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LESS CAN BE MORE: RETHINKING THE USE OF TIME IN SCHOOLS

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ABSTRACT

Teachers and school leaders have long claimed that increased workload negatively impacts results and teacher retention. However, scant empirical evidence exists to support these claims until now. Using longitudinal data from England's School Workforce Census, this paper presents the results of a study revealing associations between contact hours, timetable complexity, GCSE performance and teacher attrition. This supports the notion that decreasing departmental average contact hours may lead to higher GCSE value added for that department. The size of this drop is equivalently opposite to recent estimates of GCSE gains arising from additional allocated instruction time for pupils, showing a fiscally neutral way for departments to improve teacher workload without negatively impacting results. Further analysis in this study links improvements in teacher's contact hours, and the complexity of their workload, with teacher retention. Thus schools rethinking their use of time by increasing non-contact time for their teachers are likely to retain those teachers longer and raise their results in the process.

Keywords: workload, contact hours, workload complexity, retention, school effectiveness

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INTRODUCTION

Imagine the following. It is late June, and you are a secondary teacher who's timetable for next year is about to be released. This year has been tough: teaching

disruptive classes in scattered locations. You've pleaded with the timetabler to keep you in 'your' main room, near your colleagues and resources. Similarly, you've asked, on the strongest terms, not to have year 8, last thing on a Friday, again. You only see them once a week, and they just don't learn well by that stage of the week. You're also a bit worried, as the timetabler has previously asked if you could teach year 7 history, but it really has been a long time since you even studied this subject. Hopefully they have managed to avoid this for you as you know you will have your hands full of curriculum change in your main subject, without having to moonlight in an unfamiliar department.

Although this scenario is fictional, it won't be unfamiliar to timetabling staff in schools; indeed, in a recent TeacherTapp blog, leading educationalists Becky Allen and Laura McInerney speculated that secondary teachers could have good and bad timetables based upon their own experiences which are not too dissimilar to the scenario above (Allen and McInerney, 2019). Recently, the Department for Education (DFE) interviewed 80 ex-teachers on the topic of 'sympathetic timetables' (CooperGibson Research, 2018) and found benefits in teaching fewer year groups, getting to know students better (e.g. following a group from year to year), and teaching the same assignment year to year. Also, teaching multiple subjects was seen to increase workload.

In contrast to other school systems, England's schools enjoy wide-ranging autonomy and freedom in how they structure the school day, and in how they allocate time to teachers, subjects and year groups. This is especially true of academy schools. Such decisions may include whether to give year 9 maths four or five periods per week, while history may only have two. If schools wanted, they could have shorter periods in the morning, with extended afternoon periods offering more time for practical and sports-based options. Thus, these freedoms offer schools considerable scope to rethink their use of time.

Given both this flexibility and the way in which 'the timetable' shapes the daily life of each school, it is surprising that this issue has been so under-researched in the UK.

In the US, timetables or 'assignments' as they are called, have receive slightly more attention. Teaching out of field, teaching multiple subjects, and new assignments have been linked to teacher retention (Johnson et al., 2005) and teacher effectiveness (Bastian and Janda, 2018). Teachers in the national US Teacher Follow-Up Survey, report moving school for better assignments (Luekens et al., 2004). Investigating this qualitatively, Johnson et al. (2005) theorises that multiple assignments lead to increased preparation and consequently stress. This was verified in a study of 2,029 Teach for America recruits, where 'difficult' assignments, as indicated by teaching split grades, multiple subjects or out-of-field classes, related to poorer retention (Donaldson and Johnson, 2010).

While the discussion above has focused on the complexity of teachers' timetables, it is also possible to be concerned with the allocation of timetabled hours. From a teachers' perspective, this is their contact time. For students, research defines this as allocated instruction time. These intertwined issues are considered in this paper which has been written to accompany research presented at the 2022 Rethinking Education conference. In this presentation, I examined secondary teachers' and students' timetables, using data from England's School Workforce Census, between 2010 and 2016. Asking 'can less be more?', I compared the relationship between timetable data and school performance, and teacher retention. The findings from this offer evidence from England's schools for a link between workload, results and retention, and support teachers' claims that increased workload is bad for results, and bad for retention.

These issues are interlinked, as qualitative reviews of teacher workload show. Here regular pleas are heard for improvements in non-contact time, to allow teachers to stay on top of planning, and marking, making them less stressed and thus more likely to stay working as a teacher. If true and these issues do indeed relate to teachers' timetables, then this is of critical importance for schools and policy makers today, who are struggling to recruit and retain staff.

The structure of the remainder of this paper is as follows. After introducing the English system in which this research is based, I recap past workload reviews, and evidence linking workload with performance and retention. The Job-Demands-Resources model is useful here, as is Leithwood's 2006 model of working conditions and student learning. These provide important theoretical foundations linking time use, workload, school performance and retention. I also consider the modern movement towards the four-day week, and give examples of schools doing things differently. Having so provided theory and context, I go on to discuss my data sources, methods and findings. Altogether, this work gives high-quality evidence of a link between lighter timetables and better school performance and increased teacher retention. Asking where lighter timetables may come from, I highlight how reductions in teachers' contact time could be offset against changes to students' allocated instruction time without financial cost.

