Independent review to assess the error made in the production of the schools block National Funding Formula (NFF) units of funding and indicative allocations for 2024-25

Peter Wyman
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Letter to Secretary of State attaching report

The Rt Hon Gillian Keegan MP
Secretary of State for Education

Dear Secretary of State

On 23 October you invited me to lead an independent review to assess the error made in the production of the schools block National Funding Formula (NFF) units of funding and to put forward recommendations for changes to be made to the end-to-end NFF quality assurance and policy process. I have now completed this review and have pleasure in attaching my report.

I would particularly like to note the cooperation I have received from all your Officials whether involved in the original work, the internal review into what went wrong or in supporting my own review. The culture of wanting to learn from mistakes rather than seeking to deny responsibility for them is to be applauded.

In summary, the error occurred at the start of the affordability calculation; a coding mismatch resulted in the omission of pupil numbers from Cumberland and Westmorland & Furness, the two Local Authorities that replaced Cumbria on 1 April 2023. This understated the forecast pupil numbers in the affordability calculation which in turn understated costs by 0.62% (£370 million).

In hindsight, it is easy to see not only how the error occurred but also what could have been in place to have detected it before the affordability calculation was finalised; at the time, however, officials were simply following a tried and tested process that had worked without error in prior years. While considerable care was taken in the production of the NFF indicative allocations, had opportunities to sense check for errors been taken the error should have been avoided. Additionally, had the quality assurance process that is applied to the published NFF figures been applied to the affordability allocations it is almost certain that the error would have been detected, and I make recommendations in this regard to minimise the risk of a similar problem arising in the future.

Yours sincerely

Peter Wyman

Independent review to assess the error made in the production of the schools block National Funding Formula (NFF) units of funding and indicative allocations for 2024-25

The schools National Funding Formula (NFF) provides the methodology for determining the allocation for state funded schools in England. Inevitably it involves a complex set of calculations due to its scale, the various component parts (types of school, location, pupil needs etc). The timetable for the production of final published allocations is necessarily fairly tight, starting at the beginning of the year and completing the following December to enable local authorities, and the schools themselves, to plan effectively for the next year. The diagram in Appendix 3 sets out the steps involved in fuller detail. The not insignificant pupil migration, both to and from England and between local authority areas, is a complicating factor; in order to allow local authorities time for their own planning, indicative allocations using the previous year's pupil numbers are made available in July. Actual pupil numbers only become available for the final published allocations in December.

To ensure that the indicative allocations published in July will not overspend the available budget when they become final allocations in December, DfE officials make an "affordability" estimate, as part of the work leading up to the July publication. This affordability calculation takes the NFF's anticipated local authority-level per pupil funding rates, multiplies them by local authority-level forecast pupil numbers, sums the total for all local authorities, and compares the national total cost calculated against the national budget available. The 2024-25 affordability calculation used pupil forecast numbers at February 2023. This date is significant because it was at this point the error occurred. The February forecast included pupil numbers for Cumbria even though the Cumbria local authority was due to be abolished on 1 April and replaced by two new local authorities – Cumberland and Westmorland & Furness. The use of Cumbria in the pupil forecast was well flagged and acknowledged. However, the R code used for the affordability calculation had already been updated to take in the two new local authorities. As a result of this mismatch of input data, no pupils for the old Cumbria or the new Cumberland and Westmorland & Furness local authorities were included. The relatively informal manner of the request for forecast pupil numbers resulted in insufficient importance being attached to the data mismatch. There was no formal process to ensure there was no such mismatch. Since an overall reduction in pupil numbers was expected, alarm bells were not triggered by the total pupil numbers that resulted. At this stage of the process checks should have been in place which would have detected the error. Checks later in the process, including tests like double-running the calculation, assumed these inputs were correct. This meant that the error was not detected with the consequence that, with corrected pupil numbers instated, the overall cost to the core schools budget was £370m (0.62%) above the Spending Review Settlement, and, to bring the total back to within the Settlement, revised NFF indicative allocations had to be issued in October.

