Introduction to the Course

Understanding Society with Big Data:

Computational Social Science (CSS)

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informatics

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School of Social
& Political Science

What is Computational Social Science?

INSIGHTS

POLICY FORUM

SOCIAL SCIENCE

Computational social science: Obstacles and opportunities

Data sharing, research ethics, and incentives must improve

By David M. J. Lazer[1,2], Alex Pentland[3], Duncan J. Watts[4], Sinan Aral[3], Susan Athey[5], Noshir Contractor[6], Deen Freelon[7], Sandra Gonzalez-Bailon[4], Gary King[2], Helen Margetts[8,9], Alondra Nelson[10,11], Matthew J. Salganik[12], Markus Strohmaier[13,14], Alessandro Vespignani[1], Claudia Wagner[14,15]

The field of computational social science (CSS) has exploded in prominence over the past decade, with thousands of papers published using observational data, experimental

dependencies within data. A loosely connected intellectual community of social scientists, computer scientists, statistical physicists, and others has coalesced under this umbrella phrase.

MISALIGNMENT OF UNIVERSITIES

Generally, incentives and structures at most universities are poorly aligned for this kind of multidisciplinary endeavor. Training tends to be siloed. Integrating computational training directly into social science (e.g., teaching social scientists how to code) and

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- "[CSS is] **the development and application of computational methods to complex, typically large-scale, human (sometimes simulated) behavioral data."**

... to understand society

"Computational Social Science" Lazer et al. 2009

Why Learn Computational Social Science?

To make a living..

- Understand what others think
  - About your company, about an issue
- Think out of the box
  - Many CSS solutions complement or are alternative to Computer or Social Science solutions
- A lot of transferrable skills
  - Social Science, Data Science, AI, Machine Learning, Natural Language Processing, Network Science, Visualization
  - Soft skills: Interdisciplinary Research, Ethics, Story Building

Learning Objectives

- Formulate Research Questions
  - Understanding Society
- Identify the Data & Computational Methods
  - with “Big Data”
- Apply the Methods & Explain the Findings
  - Implications & Limitations
  - To a Wide Audience
- Collaborate Responsibly and Effectively
  - In an interdisciplinary Setting
  - Have fun 

Syllabus

1. Introduction
2. Qualitative & Quantitative Data & Analysis
3. Data & Exploration
4. Machine Learning (“AI”)

--- Flexible Learning Week & Project Planning ---

5. Ethics
6. Networks
7. Text
8. LLMs (ChatGPT )
9. Legality

Lecturers

Tuğrulcan Elmas

(Informatics)

Clare Llewellyn

(Politics)

Björn Ross

(Informatics)

Tod Van Gunten

(Sociology)

Walid Magdy

(Informatics)

Peaks Krafft

(Sociology)

THE UNIVERSITY of EDINBURGH

Edinburgh Futures Institute

Social Data Science Hub at

THE UNIVERSITY of EDINBURGH

Me

- Born in Turkey TR
- Name: Tuğrulcan “Two-rule-john” / Tj
- BS in Turkey, PhD in Switzerland, Postdoc in USA
- Research on Social Media (Trolls)
- Lecturer at the University of Edinburgh
- Co-Directing Smash

