



# Algorithm and Blues

Why the UK's exam results fiasco is an unnerving glimpse into our future

When students across the UK took to the streets to protest the Government's handling of their exam results, the besieged Education Secretary, Gavin Williamson was not the only target of their anger. The “mutant algorithm” – as the Prime Minister himself has called it – that was used to assign the final test scores has been the focus of much criticism. This has led many to ask why the class of 2020's future was left to the apparent whims of computer code in the first place. We should not be surprised though. This question is part of a broader discussion that has been brewing for years.

Under normal circumstances you could perhaps be forgiven for closing this window as soon as you read the words, ‘algorithmic bias’. However, when young people are on the news chanting “f\*\*\* the algorithm!” outside the Department for Education, one has to stop and ask what all the fuss is about. *Why is technology being blamed? Who is responsible? What even is an algorithm?*

Questions like these may seem oversimplistic, but they are actually contentious and rather philosophical issues that have occupied the minds of technologists and policymakers alike for decades. In fact, our government has gone so far as to establish a world-first advisory body to examine them: the Centre for Data Ethics and Innovation (CDEI) – the irony that its Chair, Roger Taylor, is also the head of the exam regulator, Ofqual, has not been lost.

In this snapshot we will go back to the basics of algorithms and how they apply to everyday life before exploring several of the policy options that lawmakers are going to have to grapple with for years to come.

## What is an algorithm and why should I care?

At its core, an algorithm is a set of rules created to solve a problem. Run data through that set of rules and it will give you an answer. We are relatively comfortable for this series of events being applied to mundane problems like finding a film to watch. Once you've created a profile and browsed a few titles, a computer system will analyse your past behaviour as well as the data you have given it and then provide you with a solution: a recommended title.

*“I’ve seen this in my nightmares and now it’s a reality. This is exactly what the tech ethics community has been working to avoid. I’m heartbroken for these students and for a generation that has now been taught to hate algorithms.”*

Tabitha Goldstaub, Chair of the UK Government’s AI Council

Applying the same process to more complex, larger scale problems like assessing a claim to government benefits, analysing planning permissions or, in this case, assigning a grade to a student who has not taken an exam is where things get less comfortable. Consider also how the private sector uses algorithms. In the field of human resources, recruiters are using them to not only screen candidates’ applications but monitor facial and vocal expressions during interviews.

These are high stakes problems that affect us all and while a computer algorithm is capable of solving them more efficiently than a human being, it does not always mean that it will. Breaking these processes down into their component parts, there are several basic questions to consider:

1. *Did the algorithm have the right objectives set?*
2. *How robust and reliable was the data used?*
3. *Did the algorithm correctly identify causal links in the data inputted?*

These questions get even more complicated when you introduce the idea that the algorithm’s creator may not be a human being. An artificially intelligent machine that learns from its experiences and the vast amounts of data it collates can in turn design its own algorithms without human oversight (typically known as the “black box”). This evolutionary process means that the machine can draw its own conclusions in ways that may be unforeseen, and potentially unknowable, by the original designer. In an increasingly machine-driven future, this is a reality we have to contend with.

### **Bias and algorithms gone wrong**

Regardless of the level of human intervention, the same issue of fairness lingers. Coming back to the case at hand, an algorithm was designed to assign a grade to students for a test they had not taken.

For expert technical analysis of how Ofqual’s algorithm was applied and how we should view bias, I would urge you to read [this article](#) from my FTI Consulting colleagues. They posit that for an algorithm to be biased, from a statistician’s perspective it must “systematically and unfairly treat one group of individuals differently to others”. They also draw a attention to what is considered unfair versus biased.

These of course are contentious matters and while we await the results of the Office for Statistical Regulation’s review of the Ofqual algorithm, it is clear that having a policy framework in place to address them is key.

### **What options do policymakers have?**

In the past few years, the UK has looked to take a proactive role in the development of this policy framework. Since its inception in 2018, the UK’s Centre for Data Ethics and Innovation (CDEI), an arm’s length advisory body, has been tasked with tackling algorithmic bias as well as related issues such as microtargeting and their applications to other technologies like facial recognition. The Government has also established an Office for Artificial Intelligence (AI) within the civil service and an AI Council consisting of industry leaders across multiple sectors. Of course, the policy issues presented by technology are not country-specific and it is worth noting that likeminded national governments are collaborating to solve them via institutions like the World Economic Forum and the United Nations (UN).