Following the discovery of the error, an internal review was commissioned to establish the facts on how the error was made and why it was not detected by the Quality Assurance (QA)

process. The findings of the internal review were provided to me on 2 November; I was impressed by the thoroughness of the work and the obvious openness of the various officials involved in the original work. Rather than being defensive, and seeking to blame others for mistakes, it is clear a learning culture exists in the sections of the Department I encountered (and I have no reason to doubt across the Department as a whole).

The internal review provides a clear narrative of where the error occurred and how it was that it was not discovered by the QA process. In accordance with my terms of reference, the starting point for my independent review has been the DfE internal review. As I have said, it was a thorough piece of work and I considered I could rely on its findings. Nevertheless, I have tested them through meetings with officials. In addition, and most importantly, I have been greatly assisted by two subject matter experts from outside the Department to advise me on modelling and QA best practice: Matt Gurden from the Government Actuary's Department and Alec Waterhouse from the Department for Energy Security and Net Zero. Between them they have significant experience of business critical modelling and of the associated governance and quality assurance. Their input has been invaluable, and I am most grateful to them for giving me their time and expertise.

My terms of reference (reproduced in Appendix 2) posed a set of ten questions which follow, together with my responses to them.

a. *Does the external reviewer endorse the findings of the internal review?* As I have described above, I consider the internal review to have been a thorough piece of work which sought to determine the facts, not to obfuscate or otherwise be economical with the truth. Based on my own work, I do indeed endorse the findings of the internal review.

b. *Was the business process well defined and followed?* The business process was a tried and tested methodology. It was well defined and followed throughout.

c. *Was the approach to modelling and quality assurance appropriate and followed?* Given the timetable constraints referred to in paragraph 1 above, the approach to modelling was appropriate and was followed. However, the lack of formality in the request for forecast pupil numbers in February 2023 led to the error. The close working between colleagues that I have observed is generally to be applauded. However, even between close colleagues a greater degree of formality in matters such as data requests, such as would exist were the request to a third party, should be applied. The quality assurance applied to the production of the affordability calculation was not sufficiently robust, as is now recognised by the Department. Error trap checks at this stage would have avoided the error. This means building into the code a number of calculation checks designed to flag if an error has taken place, such as confirming the total number of pupils to a known correct number. Had the error nevertheless not been found and corrected, if the same level of quality assurance been applied at this stage as is applied to the final published NFF the error would almost certainly have been detected.

d. *Was there appropriate governance of the process by which the NFF units of funding and their affordability were determined?* As referred to in (c), slightly more robust governance at this stage is required.

e. *Are the changes proposed in the internal review appropriate?* They are, and I fully endorse them. I have reproduced the internal review's recommendations in Appendix 1.

f. *What other improvements in the process should be made?* See my recommendations below.

g. *Are there any changes that should be made to central DfE model governance in light of the error?* I have no changes to propose to the DfE model governance beyond those that are implicit from the recommendations proposed by the internal review and my recommendations below.

h. *Does the error in the production of the indicative allocations have any implications for the wider NFF business process, including the operational allocation of funds by ESFA?* My recommendations below cover the wider NFF process. I have not interrogated the ESFA operational allocation process since the error did not occur there. However, my recommendations below have more general applicability than the focused ones of the internal review, and should be considered by the ESFA.

i. *Are there improvements that should be made in this wider process in light of the error and to reflect best practice?* The wider process is of very high quality and already largely reflects best practice elsewhere.

j. *Is further assurance work required?* I have not identified any areas where further assurance work is necessary.

Recommendations

As noted above, I have reproduced in Appendix 1 the recommendations from the internal review. I do not repeat them here as my own recommendations, but they should be regarded as if they were recommendations from this review. In addition, I have a small number of recommendations (some of which are included in the recommendations in the internal review) which I consider should be applied not just to the NFF business process but to all similar processes across DfE.

