Should I stay or should I go? Exploring the experiences of physics teachers in their first five years

Mark Whalley and Ian Horsewell

Abstract The recruitment and retention of physics teachers in England is an ongoing problem and one that has yet to be adequately addressed. Focusing on physics teachers in their first five years of service, this research examines issues around job satisfaction and their expressed likelihood of remaining in the teaching profession. A quantitative methodology was adopted, using a survey with a mixture of questions covering issues regarding job satisfaction and likelihood of remaining in teaching; 95 eligible responses were returned and analysed. Analysis indicated that around 25% of the sample teachers were very dissatisfied with their job, and 77% said that they had considered leaving teaching; 31% were seriously considering leaving. Correlational analysis indicates that the most significant factors negatively impacting the satisfaction of physics teachers in their first five years were planning workload and having to teach out of specialism. Suggestions are made as to how these factors can be addressed using approaches to planning and timetabling.

There is a crisis in physics education in England; too few teachers are joining the profession and they are leaving at a worrying rate. Although this is seen across subjects, this issue is exacerbated in physics for various reasons (including number of graduates and salary); this is discussed elsewhere, such as in Whalley (2023). To understand the underlying challenges driving the attrition of physics teachers, the research presented in this article focuses on those in their first five years (FFY) of teaching post-qualification. Given their similar level of experience in teaching (school structures, curricula and government have been stable during this period), focusing on this subset offers a reasonable comparison of attitudes among those who will hopefully continue to teach physics for many years. Understanding the challenges experienced by these teachers, so recently qualified, is important not only for their retention but also in the efforts to recruit further trainees.

Although the attrition rate for physics teachers is broadly similar to other subjects, this is in the context of weak recruitment to initial teacher training and lower overall numbers. The loss of a physics teacher in some schools will mean they have no remaining specialist. The Royal Society of Chemistry (2023) reported that 52% of teachers in mainstream schools in England work in schools that are understaffed for physics teachers. Given that 27.5% of physics lessons in state schools in England are not taught by someone with a relevant post A-level qualification in a physics-rich subject, many students will be disadvantaged in physics (Department for Education, 2023).

The exact number of FFY physics teachers is unknown, but it can be approximated using Department for Education initial teaching training (ITT) data, for example DfE (2024a), and an average yearly attrition rate of 9% as reported by the National Foundation for Educational Research (NFER, n.d.). Simple modelling predicts that there are 1600–1800 FFY physics teachers currently working in schools in England.

Doherty (2020) usefully summarises several important issues around retention across the teaching profession (including early-career teachers), noting that the continual changes to school curricula, assessment demands, and increased accountability through inspection have all significantly added to teacher workload. The NASUWT (2023) reported that the average number of hours worked by teachers in England is 52. Given the actual student contact time of teachers, it can be concluded that teachers are spending at least the same amount of time working outside the classroom each week as they do teaching.

This article explores issues affecting physics teachers in their first five years, focusing on job satisfaction and likelihood of leaving teaching, and then discusses possible approaches to reducing attrition.

Methodology

The purpose of this study was to capture the responses of a large sample of physics teachers in England during their first five years of teaching after completing initial teacher training. A quantitative approach was adopted in which a single survey was used to collect data.

Ethical approval for this research was granted by the University of Chester School of Education Ethics Committee. Strict ethical standards were maintained throughout the study, with participants being provided with in-depth information regarding the study and being required to provide consent before accessing the online survey. Personal data were not collected and the responses were anonymous.

Participants

A key imperative was to engage as many FFY physics teachers as possible; it was recognised that there are challenges in doing so as no single database of teachers exists to enable researchers to engage with potential participants. Consequently, the sampling was purposive in that participants were recruited through existing networks and mailing lists held and managed by the Institute of Physics (IOP) and other science / physics education focused organisations; social media platforms were also employed (*X/Twitter* and *LinkedIn*) to promote the survey and recruit participants.

