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A WORLD
TOP 100
UNIVERSITY

Training the Trainers: How do we educate staff in modern technologies?

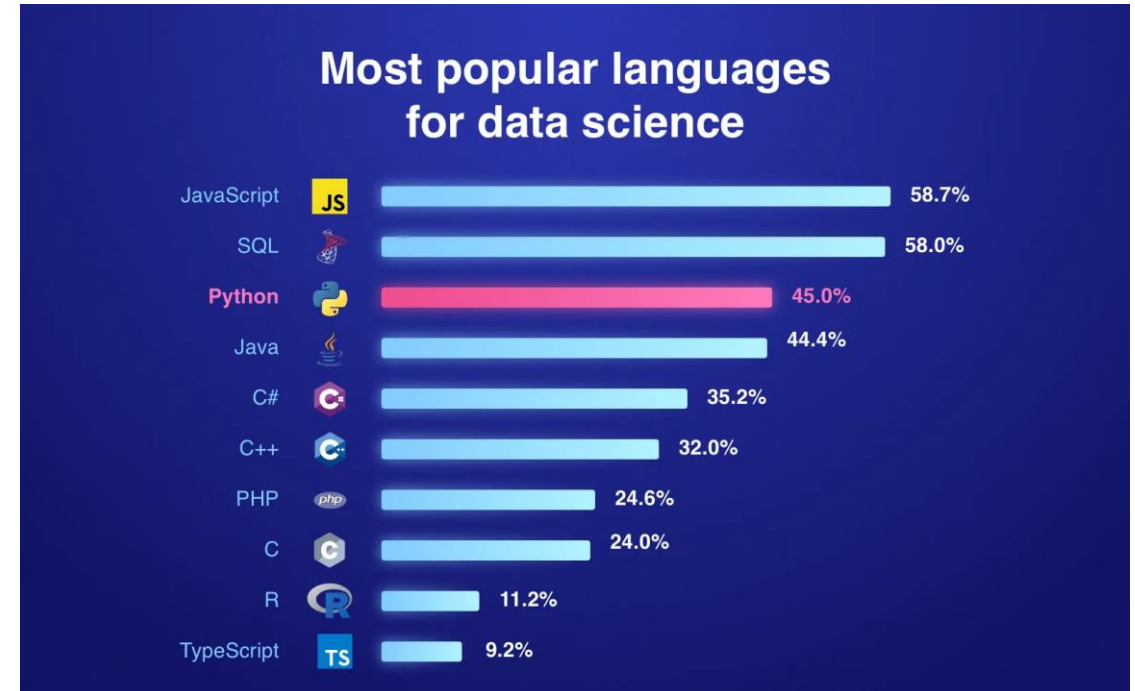
Dr Vinny Davies, University of Glasgow

WORLD
CHANGING
GLASGOW

THE SUNDAY TIMES
GOOD
UNIVERSITY
GUIDE
2024
SCOTTISH
UNIVERSITY
OF THE YEAR

Why do we need new technologies?

- Should statistics adapt to new technologies?
- Should we educate students around new technologies?
- What about less trusted technologies, e.g., ChatGPT?
- It depends if they are used in practice
 - Industry?
 - Academia?
 - Government?



Past technologies

- We have adapted in the past
- What happened to Minitab?
 - Glasgow switched from Minitab to R around 2010
- Most universities, presumably, now teach R as the core programming language
- When I did my undergraduate (Lancaster) RStudio was just being introduced
 - What about tidyverse?
- What about Machine Learning?





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Current & Future technologies

- What are technologies you adding / do you want to add?
- At the University of Glasgow, we are now adding:
 - Python
 - Version Control
 - AI – essentially Deep Learning
 - ChatGPT



Mentimeter Code: 6646 6100



Upskilling Staff

- Upskilling staff is an interesting problem
 - Do we have the time?
 - Will staff prioritise it even if they do?
- My best guess at what our staff know?
 - Machine Learning – around 50-60%
 - Python – around 20-25% (only 10% prepared to teach it)
 - Version Control – 15% well, 40% at all
 - AI – 7-12%
 - ChatGPT – 3% (Jenn) well, 7-10% basic

This is my personal best guess... no uncertainty quantification... a bad attempt at an ordinal scale...