1. Input data to a model must be subject to more critical examination, sense checking and error trapping, to ensure the accuracy of the data on which the model is built.
2. Where information produced by DfE, whether preliminary or otherwise, on which business critical processes rely might properly be regarded as a critical output, it should be subject to the same rigorous quality assurance processes as are applied to information formally published by DfE on gov.uk.
3. Processes that repeat on a regular basis should be subject to periodical, if not annual, internal review, to identify potential opportunities to simplify or reduce the steps involved, thereby reducing the chance of errors.
4. Business critical models will often be complex, involving several different stages. Dual-building a model, as was done in the NFF process, helps verify the outputs. However, such a process can in rare cases result in consistent errors arising in both versions of the model. For the most significant models, consideration should be given to performing alternative modelling, such as reverse modelling (starting from the outputs to recreate the inputs) to test the outcomes in a different way, thereby providing a more robust verification process.
5. The open, learning, culture I have encountered in DfE, where Officials have without hesitation taken responsibility for their mistakes, should be maintained at all costs; it is exemplary. However, care must be taken to guard against informality and familiarity leading to a lack of precision about what is required or is being requested, thereby introducing the potential for input errors.

Appendix 1 - Recommendations from the internal review

Recommendation 1: The focus of the team's more rigorous QA activities was on the tables and figures that they would publish on gov.uk. As the affordability calculation was not published it sat outside the scope of this QA process. The team should extend the more rigorous QA process to include the affordability calculation and associated input data to the NFF model. This includes building in the types of simple checks mentioned in this report that could have identified the error. To note, in calculating the corrected NFF allocations the team did extend the QA to the affordability calculation including dual-building and adding in more simple sense-checks, before publishing corrected figures.

Recommendation 2: The analysis team and Funding Policy Unit (FPU) should review all other inputs and adjustments related to the NFF, and those that sit outside the NFF but are linked to school funding, to assess their criticality to the allocations and the proportion of funding at risk and ensure that the QA of the inputs/adjustments is proportionate and appropriate to their criticality.

Recommendation 3: The DfE Quality Assurance team to contact all Senior Responsible Owners to ensure all business critical models that use LA data are reviewed as a matter of urgency to assure they account for LGR and correctly process the LA data. To note, all business critical model Senior Responsible Owners / Analytical Assurers / lead analysts have been contacted and made aware.

Recommendation 4: The more general extension of Recommendation 1 is where a business critical model is sensitive to or significantly reliant on a specific input then the production of that input should also be deemed to be business critical. Similarly, any "off-model adjustments" should also be deemed business critical. The DfE's QA Standards should be updated to reflect this recommendation.

Recommendation 5: The commissioning of inputs to business critical models should use a formal specification setting out the expected data and the format. Given the wide range of inputs across all DfE's business critical models, we do not recommend a prescriptive proforma that every team should use. That means, where appropriate, the commission and specification could be done via an email. The DfE's QA Standards should be updated to reflect the recommendation that a formal specification should be consistently used to request data and this should be checked as part of the analytical governance process and by the Analytical Assurer.

Recommendation 6: While the DfE QA Standards covers the activities that should be conducted on input data, this error reinforces the view that input data presents the biggest risk of error for business critical models; the DfE QA Standards should be updated to emphasise the need for modellers to communicate with data suppliers. This is so suppliers understand the criticality of their data and clearly flag any known issues to the modelling team.

Recommendation 7: The DfE's QA Standards on data verification checks will strengthen existing practice by including the requirement that manual QA checks are part of the QA process. As part of the Analytical Assurer's role in agreeing the QA plan, which is developed at the outset of the modelling, they should ensure suitable manual checks are planned. As part of the Analytical Assurer's role to sign-off of assurance of the model they should then ensure that appropriate manual checks have been conducted as part of the overall QA process. Those checks should be performed by the lead analysts as part of their self-checks during their model development and by their analytical Team Leader as part of their overview of model development. Where appropriate further manual checks could be completed by someone dual-building the model or through specific, targeted third-modeller checks.