The survey was issued during the summer term of the school year 2022–23; the process of issuing and storing responses was managed by the Institute of Physics. Ninety-five valid surveys were completed and subsequently analysed; to be eligible to participate in the survey, respondents had to be within their first five years of teaching employment after qualification and working at a school in England.

Participants were drawn relatively uniformly across the first five years of teaching careers (year 1: 20, year 2: 23, year 3: 13, year 4: 21, year 5: 18). 70 of the 95 participants work in non-selective state-funded secondary schools, 13 in the independent sector, and the remainder in colleges and selective state schools. The index of multiple deprivation for each participant's school's area was obtained from English IMD Postcode Checker (see *Weblink*). It is noteworthy that 39% of the sample teach in schools in the two least deprived deciles, compared to only 17% in the two most deprived deciles. Furthermore, 61% of the sample teach in schools in the five least deprived deciles. In this sample, it is more likely to find a physics teacher teaching in an area of lower social deprivation. Of the 95 participants, 58 were still teaching in their first school, and only 13 had taught in three or more schools.

Data collection

The survey was designed to capture a range of information concerning training experience, teaching experience (including sector and index of multiple deprivation), attitudes towards teaching, job satisfaction and thoughts about the future. The focus of this article is on physics teacher job satisfaction and the risk of leaving the teaching profession; therefore, the remainder of the article focuses on five questions addressing these areas.

Five key questions are highlighted and labelled A to E. Question A is a simple subjective measure of current job satisfaction, giving participants four options with which to answer:

A. Currently how satisfied are you with your job?

- Very satisfied
- Satisfied
- Dissatisfied
- Very dissatisfied

Question B explores the dimensions of job satisfaction through the inclusion of 12 specific items (see Table 1, which also includes findings). Responses to each item use a 4-point Likert scale representing the level of satisfaction experienced by the teacher for each element. The items were chosen to represent common elements of the life of a teacher in their first five years of teaching.

Question C explored the negative side of the teacher experience by examining elements of work that may result in participants feeling less satisfied. 21 items were included and participants responded on a 4-point Likert scale indicating how significant a factor each element was in contributing to a reduced sense of job satisfaction (see Table 2). Question E was very similar in structure to C but investigated the factors that participants might believe would contribute towards a decision to leave the profession. The items used in E were mostly the same as in C but with the addition of two extra items. While these two questions are similar it is recognised that some elements may cause significant dissatisfaction but would not cause a teacher to leave the profession, whereas other elements may have a deeper impact and provoke a teacher into leaving the teaching profession.

In order to gauge participants' attitudes towards their careers, they were asked to answer question D with five available responses coded D.1 to D.5:

D. Have you thought about leaving teaching in the last 12 months or have you left teaching?

D.1 Not at all
D.2 Yes, I have thought about it but not too seriously
D.3 Yes, I have thought about it seriously but I'm trying another school before I make up my mind
D.4 Yes, I have thought about it seriously and I've been exploring other careers
D.5 Yes, I am definitely leaving teaching

Although five responses were collected, for correlational analysis (see *Analysis and results*) D.3 and D.4 were grouped together.

Table 1 Question B – items and results

B. What aspects of your job do find satisfying? (Available responses: Very satisfying; Quite satisfying; Not satisfying at all; Disagreeable; N/A)			
Item	**Item Text**	**Weighted average (1 d.p.)**	**Rank**
B.1	Teaching physics	3.8	1
B.2	Teaching science	3.0	2
B.3	Teaching out of science	1.5	12
B.4	Pastoral work (being a form tutor or similar)	2.8	4
B.5	Planning	2.7	5
B.6	Marking	2.2	9
B.7	Preparing resources	2.8	3
B.8	Attending meetings	2.2	8
B.9	Extra-curricular activities	2.7	7
B.10	Management/leadership	1.7	11
B.11	CPD	2.7	5
B.12	Administrative tasks	1.9	10

Data were analysed using Microsoft *Excel* and the statistical software package *SPSS* (*Statistical Package for the Social Sciences*), also known as IBM *SPSS Statistics*. The latter package has increased statistical functionality, including the capacity to calculate correlation values and levels of significance.