The following is a non-exhaustive list of some of the ways the these bodies, other policymakers and experts have suggested we govern the use of algorithms.

### **Focus on improving ‘expainability’**

The ability to trace back an algorithm’s design and decisionmaking is core to not only improving trust but also assessing liability. The UK Information Commissioner’s Office is currently reviewing the responses it has received to its [consultation on the development of its AI Auditing Framework](#). There are three particularly noteworthy elements of its work thus far.

Firstly, while intended to serve as guidance rather than a strict set of rules for technology developers to follow, the ICO recommends that AI governance and risk management principles need to be embedded in an

organisation's culture rather than simply resting with the data science or engineering teams. The ICO also acknowledges the necessary trade-off between competing objectives of wanting an algorithm to be accurate whilst not wanting to collect needless levels of personal data to train it. Interestingly, the regulator acknowledges that it is unrealistic for a "zero tolerance" approach to these risks, recommending instead that organisations focus on mitigating and managing them. Finally, the draft guidance recommends that a system's performance be monitored on an ongoing basis and that limits be set for accuracy and bias levels.

### A sector-specific approach

In its [interim report on algorithmic bias](#) published last year, the CDEI found that there is currently little guidance and limited consensus out there on how to manage a trade-off between accuracy and fairness. This dilemma is essentially what played out in the exam results case. A portion of students were marked down because we know that not everybody performs to the level set out by the 'predicted grades' that teachers assign. Although the macro dataset was broadly accurate and in line with previous years, the side-effect was unfairness at a micro-level: the individual student.

The Centre also finds that these problems are largely context-specific and therefore that they need to be considered on a sector-by-sector basis. A Policing Code of Practice for instance is currently being developed.

### Establish an Algorithm 'Court'

Lord Sales, a Supreme Court justice, [suggested last year](#) that an expert commission be established to act as an independent regulator for algorithms. His argument stems from the concept that the penetration of coding "into the life of society is so great that the resources of the state should be brought to bear", citing the apparent success of the International Digital Health and AI Research Collaborative. Interestingly while he argues that a particular level of expertise is needed to be able to adjudicate technical matters he sees the objective of this commission or court as "trying to recover human agency".

### Label them or ban them

Germany's Data Ethics Commission released a [report](#) in 2019 containing a number of recommendations for

policymakers. Two proposals have garnered the most attention internationally: a labelling scheme and a proposed limit on what can be developed. The group called for a mandatory labelling framework to be put in place on any algorithm posing a potential threat to humans. In cases of "untenable" potential for harm, they argue the algorithm should be banned altogether – a position that is currently being debated at the UN and poses enormous challenges in relation to the international law governing armed conflict and the potential development of autonomous weapons systems.

### Do nothing

The starting point for debates about how to regulate a world increasingly driven by algorithms is determining what laws and regulations need to be updated. Interestingly, the more libertarian wing of the debate have argued that existing controls are sufficient. This argument stems in part from the idea that the advent of new technologies like AI that rely on algorithms are not so fundamentally different to require a paradigm shift in policymaking and that existing structures around consumer protection, quality control and liability are sufficient provided they are applied and enforced appropriately.

There is also a more fundamental element of this argument to consider. At a time when the UK Government is looking to exploit the country's reputation as a global centre for innovation and encourage inward investment post-Brexit, it will need to manage the trade-off between wanting to play a leading role in the development of new effective regulation and giving innovators the freedom to develop their technologies in the UK. Of course, in an ideal world, good regulation provides the technology sector with clearly defined parameters and world-leading standards and therefore certainty. Achieving this future state however is no easy task.

### What's next

For better or worse, the Covid-19 pandemic has accelerated the digitisation of all of our lives and we are more reliant on technology now than ever. Nevertheless, while this move towards a more automated world governed by algorithmic design has been accelerated, it was already inevitable. Governments around the world must continue to educate and consult all walks of society on the potential consequences for society and the need to

ensure that regulation remains in step with the change this brings.

It is incumbent on all of us to ensure these conversations are not just conducted by tech gurus and policymakers behind closed doors. Though perhaps a cliché to conclude, achieving the best regulatory structure requires contributions from a wider variety of sections of civil society: private citizens, charities, businesses and industry experts with the technical expertise need to come forward and be part of the discussion if policymakers have any chance of getting this right. The exam results debacle is a small taste of what will happen if we do not.

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