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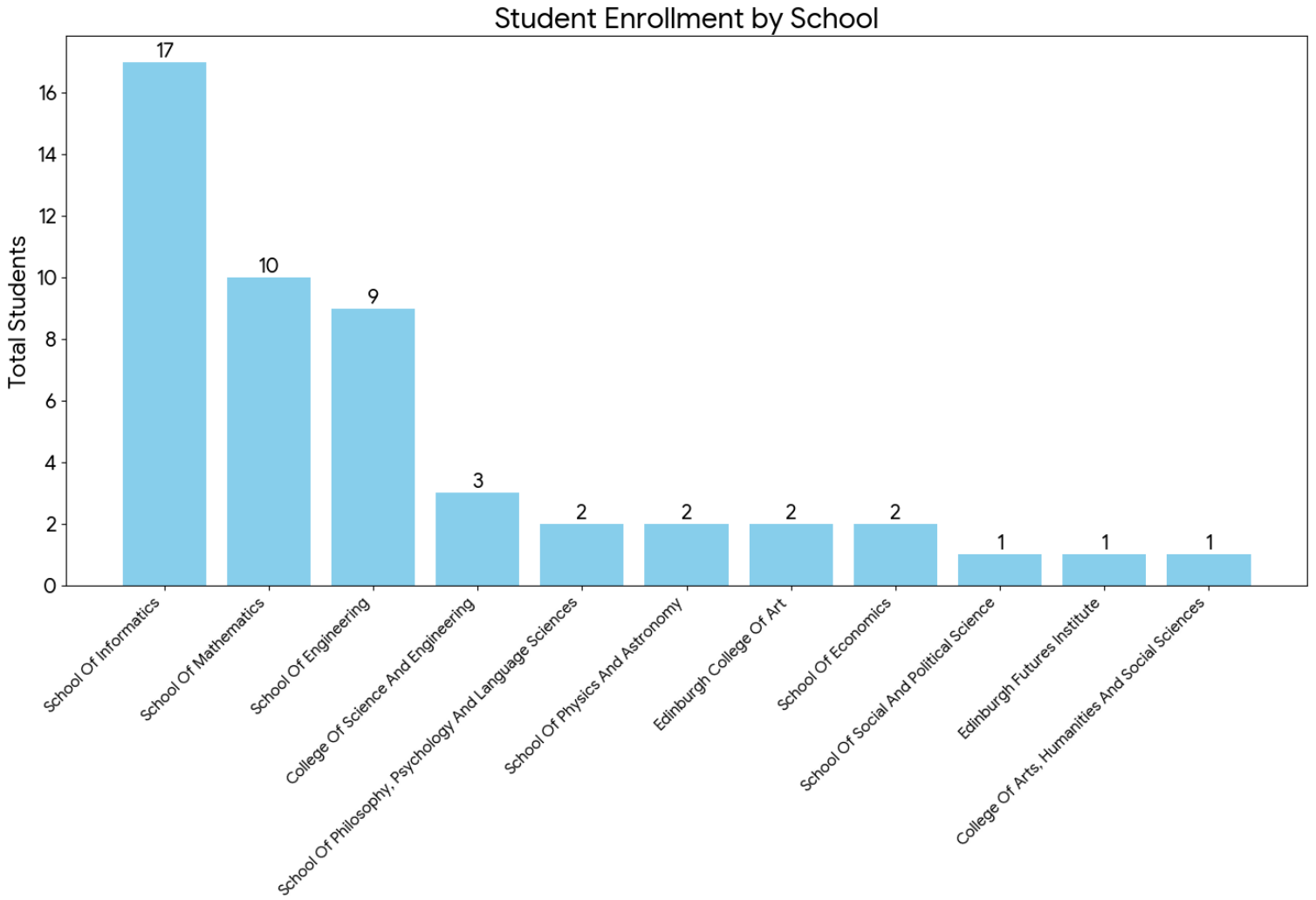
informatics

You


Student Enrollment by School
Total Students
0
2
4
6
8
10
12
14
16
17
10
9
3
2
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2
2
1
1
1
School Of Informatics
School Of Mathematics
School Of Engineering
College Of Science And Engineering
School Of Philosophy, Psychology And Language Sciences
School Of Physics And Astronomy
Edinburgh College Of Art
School Of Economics
School Of Social And Political Science
Edinburgh Futures Institute
College Of Arts, Humanities And Social Sciences
School