The use of *SPSS* has enabled correlations between job satisfaction (question A) and current career intentions (question D), and the list of items in questions C and E to be explored. *SPSS* was used to calculate the Pearson correlation factor and to obtain the level of statistical significance in the calculated correlation.

Table 2 Survey results; itemised responses (weighted averages and rankings); correlational analysis between question A and items of question C, and between question D and items of question E

Item		**Item text**	**Question C (*N* = 95)**		**Question E (*N* = 72)**		**Correlation factor between overall satisfaction (question A) and individual items of C**	**Correlation factor between likelihood of leaving (question D) and individual items of E**
			Weighted average	**Rank**	**Weighted average**	**Rank**	**(*N* = 96)**	**(*N* = 72)**
C.1	E.1	Planning workload	2.9	3	2.8	3	0.413**	0.400**
C.2	E.2	Marking workload	2.9	4	2.8	3	0.145*	0.263**
C.3	E.3	Having to teach out of specialism	2.3	9	2.4	8	0.190**	0.296**
C.4	E.4	Overly prescriptive ways of working	2.3	10	2.3	10	0.307**	0.11
C.5	E.5	Poor student behaviour/ relationships	3.0	1	3.0	2	0.326**	0.275**
C.6	E.6	Poor leadership (department level)	1.8	20	2.0	17	0.156*	0.111
C.7	E.7	Poor leadership (school level)	2.4	7	2.7	5	0.318**	0.197**

C.8	E.8	Meetings (quantity)	2.4	8	2.2	12	0.180*	0.212**
C.9	E.9	Administrative duties	2.6	5	2.4	7	0.250**	0.201**
C.10	E.10	School/MAT/college ethos	2.0	17	2.0	19	0.311**	0.157*
C.11	E.11	Lack of training (CPD/ CLPL) opportunities and mentoring/coaching support	2.0	14	2.0	18	0.225**	0.237**
C.12	E.12	Lack of consultation (involvement in decision making)	2.2	11	2.3	11	0.237**	0.253**
C.13	E.13	Level of autonomy	1.9	19	2.1	14	0.243**	0.076
C.14	E.14	Lack of opportunities to work collaboratively	2.0	14	1.9	22	0.247**	0.176*
C.15	E.15	Salary	3.0	2	3.1	1	0.196**	0.165*
C.16	E.16	Lack of career progression opportunities	2.2	12	2.4	8	0.237**	0.224**
C.17	E.17	Lack of flexible working opportunities	2.4	6	2.6	6	0.06	0.292**
C.18	E.18	Lack of confidence in your own teaching ability	2.1	13	2.1	16	0.016	0.282**
C.19	E.19	Lack of professional status	2.0	16	2.0	19	0.153*	0.271**
C.20	E.20	Difficult or bullying colleagues	1.5	21	1.8	23	0.072	0.106
C.21	E.21	Lack of practical resources and/or technician support	2.0	18	2.0	19	0.205**	0.197**
	E.22	Family/personal issues	N/A	N/A	2.1	15		–0.041
	E.23	Negative images / representation of teaching	N/A	N/A	2.1	13		0.244**

Analysis and results

Satisfaction as a teacher

The participants expressed a relatively high level of job satisfaction in question A, 71/95 (or 75%), with only 24 out of 95 reporting being either dissatisfied or very dissatisfied.

No single survey of FFY teachers exists, but data exist for teachers at all stages of their careers. Adams *et al*. (2023) report that 84% of secondary teachers across all subjects and phases enjoy classroom teaching all or most of the time, and that 56% are satisfied with their job for all or most of the time. As a like-for-like comparison is not possible, it is not possible to draw firm conclusions regarding differences between FFY physics teachers and secondary teachers in general.

Question B focused on satisfaction with elements of work. Calculating a weighted average for responses for each item allowed the items to be ranked. To obtain this value the Likert scale responses for question B were assigned values: Disagreeable = 1, Not satisfying at all = 2, Quite satisfying = 3, and Very satisfying = 4. Thus, the higher the score, the greater the level of satisfaction attributed to that element. Table 1 presents the item-by-item weighted average and rank across 12 elements.