Why upskill Staff?

- Teaching
 - Teaching will change, so staff need to know about new technologies
 - Can't just rely on a small number of staff
 - For students to learn effectively the technologies must appear in more courses
 - Student projects will also change, staff will struggle to help
- Research
 - Research is changing like teaching
 - Upskilling our staff helps with research
 - Train better future staff (PGRs) and leaders



Skills Courses

- What are we doing to upskill staff? One approach is skills courses
- Staff don't have time to take long courses, e.g. existing modules
- They will engage in shorter training sessions / seminars
- They will learn if their PGRs begin using it



Skills Courses

- Version Control, ChatGPT (in development)
- Detailed information in course materials, combined with regular (6 monthly) training sessions / seminars
- We aim to teach staff, PGRs, PGTs and UGs
 - Aiming the course at multiple level makes the time investments worthwhile
- A contagious approach – you will learn it if others around you use it

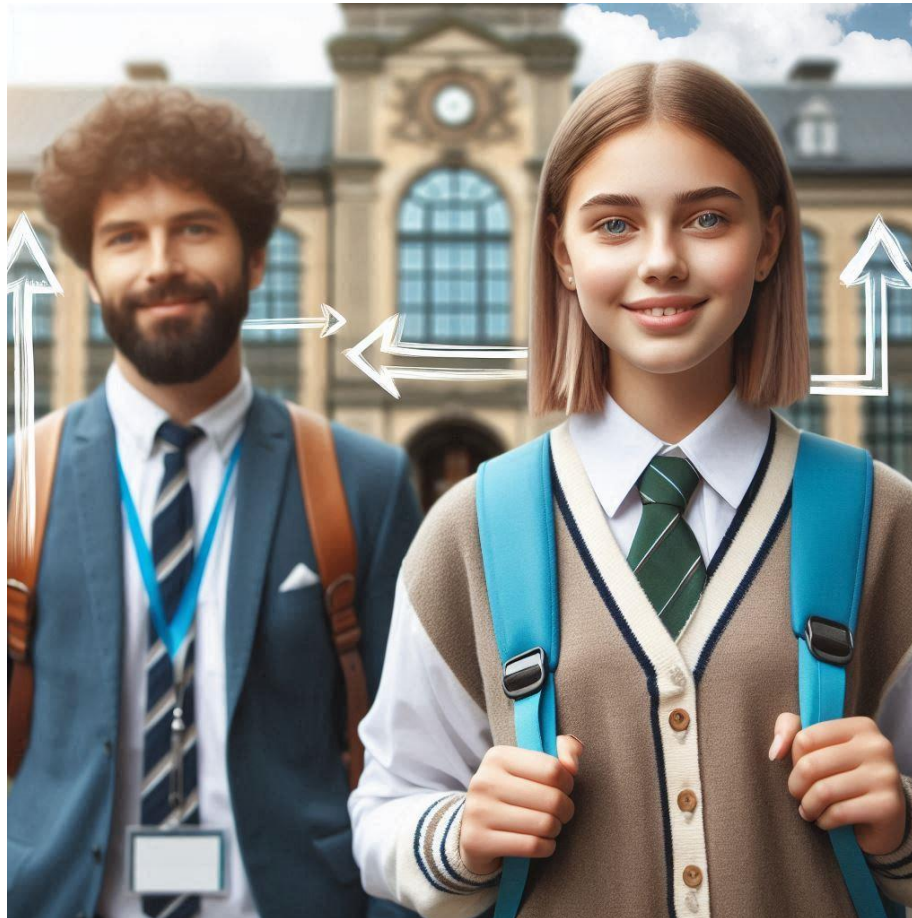
I'm sure there is a proper pedagogical term for this, but I couldn't quite find the right thing... ChatGPT just lied to me...



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A contagious approach

- This was the best Microsoft Designer could manage...