Recommendation 8: DfE officials acknowledge that the error occurred due to inconsistent handling of the data relating to Local Government Reorganisation (LGR) between the team supplying the LA-level data and the modelling team who used it, and insufficient QA checks to cover all parts of the process. External changes such as LGR have implications for the move to automated, code-driven Reproducible Analytical Pipelines which are designed to improve efficiency and to eliminate particular types of risk. Specifically it highlights the need to strengthen the existing DfE QA guidance by emphasising the need to map how and where such external changes affect the business critical model and any associated code from inputs through to final outputs.

Recommendation 9: The DfE should maintain a central wiki of changes that have the potential to affect multiple teams and multiple business critical models across DfE.

Recommendation 10: The DfE QA Team to strengthen the guidance on the governance and sign-off on business critical models, including:

a. Updating guidance on the role of the Analytical Assurer, clarifying their role in asking for reassurances that notable changes have been appropriately accounted for in the analysis.
b. Clarifying the terms of reference for QA sign-off panels, to include testing the scope of the QA around the model and inputs.

Appendix 2 - Terms of Reference for the independent review of the schools national funding formula

Aim

To assess the nature, extent and impact of the error made in the production of the schools block NFF units of funding and indicative allocations for 24-25 and make recommendations for changes to be made to the NFF end-to-end quality assurance and policy process.

Objectives

The primary objectives of this review are as follows:

1. To assess the findings of the internal review on the nature and extent of the error in the schools block NFF units of funding and indicative allocations for 24-25, confirm the root cause(s) of the error and assess whether it was an isolated incident or systemic in nature.
    a. Does the external reviewer endorse the findings of the internal review?
    b. Was the business process well defined and followed?
    c. Was the approach to modelling and quality assurance appropriate and followed?
    d. Was there appropriate governance of the process by which the NFF units of funding and their affordability were determined?
    e. Are the changes proposed in the internal review appropriate?
    f. What other improvements in the process should be made?
    g. Are there any changes that should be made to central DfE model governance guidance in light of the error?
2. To assess how the end-to-end business process of the schools NFF policy operates and whether improvements should be made in light of the error(s) in the production of schools block NFF units of funding and indicative allocations for 24-25.
    a. Does the error in the production of have any implications for the wider NFF business process, including the operational allocation of funds by ESFA?
    b. Are there improvements that should be made in this wider process in light of the error and to reflect best practice elsewhere?
    c. Is further assurance work required?

Scope

The scope of the review shall cover following areas:

- The process employed in producing the schools block NFF indicative allocations for 24-25, covering policy-setting, modelling and QA.
- The wider NFF business process, including the operational allocation of funds by ESFA.

- Best practice for similar processes in other government departments and the private sector.

Independence and Expertise

The review will be led by an external, independent reviewer and supported by a small panel of experts in finance, analysis, funding, quality assurance, and/or audit. The reviewer and expert panel shall not have any conflicts of interest that may compromise the impartiality and objectivity of the review process. Their work shall be supported by officials at DfE as required, but the conclusions reached shall be the reviewer's own, independent assessment.

Methodology

Evidence will be gathered from individuals involved in the process, including primary sources such as emails and documents, as well as interviews to give their account of events. This will include, but not necessarily limited to, the report of the initial internal investigation into what happened which will be available on 23rd October. The reviewer will also consider the findings of previous audits of the NFF process (carried out by GIAA) and assessment of best practice elsewhere.

Timeline

The review should provide a final report by 15th December 2023.

Reporting

The independent reviewer shall submit a private report to the Secretary of State and Permanent Secretary upon completion of the review. The report should include findings, conclusions, and actionable recommendations. The report should be presented in a format suitable for potential public disclosure.

Implementation of Recommendations

The Senior Responsible Owner and Analytical Assurer for the NFF indicative allocations process will be responsible for implementing the recommendations outlined in the review report. A clear plan for corrective action and improvement shall be developed and monitored.

Confidentiality

The reviewer(s) shall maintain strict confidentiality regarding sensitive information obtained during the review process and shall adhere to all applicable data protection and privacy laws.