Question B (What aspects of your job do you find satisfying?) shows teachers clearly enjoy teaching both physics and science, but they find any teaching out of science disagreeable. The range of the weighted averages suggests that there are clearly areas of work that teachers generally find agreeable and disagreeable. Management and leadership, along with administrative tasks, are mostly found to be the most disagreeable part of work. It should be noted that while marking is ranked 9th, it is a core teaching activity, whereas for any classroom teacher both management and administrative tasks ordinarily should not constitute the working lives of teachers (DFE, 2019).

This analysis of questions C and E highlights some of the major factors negatively affecting physics teachers, both in terms of their general job satisfaction and in potentially causing them to consider leaving the profession (see Table 2). Across

Table 3 Reponses to question D 'Have you thought about leaving teaching in the last 12 months or have you left teaching?'

D. Have you thought about leaving teaching in the last 12 months or have you left teaching?'			
Response	**Responses (count)**	**Reponses (%)**	**Responses - combined (%)**
Not at all	22	23.2	23.2
Yes, I have thought about it but not too seriously	43	45.3	45.3
Yes, I have thought about it seriously and I've been exploring other careers	14	14.7	27.3
Yes, I have thought about it seriously but I'm trying another school before I make up my mind	12	12.6	
Yes, I am definitely leaving teaching	4	4.2	4.2

the two questions, the two aspects having the most significant negative impact were 'Poor student behaviour' and 'Salary', and these were followed in both questions by the workload items of planning and marking. Overall, the trend through responses to C and E was very similar, though with some items, such as 'Meetings (quantity)', it was seen that this was more significant in causing dissatisfaction than as a prompt to consider leaving teaching.

In addition, the responses to question C were from all the participants, whereas question E was filtered using question D, and those who had not considered leaving teaching at all were excluded.

It is worth noting that perceptions of leadership at a whole-school level have a far greater negative effect on physics teachers than that at departmental level.

Of the 95 participants, 73 (77%) had said that they had considered leaving teaching, of which 30 (31.5%) responded that they were seriously considering leaving teaching or had already decided to leave, while only 22 had said they had not considered it at all. A caveat with this is that a reported intention to leave may not translate into actually leaving teaching. The national equivalent measure is 28% (Adams *et al.* 2023), and so the 31.5% of this cohort seriously considering leaving teaching is greater. However, this physics-specific sample is relatively small, and so it would be unwise to claim any greater significance to this value than to the national value.

Correlational analysis

In order to calculate both weighted averages and correlation factors, the Likert scale responses for questions A, C, D and E were assigned ordinal values from 1 to 4, where 1 represents the end of the scale corresponding to dissatisfaction and 4 to satisfaction. Note that this analysis was conducted separately to the simple analysis presented above in which scales were chosen in which the higher the level of dissatisfaction, the greater the number. The important feature of this ordinal coding is that the direction of the responses (more negative to more positive) all align, so enabling correlational analysis. For question A the responses were assigned: very dissatisfied: 1, dissatisfied: 2, satisfied: 3, very satisfied: 4. For questions C and E the responses were assigned: big factor: 1, medium factor: 2, small factor: 3, not a factor: 4. For question D, the responses as described and coded above were assigned: D5: 1, D3 and D4: 2, D2: 3, D1: 4.

SPSS calculates the Pearson correlation factor between pairs of data sets; factors range from –1 to +1, with the extremes showing perfect negative and positive correlation respectively, and 0 showing no correlation at all. However, it should be noted that in a large data set, statistically significant correlations may have a correlation factor that appears to be relatively low, but *SPSS* indicates this level, and correlations at both 0.05 and 0.01 level (95% and 99%) are indicated in the results by * and ** respectively.

The results for the correlational analyses are also presented in Table 2, firstly examining the correlation between overall job satisfaction and individual elements of work, and then between likelihood of leaving teaching and the individual elements.