BACKGROUND

The English School System

Over the past decades, England's educational policy has increasingly promoted market forces as a means of enhancing school performance, resulting in greater autonomy for schools. Thus, teachers apply to, and are appointed directly by schools (Allen et al., 2018), and while some limitations exist, parents and students are

provided with school choice (Burgess et al., 2017). Increasingly, schools have reopened as academy schools and been granted the freedom to vary many aspects of school life, such as teachers' pay and conditions, and the freedom to determine the length of the school day and how much teaching time they allocate to each subject.

Compulsory education in England is organised into five key stages. Primary education spans Key Stages 1 and 2, concluding in year 6 with the advent of national curriculum tests in English and mathematics, known as KS2 SATs. Secondary schooling comprises Key Stages 3, 4 and 5, corresponding to years 7–9, 10–11, and 12–13, respectively. General Certificate in Secondary Education (GCSE) examinations are held at the end of year 11 when students are usually 16 years old. English, mathematics and science are compulsory at KS4. At the time of this study, school performance was measured using subject level value added for each GCSE English Baccalaureate pillar, relative to pupils' overall performance at KS2.

Past Workload Reviews

We have been here before. In the late nineties and early noughties teacher shortages were growing, of which workload was thought a key cause. The 'New Labour' government of the time consulted extensively and invested heavily in policy action, including the 2003 policy "*Raising standards and tackling workload: a national agreement*". This reform is noteworthy as it represents the most recent attempt to query the issue of contact hours. This consideration is summarised in the School Teachers' Review Body's (STRB) report entitled "*Special* R*eview of Approaches to Reducing Teacher Workload*" (2002). Here the Body noted the strong views of "teacher and headteacher associations [who] see teaching time as the key determinant of workload" (2002, para 51), and did not object "in principle to a limit … on contact or teaching time" (ibid, para 52). In the end, however, the STRB viewed a cap on contact hours as impracticable. They also believed that the problem of workload was more related to overall hours, rather than contact hours. Notwithstanding, it also conceded that if "within a reasonable time, the volume of nonteaching work cannot be sufficiently reduced, then the demand for setting a limit on contact or teaching time will re-emerge" (ibid, para 52).

Could it ever work though? If teachers were to have less contact time, how would such time be created without great expense? This question was considered by PricewaterhouseCoopers (2001) in their report for the STRB. Five possible methods were discussed:

- Reducing pupil taught time (or allocated instruction time)
- Increasing pupil-teacher ratios and/or new approaches to timetabling
- Recruiting additional teachers

- Supporting learning via non-teaching staff
- Supporting learning using ICT

Despite having acknowledged the possibility of reduced taught time, PWC concluded that few could "see how taught-time could be reduced, unless it was replaced by other ways for pupils to learn" (PricewaterhouseCoopers, 2001, p. 61) but that this was likely to be covered by ICT innovations and uses of support staff, and thus the issue of taught time needed no further thought.

Looking back at this episode from the position of the 2022 Rethinking Education conference, it is disappointing that PWC did not then review more radical reforms, and indeed rethink schools' use of taught time, especially since models of educational effectiveness have long highlighted the balance between quality and quantity when it comes to time (Carroll, 1989; Creemers and Kyriakides, 2006b). This is a point which has since found experimental support in an English secondary school, where repurposing some KS3 time to teach learning to learning significantly raised student performance (Mannion and Mercer, 2016). Notwithstanding the STRB's decision, teachers and schools were positive about the Government's reforms. However, the short-term impact for secondary teachers was disappointing as follow-up reviews only observed small reductions in workload (Thomas et al., 2004, p. i) and negligible changes in job satisfaction (Gunter et al., 2005). Unfortunately, longer-term impact assessments were not commissioned, and the ultimate success of these reforms is questionable as the issue of teacher supply quickly resurfaced again as the UK emerged from the 2007 Global Financial Crisis (NAO, 2016). During that time, teachers' workload had remained stubbornly high (Micklewright et al., 2014), which led some academic commentators to ask "Where did it all go wrong?" (Webster, 2014).

Accordingly, in 2014, England's Department for Education launched 'The Workload Challenge', once again looking to find those "unnecessary or unproductive tasks teachers carry out … that is, work which teachers carry out which does not contribute to raising standards for pupils" (DFE, 2015, p. 4). Again, this initiative frames excessive workload as anything other than that associated with 'raising standards' – against a backdrop that believes more time = better learning. However, the issue of formal contact hours or instructional time was once again overlooked. However, the success of this has been called into question by leading researchers who are increasingly calling workload intractable (Allen et al., 2019).