Logistics

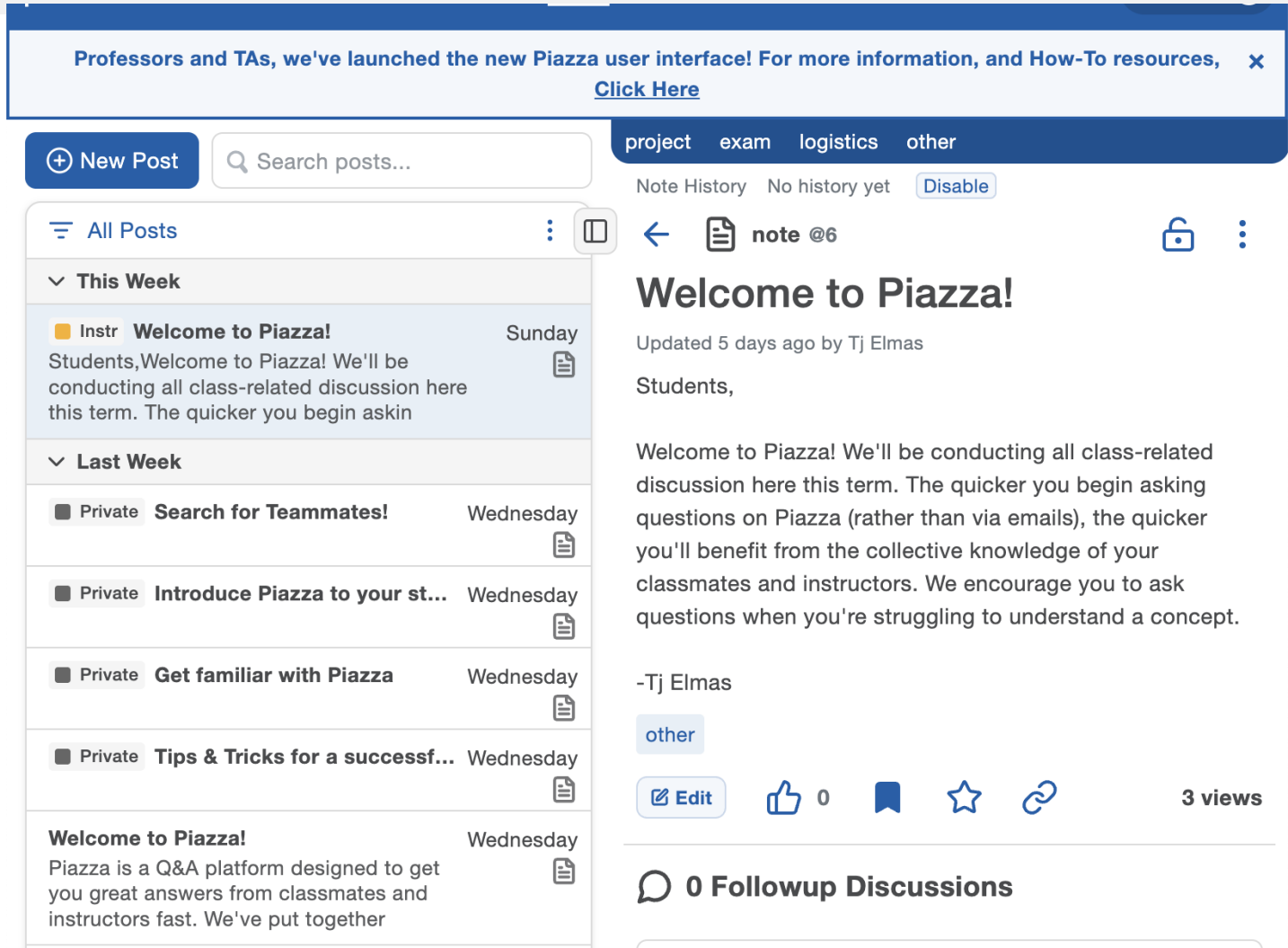
- Lectures x10: Tuesday 14:00 2.12 - Appleton Tower
- Tutorials x4:
  - Wednesday 14:10-15:00 & 15:10-16:00: 01M.19 Meeting Room - Doorway 4 - Medical School, Teviot
  - Thursday 14:10-15:00 G.17 - Lister Learning and Teaching Centre
  - Thursday 15:10-16:00 3.4 - Lister Learning and Teaching Centre
- Labs x5: 9:00-11:00 Friday at Appleton Tower West Lab 5.05

Lecture Format

- 2 hours lectures
  - Including guest lectures
- Questions at the question breaks
  - unless otherwise stated
- Lectures are recorded

Communication Channel

- Piazza
  - No need to ask & answer same questions over email
  - Discussions



Grading

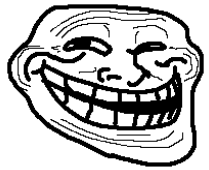
- 50% Project
  - Group work on a CSS project
  - Final report
- 50% Final Exam
  - Fundamental Concepts
  - Technical Question
  - Practical Question

Group Project

- 10 Groups, 5 People each
- Randomly allocated groups
- Abstract & Organization Plan at the end of week 6
  - Unmarked, for getting early feedback
- Presentations at the last lab session

Prerequisites

- Mathematical maturity
- Strong programming skills
- Brush up your Python skills
- Nah I'm just kidding



  - No coding only vibes
  - But you have to do the project by yourself!

Tools

NotebookLM

Power BI

KNIME

Gephi

Labs

- Learn & Apply the tools
- Tom & Nataliya will be the lab demonstrators
  - Self-paced, but feel free to ask them questions
- Coming to sessions are optional

Tutorials

- Learn & discuss theoretical concepts through questions
  - No tools
- Me & Walid will be the tutors ☺