A contagious approach

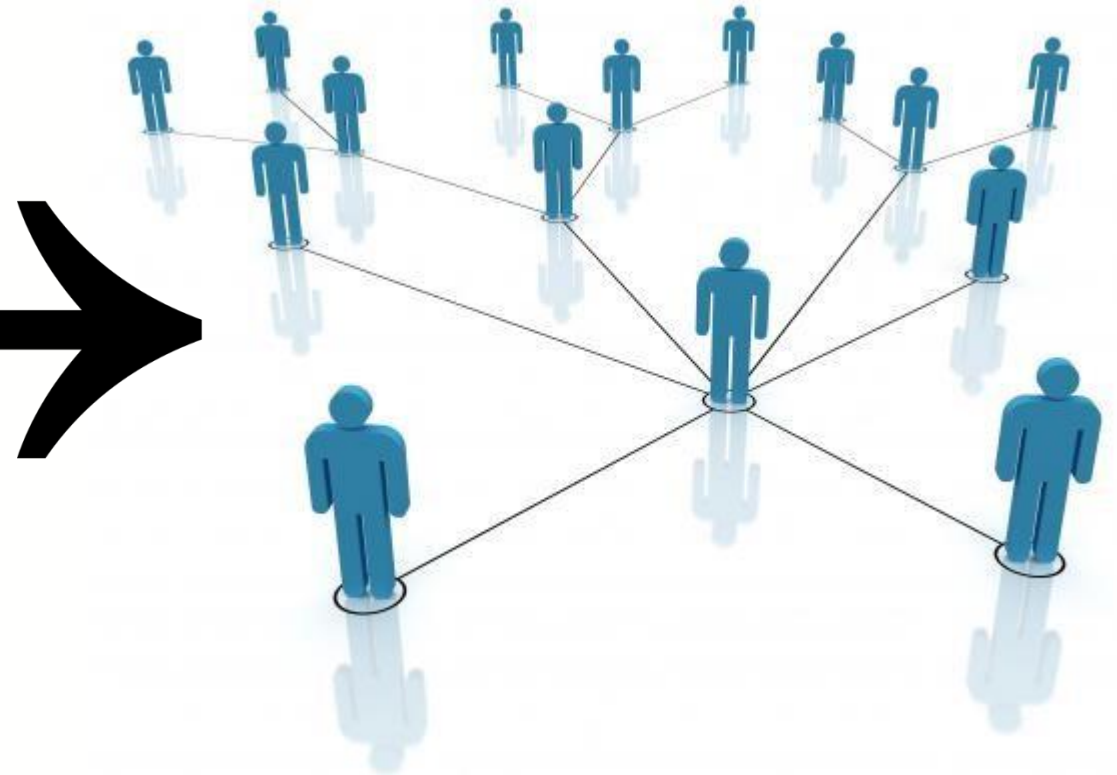
- Staff educates PGR, or PGR educates Staff.





A contagious approach

- Staff educates PGR, or PGR educates Staff. A network where everyone learns





Multi Code Integration

- For students to properly learn new technologies, they must be integrated into multiple courses





R-Python Integration

Jack, E., Alexander, C., McArthur, D., & Mair, C. (2023). Reflections on designing and delivering an online distance learning programme in the mathematical sciences. *MSOR Connections*, 21(2), 25-33.

- Our accessible notes now allow switching between languages or descriptions
- We first used this in our Version Control course for GitHub Desktop vs command-line
- We can also use it for R vs Python

R | Python

```
library(ggplot2)
library(dplyr)
library(moderndiver)
library(gapminder)
library(skimr)
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R | Python

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from statsmodels.formula.api import ols
```



Benefits and Problems of Multi Code Integration

- Benefits – Students see the programming languages throughout the programme
- Problem – not many of our staff know Python
- What are the impacts of multi code integration?
 - Does it force staff to learn basic Python?
 - Do we need to teach them?
- Not in my opinion, but we need to provide them support
 - Drop-in sessions? PGR support?





Do staff need to know both options?

- What do you think about the concept of teaching a course in multiple languages?
- Do you think that staff need to know both options?
- Is it fine that code is available in 2 languages, but only taught in 1?