Some schools are already rethinking their use of time

Despite a lack of policy action on contact time, Some schools have rethought their use of time. In London, School 21 offers staff includes additional guaranteed and ring-fenced time for staff CPD. Forest Gate School closes early on a Friday to benefit

well-being and morale. Doncaster's XP school has an almost unique timetable to allow large-scale group work called expeditions. Further afield, Templestowe College in Australia adapts its timetable to individual needs, and Melbourne Girl's Grammar's timetable more closely resembles that of a Cambridge college than a secondary school.

At a more systemic level, Singaporean schools require students to engage in self-directed independent home-based learning days, and the Welsh Government is currently reviewing the shape of the school day, week and year.

Theoretical basis

In the background above, I discuss how workload and contact hours have been approached by previous government reforms. In these, there is an assumption that teachers' workload is linked with school performance and teacher supply. This section examines the theoretical underpinnings of these assumptions.

Looking outside education, the issue of work time and productivity has long been debated. In 1914 Henry Ford famously doubled his employee's wages, and in 1924, he reduced their working week from six to five days without any reduction in pay. Workers' productivity rose significantly. This was a clear example that 'less can be more' (Raff and Summers, 1987). Within management science, recent developments explore optimal staffing decisions, trade-offs between speed and quality, and revenue optimisation. Since the COVID-19 pandemic, discussions about the benefits of the four-day week have become widespread.

The renewed attention on links between teachers' work environment and their retention, particularly by American researchers, has identified that school factors, including time use in schools, are linked to teachers' intention to move school and to school performance (Kraft et al., 2016; Ladd, 2011). To explain this, researchers have drawn on a range of theories of school effectiveness and school improvement which build in factors of resource sufficiency and time use into models of effectiveness, although teacher contact time is rarely mentioned directly (Carroll, 1989; Creemers and Kyriakides, 2008; MacBeath and Dempster, 2008). Among this field, it is Leithwood who discusses workload most. To do this, he extends prior models to highlight the importance of teachers' internal states, some of which are influenced by workload, as shown in Figure 1. Although many other theorists omit teacher workload, Leithwood disagrees and finds that "working conditions within the classroom matter, particularly those that influence workload volume and workload complexity" (Leithwood, 2006a, p. 46). For Leithwood, increased contact hours are likely to influence a teacher's internal states, and in turn, their classroom practices, retention and student outcomes.

The link between workload and motivation, job performance and retention is also explained by the Job Demands Resources theory, which links organisational features, such as role overload and job demands, to teacher well-being, retention,

performance and eventually burnout (Alarcon, 2011; Bakker and Demerouti, 2014). In this framework, a difficult timetable would be an additional job demand and lead to stress and declining motivation.

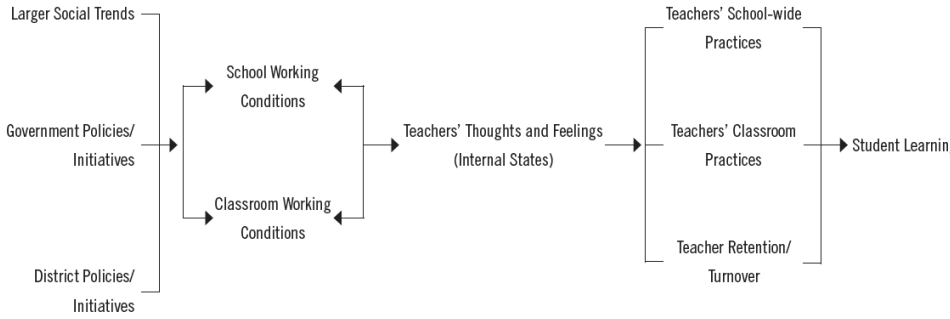

Figure 1: Leithwood's conceptual link between conditions and learning
(Source: Leithwood, 2006, p. 10)

In this section, workload and teachers' time pressures have been related to teacher stress, retention and pupil attainment. Although workload is a complex, multi-levelled construct, workload volume measured by time, is nevertheless a critical component. In repeated studies, teachers, middle leaders and senior leaders have all reported lack of time as one of the major contributors to workload, declining job satisfaction and commitment to the profession. Increased non-contact time and employing additional teachers are often the top two interventions requested by teachers. The argument for more time is an educational one. Improved workload is theorised to lead to better collaboration, planning, morale, etc., all of which are said to link to better pupil results. This theorising, and the calls of teachers and school leaders have led me to my research questions which are:

1. Do lower contact hours relate to better school performance/results?
2. Are teachers more likely to quit teaching, or to move schools, with increased contact time and workload complexity?