Appendix 3 - Summary of the 2024-25 schools national funding formula (NFF) modelling and mainstream school funding allocation process

The process set out below demonstrates the approximate timeline for activity relating to the annual NFF modelling and mainstream school funding allocation.

January 2023: Project set-up

DfE led. QA Plan for schools NFF modelling designed and agreed.

March 2023: Block split / affordability calculation

DfE led. Split 24-25 core budget into blocks. Initial calculation of affordability of schools NFF using estimated pupil numbers.

March 2023: NFF model building

DfE led. Begin building 24-25 NFF model, starting from final 23-24 model. Collect data inputs.

May 2023: Model lockdown

DfE led. Final NFF design agreed by ministers. The principal model is fully built and analysts believe it is correctly implementing ministers' decisions. Only changes to the principal model after this point are if remaining QA identifies errors.

July 2023: Complete NFF QA

DfE led. All QA activity completed including: dual-build model completed and reconciled; model walk-throughs; sense-checks of intermediate and final model outputs by both analysts and policy officials; completion of QA documentation; QA Sign-off Panel review process; production and checking of final output tables, technical note, policy document; affordability calculation re-run to confirm affordability of the NFF.

July 2023: NFF publication

DfE led. Output tables and technical note published on GOV.UK.

Aug 2023: Operational Guide / Authority Proforma Tool (APT)

ESFA led. Operational guide and allowable local formula factor values published. Draft Authority Proforma Tool (APT) sent to LAs.

Aug 2023: Further NFF data

DfE led. Schools NFF step-by-step tables made available on COLLECT system to schools and LAs.

Autumn 2023: Early work for 25-26 NFF modelling

DfE led Policy and analyst discussions about plans for 25-26 NFF. Analysis done to inform and support policy thinking.

December 2023: 24-25 Dedicated Schools Grant (DSG) allocations

ESFA led: DSG allocations published, based on NFF outputs. Final APTs with updated schools block pupil data sent to LAs.
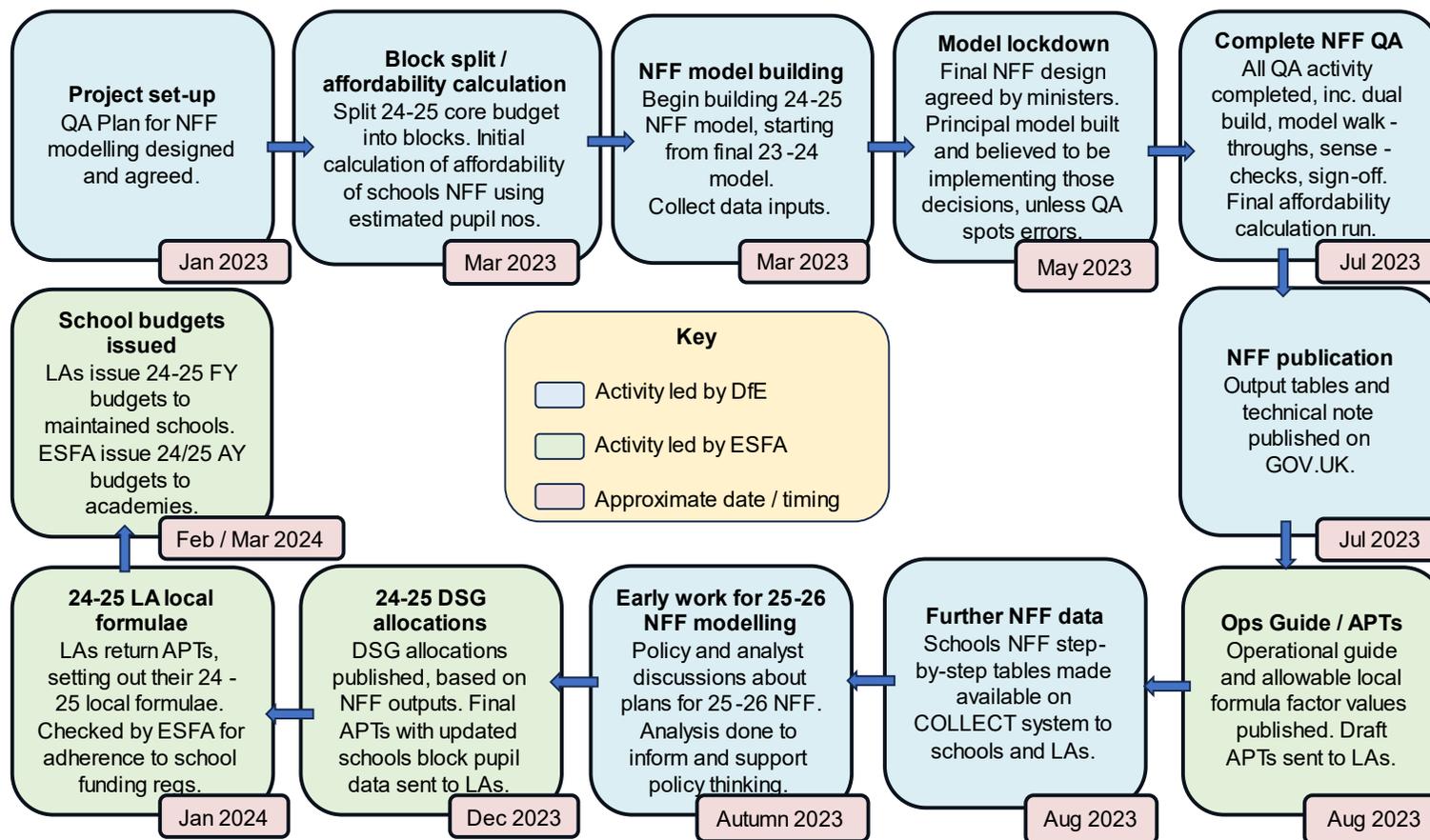
January 2024: 24-25 LA local formulae

