

FAIRNESS IN TENSION

A SOCIO-TECHNICAL ANALYSIS OF AN ALGORITHM USED TO GRADE STUDENTS



My research

Socio-technical mapping of algorithms

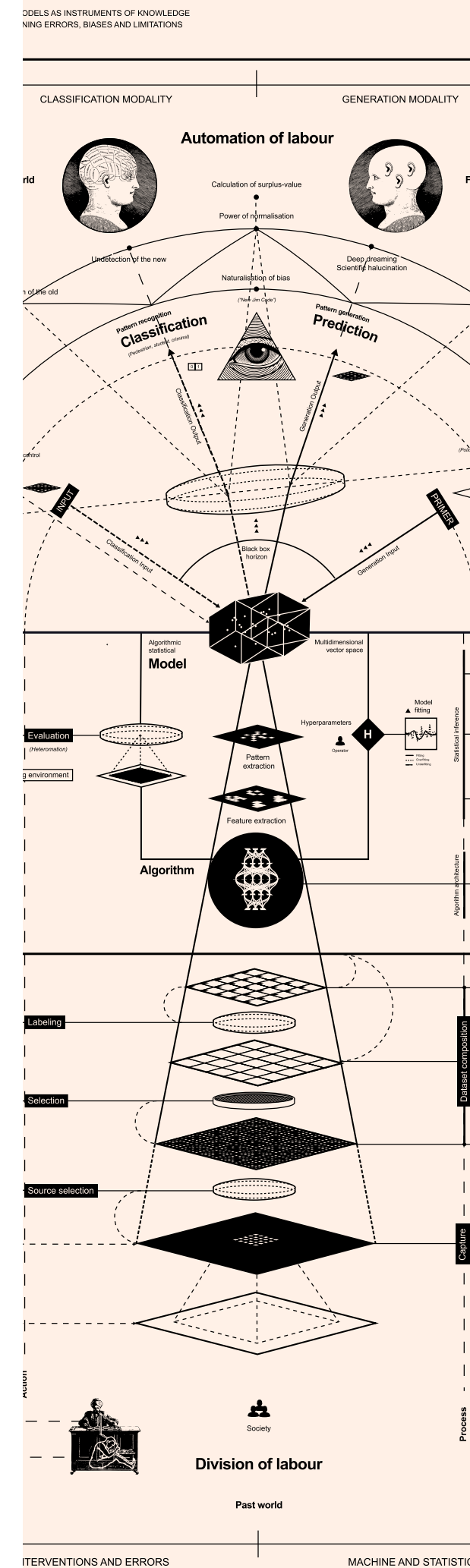
- A new way to open black boxes
- Algorithms to moderate access to higher education

The OfQual algorithm case

- Office of qualification
- During Covid-19 -> implemented an algorithm

What went wrong with the algorithm?

- Abstraction traps (Selbs & al., 2019)
 - Solutionism, portability, ripple effect, formalism, framing