RESEARCH DESIGN AND METHODS

Data Source

The School Workforce Census (SWC) started in 2010 and is followed through to 2016 for this study. It is completed by all state schools and contains timetable data for 75% of secondary teachers. This can be matched to school-level value-added scores. A full discussion of the validity and reliability of this data can be found in

Connolly (2022) interlinked, challenges besetting schools in England. Repeated reforms have sought to ease workload concerns and boost teacher supply, with limited success. There is, however, one outstanding requested reform from secondary teachers. In various guises, teachers have regularly called for increased non-contact time, which directly relates to less scheduled teaching. Whether it is due to perceived cost or implementation difficulties, this call has been repeatedly dismissed or overlooked by policy-makers and researchers alike. In response, this thesis presents novel and compelling evidence on the importance of contact hours and workload complexity. By analysing teachers' contact hours using School Workforce Census data (2010–2016). Access to this data was kindly agreed by the Department of Education who supported this research.

Panel Construction

Research Question 1. To explore the association between workload and attainment, a school-level panel is constructed where departments are followed over time, from 2010 to 2014. A longer timeframe was not possible because of changes in assessment data. The main dependent variable is the school-level value-added result in each subject (taken from public tables). The key independent variable is the average contact hours (per-FTE) for each department.

A second panel is constructed by taking the difference between English and mathematics departments, meaning there is one entry per school per year (see equations 2 and 3). This allows for superior control of unobserved variable bias.

To avoid other potential biases, this panel excluded departments outlying hours (±3 SD), small departments of one or two teachers, small schools (roll < 300), and schools of questionable data quality.

Research Question 2. RQ2 required a teacher level panel to be constructed from SWC data 2010 to 2015, following each teacher up until the point they leave their school. The key dependent variables were two Boolean flags, to identify whether a teacher was a mover, or a leaver – e.g., when a teacher changes school, or when they cease teaching in the state sector. The main independent variable was the number of contact hours taught per week for each teacher, and four workload complexity variables derived from the SWC timetable data:

1. The number of subjects on a teacher's timetable,
2. The number of National Curriculum levels, or year groups, taught,
3. Whether a teacher taught an assignment in the previous year,
4. The percentage of assignments of short duration (≤one hour).

where an assignment is a subject/yeargroup combination.

This panel was restricted to full-time qualified classroom teachers under the age of 60. Teachers are also deemed out of scope if they had outlying hours (±3 SD ≈ 8/28 hours) or were in schools with questionable data quality. Also, centrally employed teachers cannot be linked to a school and so must be excluded. Where a teacher works in multiple schools, only their largest contract is retained. Schools which close and reopen, e.g., as an academy, are treated as the same school. This results in an overall sample of 3,278 schools and 226,136 panel members (2010–2015).

Empirical Approach

Research Question 1. Here, longitudinal panel models are estimated, both with and without school fixed effects:

$$VA_{sdt} = AVHRS_{sdt} + SCHL_{st} + DEPT_{sdt} + YEAR_t \left[+u_s\right] + e_{sdt} \qquad \text{equation 1}$$

where the subscript *s* refers to individual schools, *d* refers to the department (English/science/mathematics) and *t* refers to the year. In addition, the following notation applies:

- VA → refers to the value-added score obtained by the school in this department
- AVHRS → average contact hours (per-FTE) in a department
- SCHL → a vector of school-level covariates (% of students on free school meals (FSM), the cohort's baseline KS2 average point score, % of pupils with special educational needs (SEN), % of students for whom English is an additional language (EAL), % pupil absence, OfSTED score, London)
- DEPT → a vector of department variables (percentage of early career teachers, permanent contracts, % turnover, full-time teachers, average teacher age, allocated instruction time per pupil (KS4), % pupils entered for EBacc subject) and a dummy variable for either English, science, or mathematics
- YEAR → year dummies
- u_s represents fixed school/department effects, and e_{st} is the error term.

This model is estimated using the Stata 16 command `xtreg`. The main dependent variables are schools' value-added scores in English, science and mathematics for all pupils. The key predictor variable is the average department contact hours, per FTE. While value added is an imperfect measure, it does have considerable policy significance and the use of school fixed effects helps to mitigate concerns. The covariates are chosen after consulting models of school improvement and effectiveness, and of pupil learning (Carroll, 1989; Creemers and Kyriakides, 2008; Reezigt and Creemers, 2005). I omit their description for space reasons and refer interested readers to Connolly (2022).

A key worry for any regression model is the potential that an influential variable has not been included in the model. These are called unobserved variable(s) and can bias the results of the regression. As this study uses longitudinal data, we can minimise the opportunity for such biases by using school-department fixed effects (equation 1) which eliminate time invariant unobserved variables via a process called time-demeaning. To remove school-level factors which might change over time (e.g., an OfSTED visit), I extend equation 1 to model the difference between English and mathematics departments, in the same school, whilst simultaneously applying school level fixed effects (equation 2). Thus, one off events that effect both departments will drop out of the equation. Further, as core departments teach the entire cohort, students also act as their own controls.

