 year of work wasted?
- NO! We plan to continue with the asynchronous lecture delivery but in the extended 1.5 hour in-person sessions after the recap lectures we will cover the exercises from 2020 i.e. journal discussions and past assignment questions with in addition the worksheets on SPSS to be started in the labs.
- The only downside is the university has upgraded SPSS to version 28 (from my walkthroughs using version 24) so although the walkthroughs are available they are perhaps less useful!