MARCH

SEPTEMBER

20-03-20
Cancellation
of exams

22-05-20
OfQual asked
for teachers' ranking

11-08-20
OfQual sent a
letter to students

13-08-20
Students
received
grades

17-08-20
U-TURN

15-09-20
Secretary of Ed.
resigned in

16-08-20
Students'
riots



Education in England

Education in England

Access to higher education

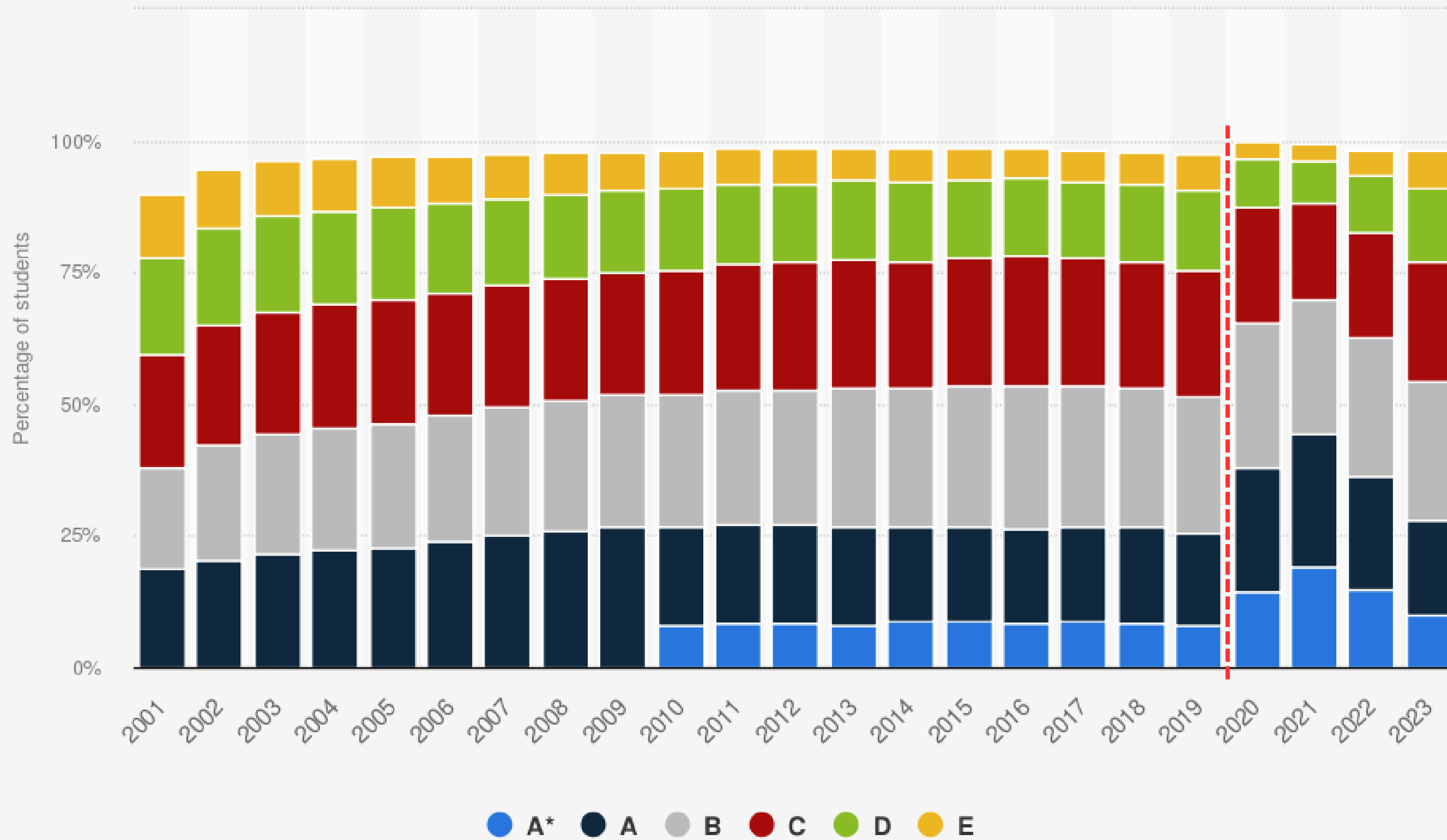
- A-levels
- 5 Exam boards
 - Delivers A-Levels and grades
- OfQual

A semi-market system (Opposs & al., 2020)

- Competition and regulation
- Need standards at all cost



A level pass rates in England for the academic years 2001 to 2023, by grade



Source
 Joint Council for Qualifications
 © Statista 2024

Additional Information:
 United Kingdom (England); Joint Council for Qualifications; 2001 to 2023; 16-19 years

OfQual abstraction traps Selbs et al. - 2019

SOLUTIONISM

*Consider when to
design*

PORTABILITY

RIPPLE EFFECT

FORMALISM

FRAMING

**Continuous
evaluations** are
not taken in
consideration

```
<div className="container">
  <Title name="our" title="product">
  <div className="row">
    <ProductConsumer>
      {(value) => {
        console.log(value)
      }}
    </ProductConsumer>
  </div>
</div>
```

The OfQual algorithm

The algorithm $p_{kj} = (1 - r_j)ck + r_j (ckj + qkj - pkj)$

The algorithm

$$p_{kj} = (1 - r_j) c_{kj} + r_j (c_{kj} + q_{kj} - p_{kj})$$

IN CENTERS

Centers produce ranking (CAGs)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