My final model investigates the effect of workload on the following year's exam outcomes because GCSE is a two-year course (equation 3).

$$\Delta VA_{st} = \Delta AVHRS_{st} + \Delta DEPT_{st} + YEAR_t + e_{st} \quad \text{equation 2}$$

$$\Delta VA_{st+1} = \Delta AVHRS_{st} + \Delta DEPT_{st} + \Delta PTENTERED_{st+1} + YEAR_t + e_{st} \quad \text{equation 3}$$

where:

$\Delta DEPT$ is a vector of covariates for the difference in departmental covariates; $\Delta PTENTERED$ gives the difference in the proportion of pupils who entered the exam (to control for off-rolling).

Research Question 2. Logistic panel regression is used to estimate the relationship between the probability that a teacher will move/leave and their workload and workload complexity; this method has been previously used to explore retention (Kraft et al., 2016; Ladd, 2011; Sims, 2017). While the observational nature of this data precludes causal claims, three factors allow confidence that any relationship observed will be consistent with a causal effect:

1. Trends are seen over time and between departments
2. A clear temporal relationship where timetables are set before September, and workload is measured in November, with actual turnover observed at the end of the academic year
3. The use of a rich set of controls

To check the robustness of any results, I first test the functional form of workload and model sensitivity to changes in covariates by entering variables in blocks and by year. I next estimate logistic panel models by considering teachers by department, first using dummies (question 4) and then by interacting hours with

department (equation 5), and then, by considering departments separately. Finally, I apply fixed effects to annual models.

$$Mover\ /\ Leaver_{ist} = \left(H_{ist}\left[+H_{ist}^{\ 2}\right]\right) + D_{ist} + TC_{ist} + SC_{st} + WLC_{ist} + YR_{t} + u_{st} + e_{ist}$$

equation 4

For all in-scope teachers, interacting department with contact hours:

$$Mover\ /\ Leaver_{ist} = \left(H_{ist}\left[+H_{ist}^{\ 2}\right]\right) \times D_{ist} + TC_{ist} + SC_{st} + WLC_{ist} + YR_{t} + u_{st} + e_{ist}$$

equation 5

where the subscript *i* refers to individual teachers who are nested in schools indicated by the subscript *s* in year *t*. In addition, the following notation applies:

- Mover/Leaver → a flag to indicate moving school or leaving the state sector
- H → teachers' contact hours [leavers' models include a quadratic term]
- TC → a vector of teacher-level covariates including % school turnover outside this teachers' department
- SC → a vector of school-level covariates
- D → dummy variable for departmental affiliation
- WLC → a vector of four WLC variables
- YR → Dummies for year fixed effects
- u_{st} → the unobserved school residual. When not using fixed effects to remove this unobserved school effects are proxied using the turnover in departments other than that of teacher *i*.
- e_{ist} → the unobserved teacher residual

Threats to identification

For both research questions covered by this paper, a wide range of possible biases have been considered. These include biases due to incorrect specification, variable selection, sorting, missing data, reverse causality and non-response. In all cases, no sign of bias was observed. Moreover, the nature of the SWC lends confidence to our results. School timetables are decided before results are known and typically before teachers make decisions to either move or leave. SWC data is automatically collected from school databases eliminating the possibility of self-report bias. This automated process builds in numerous validation and verification checks to provide multiple opportunities for errors to be queried and corrected. A more detailed consideration of this is available in Connolly (2022).

RESULTS

Workload and School Performance

My first research question asked whether average contact hours relate to schools' KS4-value added scores. In other words, do departments with lower average contact hours achieve better results? The results of this analysis are presented in Table 1 as effect sizes and answer this question in the affirmative. This is a highly statistically significant result, which suggests that an increase in contact hours, is most damaging when in year 10. Here a one standard deviation increase in average contact hours relates to a 0.06 standard deviation decrease in departmental value added (model 4). Although these effect sizes appear small, this is not unexpected when using administrative data and national standardised tests (Kraft, 2018). However, the relevance of this effect size is evident when compared to the effect size of additional learning time for pupils which was found to be between 0.02 and 0.09 SD in a similar analysis using the same data by Connolly (2021). Thus, the effect of extra non-contact time for teachers appears similar (but opposite in sign) to that of extra contact time for pupils. This comparison has a profound implication – if a school were to decrease pupils' contact time, to improve staff non-contact time, the net effect on results is likely to be zero (all other things being held equal).

Table 1: Effect Size of Contact Hours on Value Added, 2010–2014

	Avg hours per FTE effect size (SD)		Difference models (F0 and F1) – English and mathematics	
	Model 1 Equation 1	**Model 2 Equation 1**	**Model 3 Equation 2**	**Model 4 Equation 3**
All pupils	–0.03***	–0.03***	–0.04**	–0.06**
Number of schools	2,705	2,705	2,731	2,382‡
School Fixed Effects	No	Yes	Yes	Yes
Differenced	No	No	Yes	Yes
Value Added in year = *t* + 1	No	No	No	Yes

Source: SWC. 2010–2014. DQ20. English, science and mathematics departments.