Examining correlations between overall job satisfaction (question A) and individual items that make teachers feel less satisfied (question C), clearly shows numerous aspects of work that have positive correlations at a high level of significance (>99%). There are some noticeable similarities between the two sets of correlation factors, but some interesting differences. These suggest that while dissatisfaction with certain elements of the job may lead to overall dissatisfaction at work for most colleagues, specific factors are identified by those who have thought about leaving.

The quantity of planning required of teachers is clearly a significant factor affecting the job satisfaction of the participants and they also report this as being probably the most significant driver in them considering leaving teaching. The correlation factors are large, and statistically significant.

A result of particular interest is that around opportunities to work flexibly. In terms of overall satisfaction there is no correlation between job satisfaction and flexible working opportunities, but when it comes to those who have thought about leaving, lack of flexible working opportunities becomes a significant factor. Similarly, although not to the same extent, while responses indicated some correlation between marking load and job satisfaction, participants felt that this would be a more significant factor when considering leaving teaching.

Discussion

The first five years of a teacher's career can be both exciting and challenging. A new career, new experiences, and impacting the lives of many young people can be immensely rewarding, but at the same time the challenges come thick and fast. During these early years of teaching, teachers are not only developing their classroom skills but also building their broader professional knowledge, which goes beyond the teaching of their own subject.

During these first five years, this research indicates that the workload created by planning has a significant impact on job satisfaction and could potentially make teachers more likely to leave the profession. Given the dire shortage of physics teachers exacerbated by the challenges of recruitment, it would seem prudent for leaders in schools to address the aspects of planning workload within their control. No doubt there are multiple ways in which planning workload can be reduced, but here two approaches will be discussed, firstly the use of pre-prepared planning, and secondly the deployment of matched timetables.

Supported planning

Planning takes time; preparing lessons and practical activities, and often preparing *PowerPoint* presentations, all adds to workload. A simple solution is to use resources obtained from elsewhere, often in the form of lesson plans, presentations, assessments and tasks; these will now be referred to as 'external resources'. These may be schemes of work from publishers and other external bodies, pre-existing materials in the school, or materials issued across a Multi-Academy Trust (MAT).

The blanket use of external resources can be time-efficient and significantly reduce workload, but the relevance and useability of the resources in every specific context should be considered, and, if possible, adaptations made to suit the teacher, the students and the school and community context.

It is important for senior leaders to recognise that the use of external resources is a double-edged sword. There are a wide range of practices across schools, from complete autonomy in preparing lesson resources through to the expectation that teachers will adhere to school/MAT-approved external resources about which they have little or no say. 'Overly prescriptive ways of working' and 'level of autonomy' were both identified as factors that significantly reduce job satisfaction (though not factors contributing towards the likelihood of leaving teaching). Therefore it must be acknowledged that the use of materials prepared by others and potentially imposed on teachers will clearly reduce planning load but at the cost of reducing a teacher's sense of personal agency. A balance should therefore be sought between the extremes of complete planning autonomy (planning workload) and the slavish use of external resources especially as expertise increases.

Matched timetables

Planning workload and teaching out of specialism are evidently key issues, and so addressing these together would present an efficient and effective way of reducing the negative impact of these factors and thus potentially contributing to improved teacher retention.

The results are compelling; in Table 2 items C.3 and E.3 are 'Having to teach out of specialism'; while in terms of overall job satisfaction there is a correlation at the 95% level between teaching out of specialism and increased dissatisfaction, the correlation between teaching out of specialism and likelihood of leaving is very strong. The implication of this is that allowing teachers to teach their specialism clearly improves job satisfaction, but more significantly is a key element in retaining teachers.

Teaching out of specialism, especially early in a teacher's career, can pose an array of challenges. The teacher's content knowledge may be weaker and so time is needed to learn unfamiliar material. Their subject-specific pedagogy is likely to require development (which may also include practical work). They may have lower confidence in the subject and they may simply lack interest in the subject. However, the reality of teaching will often require teachers to teach out of specialism; it is therefore advisable to minimise the time demands of such work. A bonus of teaching within specialism is that if practitioners teach the same content for

several years their competence improves faster (Allen and Sims, 2018), thus improving outcomes for students.