The algorithm

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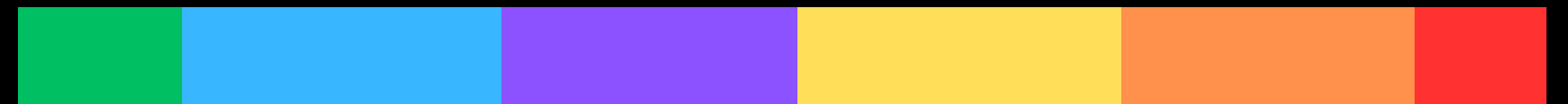
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AT OfQual

Predict historical center's distribution



The algorithm

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Predict on previous achievements



The algorithm

$$pkj = (1 - rj)ck + rj (ckj + qkj - pkj)$$

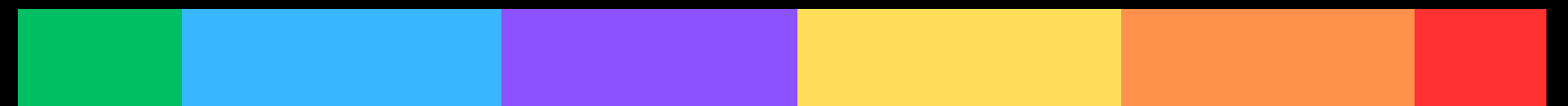
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Adjust 2020 prediction



Apply rankings



The algorithm

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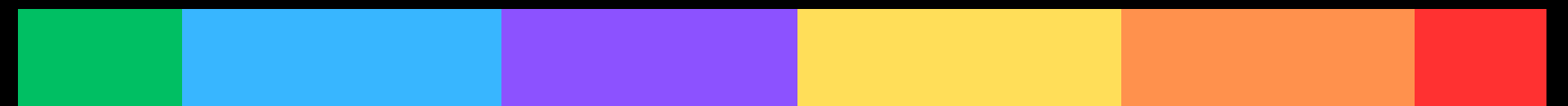
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OTHER CASES

- No history -> apply national prediction
- Small cohort -> apply CAGs' ranking directly

OfQual abstraction traps

Selbs et al. - 2019

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Take into consideration specificities of each scenario

Adopting a **center-based solution** ment favoring some over others

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Equity and the algorithm

Testing equality in the algorithm

- **'Students background'** variable tested:
 - gender, prior attainment, ethnicity, major language, special education needs, free school meal, social economic status
- **Removing biases** is the main focus
 - OfQual *"demonstrated that the standardisation model used **did not itself introduce bias into the grading**" - OfQual, 2020*
 - Confirmed by independent research

Removing biases ≠ making equality

OfQual abstraction traps Selbs et al. - 2019

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Avoid reinforcing existing inequalities or induce new ones

Maintenance of **historical social differentiation** and **maintain low-achieving centers**

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Contestation and cancellation

The contestation

Multi-sited contestation

- #fuckthealgorithm on twitter and in the street



The contestation

Multi-sited contestation

- #fuckthealgorithm on twitter and in the street

Against its unfair consequences (Kelly, 2021)

- 40% of downgraded students
- Mainly in lower socio-economic areas



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Include the point of views of relevants social groups

In-house development made the algorithm **opaque for students**

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Against the idea of the algorithm (Benjamin, 2022)

- No ability for students to prove themselves



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By removing exams they **removed students' agency**

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Of Qual and the law

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The Information Commissioner's Office (ICO)

- Enforce (UK-)GDPR laws
 - *“automated decision making does not take place [...] teachers and exam board officers are involved in decisions on calculated grades” - ICO 2020*

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2010 Equality Act - Protected characteristics

- age, gender reassignment, civil status, pregnancy, **disability**, race (colour, nationality, **ethnic** or origins), belief, **sex**, sexual orientation

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The center for data, ethics, and innovation

- Changed ministry

FAIRNESS IN TENSION

OfQual's conflicting accounts of fairness

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**REMOVING
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**LETTING
STUDENTS
PROVE
THEMSELVES**

THANK FOR LISTENING



SOURCES:

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