Key: $^{+}p < 0.1$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

‡ The number of schools is reduced by the use of the time lapse F1 operator.

Effect Size = 1SD change in hours = 0.03 SD change in results. (This differs to the next section.)

Workload, Workload complexity and Retention

Teachers who Move School – After running longitudinal logistic models, a statistically significant relationship is found between workload and the probability that an in-scope teacher will move school, e.g., the more contact hours a teacher has on their timetable, the greater the probability they will move school. While this does vary by department (and is strongest for English teachers), this supports teachers' and school leaders' requests for consideration of workload. Numerical results are omitted for space reasons and also because Figures 2 and 3 offer a clear demonstration of the relationship between hours and the probability a teacher will move school.

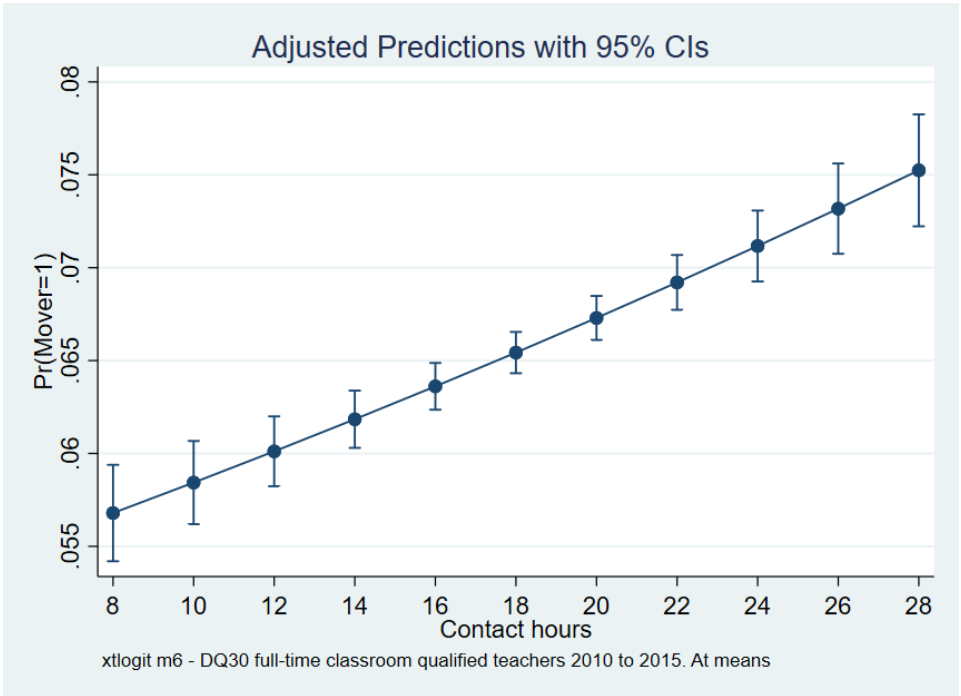

Figure 2: Probability of moving schools (Department dummies) – 2010–2015
Source: SWC 2010–2015

When considering workload complexity, this too appears to effect the probability of a teacher moving school. The effect of each new assignment was strongest for mathematics teachers and teachers in departments other than English, science, or mathematics. Similarly, the effect of teaching additional year groups, or additional subjects was related to the probability of moving school, although the

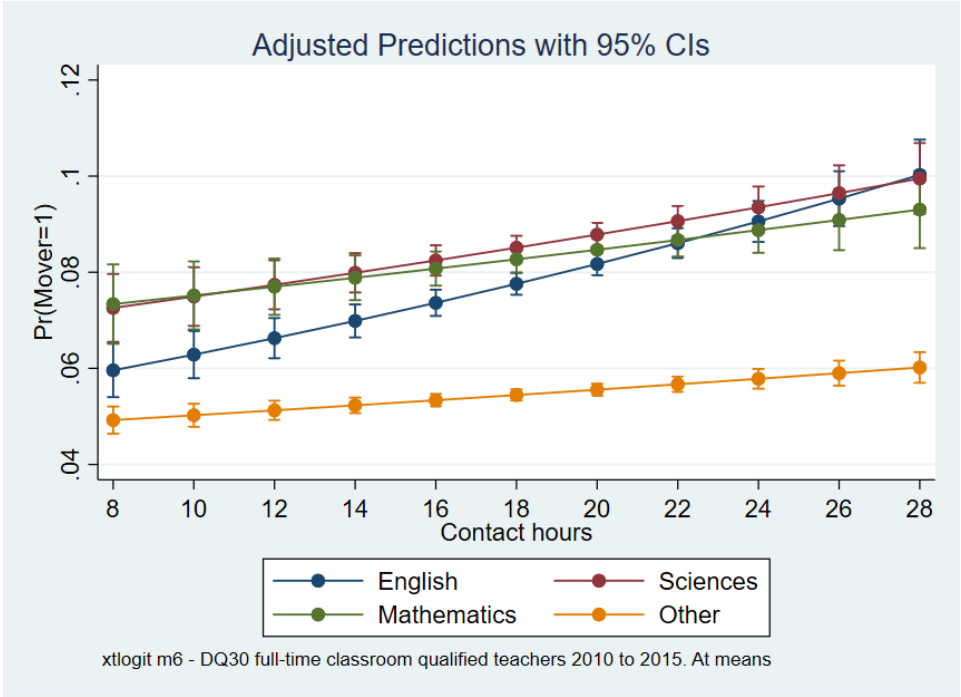

Figure 3: Probability of moving school (Department interaction) – 2010–2015
Source: SWC 2010–2015