Planning and teaching out of specialism can be addressed simultaneously through the adoption of matched timetables. A matched timetable has two core features: first, the amount of time spent teaching in specialism is maximised, and, second, the number of repeated classes is increased (both in and out of specialism). Timetables are often compromises, and physics teachers will regularly teach out of specialism, especially at key stage 3 (ages 11–14). However, if a teacher can have repeated classes (for example three year 9 classes as opposed to three classes from three different year groups) then the planning load will be reduced and it will give the teacher an opportunity to develop their skills in a more focused way.

Conclusion

While the focus of this article has been on physics teachers, valuable lessons can be drawn for other multi-subject departments. It is not only science departments that routinely require teachers to teach out of specialism; this is also commonplace in modern foreign languages and design and technology departments, and is sometimes experienced in broader humanities departments in some schools.

The issue of salary is significant in teacher retention, being a significant contributor to dissatisfaction. However, as discussed in Whalley (2023), this is a factor generally beyond the control of school leaders and so can only be remedied by the actions of government. Therefore, given the limited influence of school leaders in this area, it is not discussed further here.

This study has focused on the experiences of physics teachers in England in the first five years of their teaching careers. While the sample is relatively small, important conclusions can be drawn from the data, crucially highlighting areas of work that contribute to a greater level of dissatisfaction and an increased likelihood of leaving the profession. While some of the findings reflect those seen elsewhere across the profession, such as in the report on workload from the Department for Education (2024b), certain other areas that are diluted in cross-profession studies (for example teaching out of specialism) become more significant. There are ways to tackle these problems, but these will require time, resources (physical, human and financial) and leadership at all levels committed to addressing the issue of teacher retention.

Weblink

English IMD Postcode Checker: www.fscbiodiversity.uk/imd

References

Adams, L., Coburn-Crane, S., Sanders-Earley, A., Keeble, R., Harris, H., Taylor, J. Taylor, B. (2023) *Working lives of teachers and leaders.* London: Department for Education. www.gov.uk/government/publications/working-lives-of-teachers-and-leaders-wave-1

Allen, R. and Sims, S. (2018) *The Teacher Gap*. London: Routledge.

Department for Education (2019) *Reducing workload: supporting teachers in the early stages of their career.* www.gov.uk/government/publications/supporting-early-career-teachers-reducing-teacher-workload

Department for Education (2023) *School workforce in England.* https://explore-education-statistics.service.gov.uk/find-statistics/school-workforce-in-england

Department for Education (2024a) *Statistics: initial teacher training.* www.gov.uk/government/collections/statistics-teacher-training

Department for Education (2024b) *Working lives of teachers and leaders: wave 2 summary report.* www.gov.uk/government/publications/working-lives-of-teachers-and-leaders-wave-2/working-lives-of-teachers-and-leaders-wave-2-summary-report

Doherty, J. (2020) A systematic review of literature on teacher attrition and school-related factors that affect it. *TEAN journal*, **12**(1).

NASUWT (2023) *Big Question Survey.* www.nasuwt.org.uk/news/campaigns/big-question-survey.html

NFER (n.d.) *Teacher recruitment and retention in England data dashboard.* National Foundation for Educational Research. www.nfer.ac.uk/key-topics-expertise/school-workforce/teacher-recruitment-and-retention-in-england-data-dashboard/

Royal Society of Chemistry (2023) *The Science Teaching Survey 2023.* www.rsc.org/policy-evidence-campaigns/chemistry-education/education-reports-surveys-campaigns/the-science-teaching-survey

Whalley, M. (2023) Where are the physics teachers? Challenges and opportunities in retaining physics teachers. *SSR in Practice*, **105**(389), 4–5.

Mark Whalley is a senior lecturer in Educational Leadership at the University of Chester, UK.
✉ mark.whalley@chester.ac.uk

Ian Horsewell is the Strategic Lead for Professional Community and Retention at the Institute of Physics, UK.
✉ ian.horsewell@iop.org