ESFA led. LAs return APTs, setting out their 24-25 local formulae. Checked by ESFA for adherence to school funding regs.

February to March 2024: School budgets issued

ESFA led. LAs issue 24-25 FY budgets to maintained schools. ESFA issue 24/25 AY budgets to academies.

Appendix 3 - Summary of the 2024-25 schools national funding formula (NFF) modelling and mainstream school funding allocation process

Project set-up
QA Plan for NFF modelling designed and agreed.
Jan 2023

Block split / affordability calculation
Split 24-25 core budget into blocks. Initial calculation of affordability of schools NFF using estimated pupil nos.
Mar 2023

NFF model building
Begin building 24-25 NFF model, starting from final 23-24 model. Collect data inputs.
Mar 2023

Model lockdown
Final NFF design agreed by ministers. Principal model built and believed to be implementing those decisions, unless QA spots errors.
May 2023

Complete NFF QA
All QA activity completed, inc. dual build, model walk-throughs, sense-checks, sign-off. Final affordability calculation run.
Jul 2023

Key

☐ Activity led by DfE

☐ Activity led by ESFA

☐ Approximate date / timing

NFF publication
Output tables and technical note published on GOV.UK.
Jul 2023

School budgets issued
LAs issue 24-25 FY budgets to maintained schools. ESFA issue 24/25 AY budgets to academies.
Feb / Mar 2024

24-25 LA local formulae
LAs return APTs, setting out their 24-25 local formulae. Checked by ESFA for adherence to school funding regs.
Jan 2024

24-25 DSG allocations
DSG allocations published, based on NFF outputs. Final APTs with updated schools block pupil data sent to LAs.
Dec 2023

Early work for 25-26 NFF modelling
Policy and analyst discussions about plans for 25-26 NFF. Analysis done to inform and support policy thinking.
Autumn 2023

Further NFF data
Schools NFF step-by-step tables made available on COLLECT system to schools and LAs.
Aug 2023

Ops Guide / APTs
Operational guide and allowable local formula factor values published. Draft APTs sent to LAs.
Aug 2023