extent of this varied by department. Again, these effects appear small, but when combined the effect is cumulative and meaningful in a practical sense. To illustrate this, consider three hypothetical teachers (A, B and C). These are 'average' English teachers who have been teaching for four or more years.

- Teacher A: Although full-time, teacher A teaches English, Drama, Media Studies and PHSE to years 10 and 11, for 14 hours per week.
- Teacher B: teacher B teaches fewer subjects (just English and Media Studies) to years 10 to 13, for 23 hours per week.
- Teacher C: teacher C concentrates on sixth form teaching in English only, for a total of 25 hours per week.

The probability of each teacher moving school varies considerably and is 5%, 7.9% and 10% for teachers A, B and C, respectively. Thus, we can see that workload combined with workload complexity make for practically meaningful differences in retention.

Teachers who leave the state system – When looking at leavers, again a highly statistically significant relationship is seen, although this time it is a non-linear relationship, as shown in Figures 4 and 5. Again, for space reasons, I omit results tables, instead graphically showing the relationship between workload and the probability of leaving. Workload complexity is tested too, showing small effects varying by department. Again, when combined these factors appear to exhibit a meaningful relationship. Take for example, two 'average' science teachers, in 'average' schools, but who are given very different timetables.

- Teacher D: teaches GCSE groups years 10 and 11, over three sciences. They also teach PHSE, for a total of 16 hours per week with no short assignments.
- Teacher E: teaches years 7 through 13, for one science subject only and totals 26 hours. 15% of this timetable is made up of short assignments.

The probability of Teacher D leaving the State sector is 4%, while it is 9.4% for Teacher E.

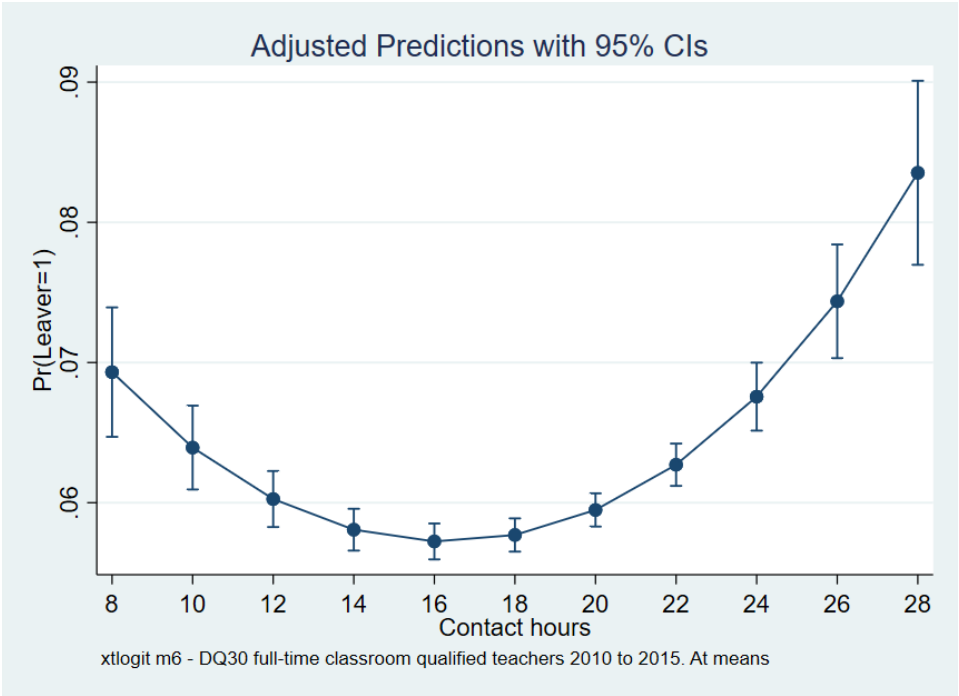

Figure 4: Probability of leaving sector, all teachers – 2010–2015
Source: SWC 2010–2015