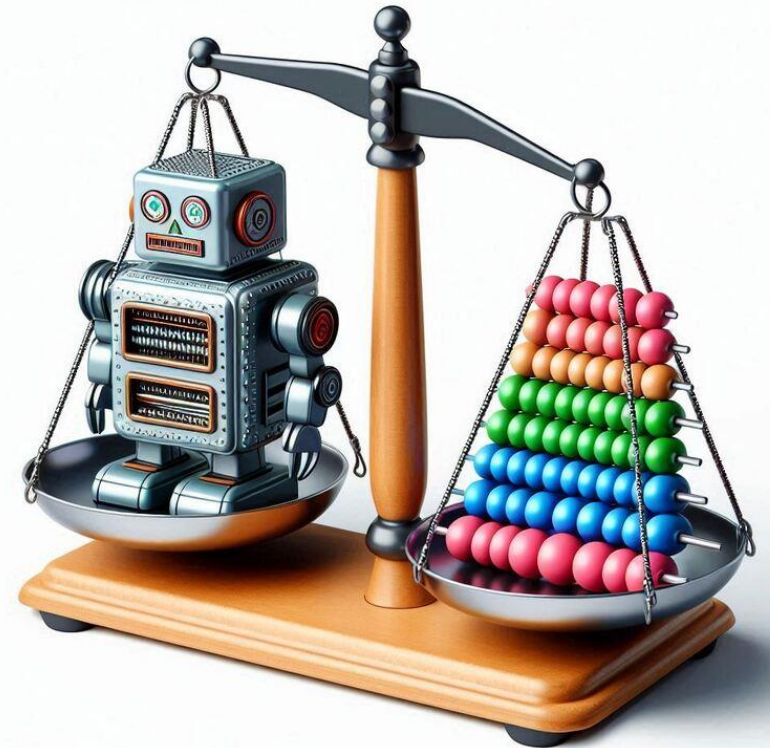


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Should we teach AI?

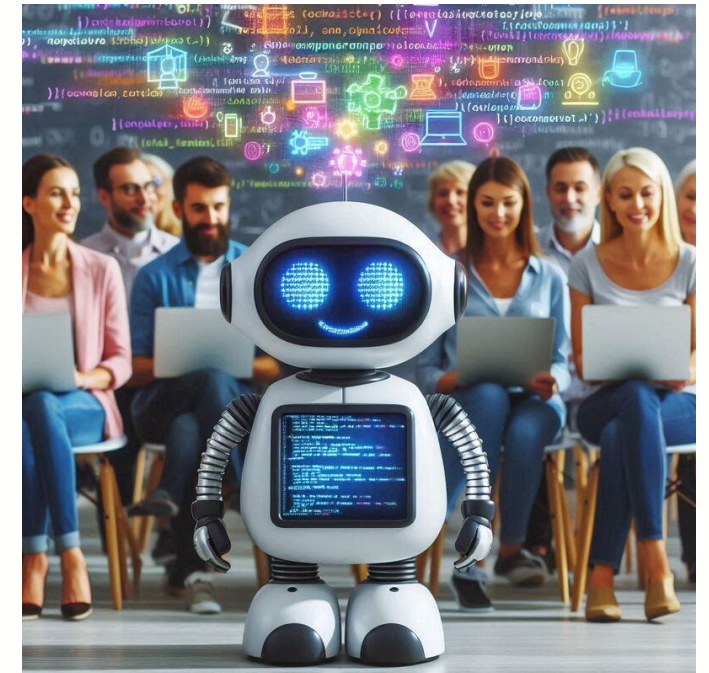
- How much to teach AI in Statistics courses is a big question for universities currently?
- Whether you integrate it depends on your course and your available staff?
- How do we teach enough staff about AI to not be reliant on a small number of staff?
- How do we ensure the course is up-to-date if we don't have an in-depth knowledge of AI?