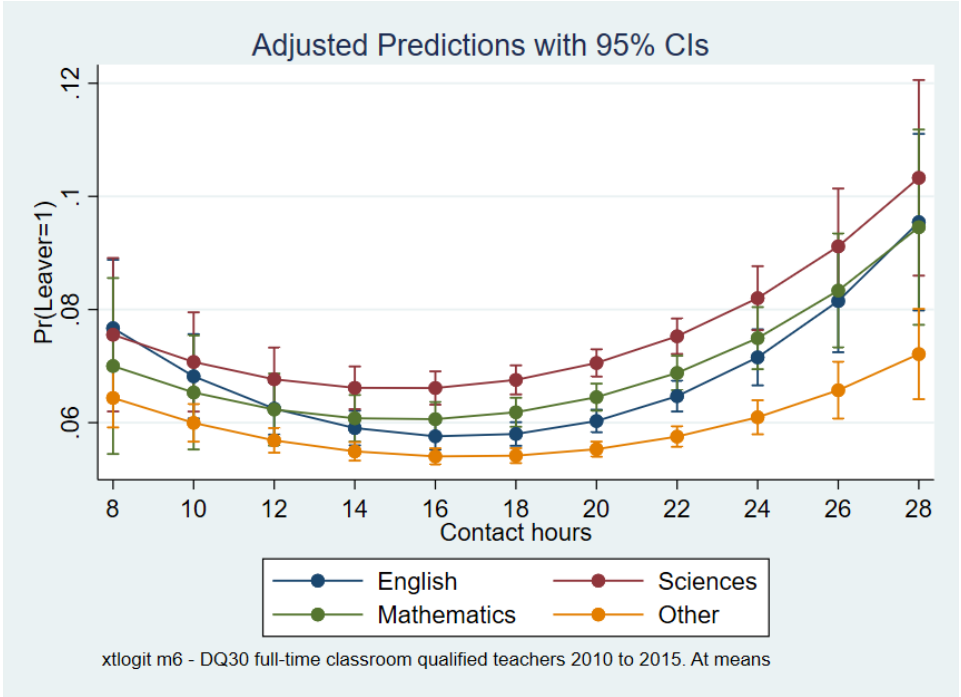

Figure 5: Probability of leaving sector, all teachers by department – 2010–2015
Source: SWC 2010–2015

This result for both movers and leavers offers a point of caution for timetabling colleagues, as their timetabling decisions may affect teachers' retention. Thus, it would be wise to consult with colleagues as much as possible during the timetabling process.

Discussion

This paper was written for the Rethinking Education conference, where delegates were encouraged to think boldly about how different education might be. In that spirit, this paper offers a rethink of teachers' contact time, and links this to school performance and retention. The results are based on England's school census data (2010 – 2015) which is reliable and high quality. Robust results point to meaningful potential benefits arising from reducing teachers' contact time, possible even at the expense of pupils' taught time. Put simply, departments with more non-contact time are likely to get better results. They are also more likely to retain their staff longer.

Some schools are already acting on their timetables, to facilitate staff training, common planning time, and simply giving staff increased personal flexibility

(Hall, 2022; Kallam et al., 2022). This is particularly true as the recent pandemic has challenged notions of the traditional '40-hour work week'. The findings in this study concur with the schools rethinking their use of time, suggesting that less can indeed be more. So too, scholars from the school improvement domain have regularly entreated policy makers and reformers to allocate teachers sufficient time, whether it be to effect policy change, to work on improvement initiatives, engage in CPD, mentoring, or induction, and so on. Such pleas stretch back decades. In their book, *Changing our Schools*, renowned professor Louise Stoll and educational consultant Dean Fink challenge schools "to find time for teachers to collaborate… and to meet with pupils" (1996, p. 129). In their subsequent book, *It's about learning (and it's about time)*, Stoll and Fink are joined by Earl as they urge schools to make "significant investments of time" (2003, p. xvi). They are not alone.

In 2004, Singapore's Prime Minister, Lee Hsien Loong, launched the 'Teach Less, Learn More' policy to create "more space for the teachers to think, to reflect, to find ways to bring out the best in their students and to deliver quality results … [partly by] teach[ing] less to our students so that they will learn more" (2004 para.112). While in Europe, part of Finland's success is attributed to a focus on quality over quantity, with less time spent in formal learning (Sahlberg, 2015). Looking across these, and similar successful systems, internationally renowned professors Andy Hargreaves and Dennis Shirley challenge schools to embrace paradox by "teach[ing] less to learn more – to support learning in depth rather than superficial coverage of imposed curriculum content" (2012, p. 176).

The world is experiencing radical change – from the profound impact of technology on work (Susskind and Susskind, 2015), to climate change. Preparing students for this world will require schools to adapt and evolve (Robinson and Aronica, 2015; Wagner, 2012; Wagner and Dintersmith, 2015), particularly in their use of time. Such a rethink is overdue.

Put very simply, if lighter timetables lead to better performance, and improved retention, thus preserving leadership time, teacher talent, and institutional capital … and if such time may be created by reductions in students' allocated instruction time without a deleterious effect on school performance or budget… then schools should be emboldened to rethink their use of time to ambitiously enrich the curriculum, improve pupil well-being, and better support and develop teachers as professionals.

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