Teaching staff AI

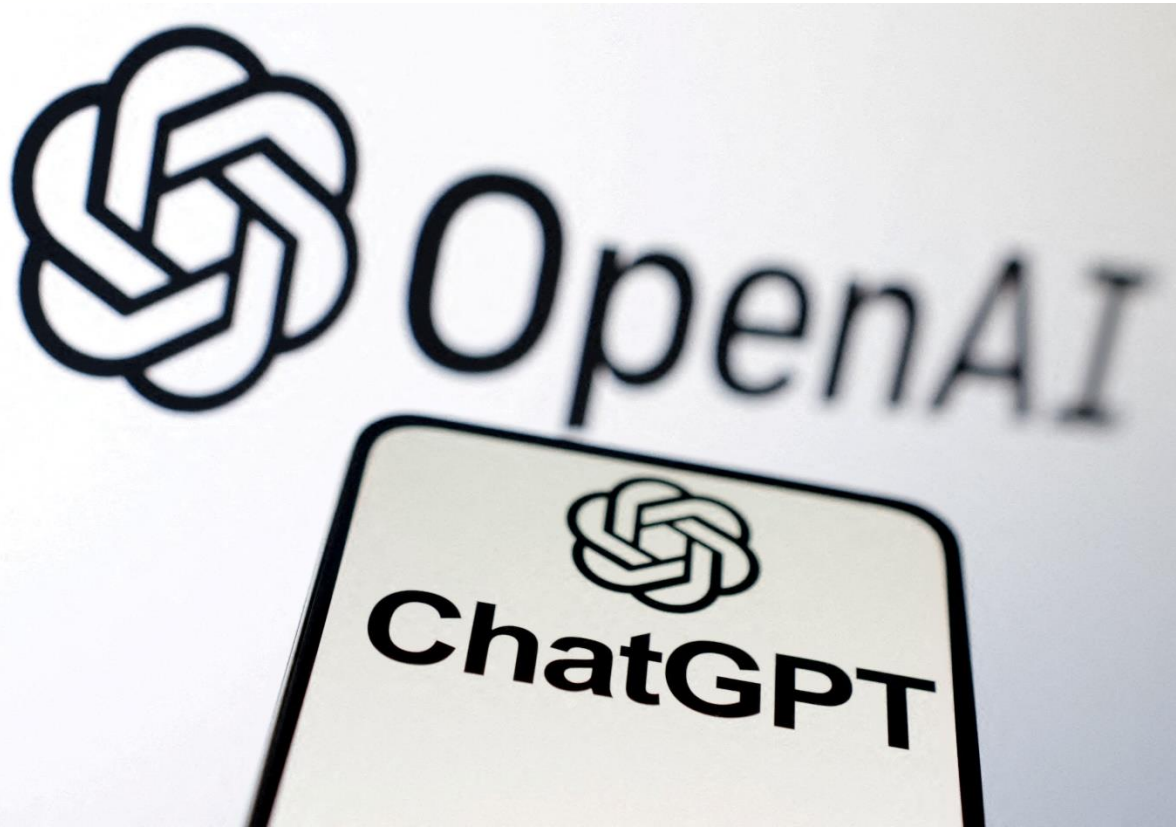
- How do we ensure we have enough trained staff to not get caught short?
- Encourage research collaboration between staff with different skills?
- Invite speakers that teach within AI disciplines?
- Internal staff seminars?
 - Doesn't seem possible with current workloads
- Require specialist Computing Science teaching staff
 - Even harder to find than statisticians!





Integrating Generative AI (ChatGPT)

- Should we integrate ChatGPT?
- How do we teach it when we don't know how to use it?



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Taking generative AI seriously

- How do we convince our school / department of its importance?
 - I demonstrated how quickly ChatGPT could get 95-100% on my Python assignment. Most people appeared completely surprised
- Everything will change, people are starting to understand it, but they don't understand quite how much things will need to change
 - It will also evolve as students learn more quickly than us



How do we teach generative AI?

- It seems difficult to integrate into every course, but multi-course integration will almost certainly be necessary in the long run
- We are addressing this with another skills course
 - No idea where we are finding this time...
- Does every school have the skills to put this together?
- Is there a need for training materials that are more applicable to statistics?
 - Yes, at least in my opinion



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Thanks for Listening

Let me know if you have any questions

Or feel free to reach out at:
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Slides available at:
https://github.com/vinnydavies/presentations/blob/master/UKCOTS2024_VinnyDavies.pdf

