

Exploring the experiences of undergraduate physics students on a 'Teaching Physics in School' module and the effects on their intentions to become physics teachers

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Exploring the experiences of undergraduate physics students on a 'Teaching Physics in School' module and the effects on their intentions to become physics teachers

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ABSTRACT

This poster describes an undergraduate physics module at a university in England that places year 3 student physicists in secondary school classrooms for a semester. This is done as a way of introducing them to the occupation of secondary physics teaching using a realistic job preview approach. The module helps the undergraduate students develop their communication and professional skills and supports the physics learning of pupils in the schools where they are placed. The perceptions of the participating students toward secondary school physics teaching are then investigated with emerging themes; the difficulty of explaining physics concepts to children and the need to make school physics enjoyable.

ONGOING DIFFICULTIES IN RECRUITMENT OF PHYSICS TEACHERS

In 2020-21 only 22% of government target for new secondary physics teachers were recruited [1] and in the following academic year by September 2022 this figure was 15% [2]. Only 398 new physics teachers had been recruited against an increased target of 2610 (Teach First recruitment is excluded from this data).

To put these numbers in context, in the same academic year in England a total of 5,620 students graduated from physics and astronomy degrees [3] making the target for physics teacher recruitment an unrealistic 46% of the total, but the actual number recruited a disappointing 7% as shown in Figure 1. Similar shortages of physics and STEM teachers have been reported around the world [4] suggesting that it is important to understand more fully ways of introducing secondary teaching as a career possibility for physics undergraduate students.

Are financial incentives the only viable solution?

Physics teacher recruitment efforts have often focused on financial incentives for initial training. Evidence suggests however that these have only a limited impact [5,6,7] and point rather to effective strategies focused on giving potential physics teachers the opportunity to see if the job is the right fit for them through realistic job previews [5].

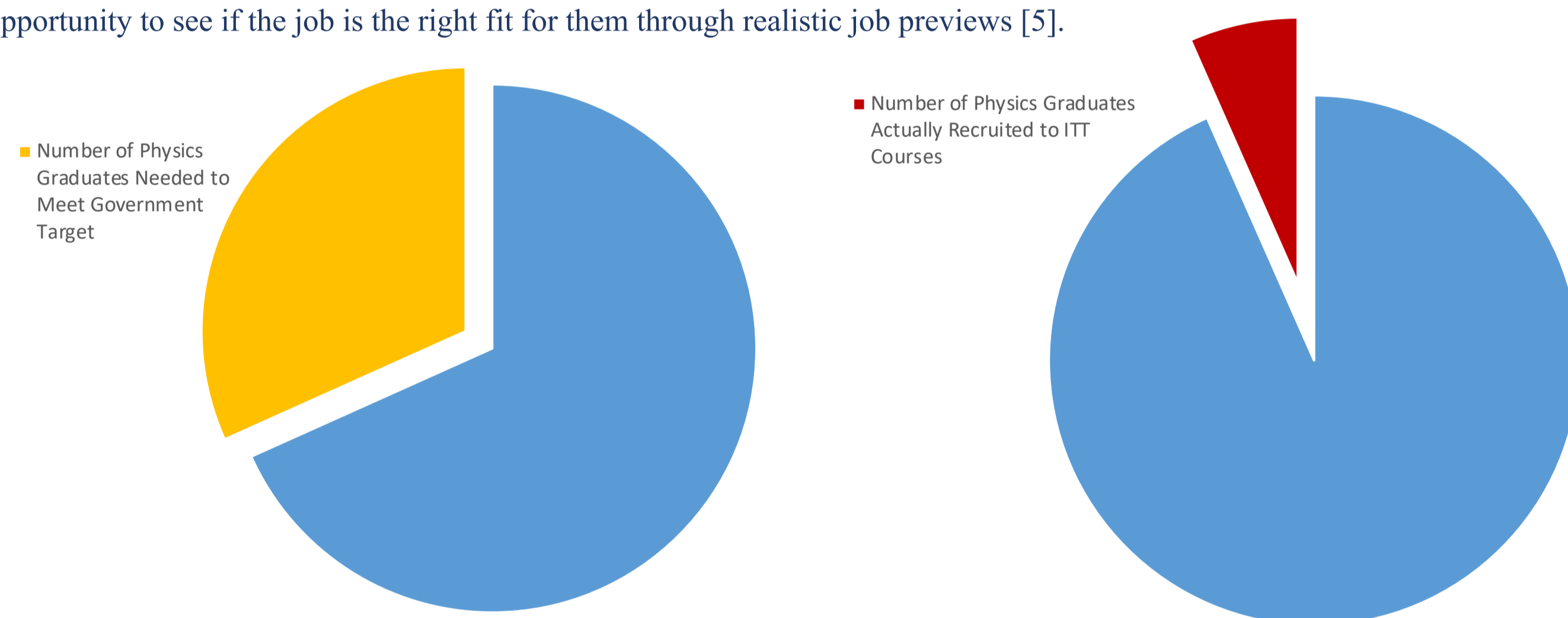


Figure 1 Comparison of the physics graduates required to meet the government target for recruitments and those who were actually recruited in 2022

TEACHING PHYSICS IN SCHOOLS – Y3 MODULE

A y3 module that contributes 10 credits to physics undergraduates final year is offered that provides weekly classroom experience in a local secondary school along with some training in pedagogy and communication.

REALISTIC JOB PREVIEW

Realistic job preview attempts to support individuals in finding out whether a particular occupation will meet their own preferences and needs in employment. The intention of this being that if the right people are able to select the right occupation it will lead to long term job satisfaction for the individual and lower rates of job turnover for the employing organisation [10]. A realistic job preview differs from a more traditional approach to recruitment in that it aims to show job candidates both positive and negative aspects of a role in an attempt to ensure they have realistic expectations rather than relying on a potentially distorted overly optimistic presentation of reality that may lead to later disappointment [11]. Similar strategies in the US [12] have been shown to contribute to increases in recruitment of new physics teachers. Situating the introduction secondary physics module in the undergraduate physics degree program is also significant as it has been found in Sweden that culture and assumptions of physics departments can influence students' choices to train to teach physics [13].

METHODOLOGY

A short online survey of attitudes to teaching secondary school physics was administered to students taking the module who consented to participate (n=5/12). This was done twice; before they started and after the end of the module to investigate any changes in attitudes. After the module had finished, two students also volunteered to participate in a semi-structured interview conducted via video call about their experiences and how it had affected their intentions to become a physics teacher. The interviews were transcribed and thematically analysed [14]. Communication with students about their participation in the study was done by an academic colleague not connected with the module in an attempt to ensure participants were not influenced to participate by a desire to gain credit in assessment of the module.

The themes discussed in the interviews were:

- Describe the types of things a physics teacher does and are these similar or different to what you thought before the module began.
- What do you think are the biggest challenges in physics teaching?
- Describe a critical incident on your school placement – a key moment that caused a change in your thinking.
- Describe any of your skills that you think have been developed through participating in this module with examples.
- How likely are you to train to be a physics teacher in the future?

FINDINGS

There was no significant overall change in the students attitudes toward physics teaching before and after completing the module as measured by the survey instrument. Interesting detail was expressed in the written answers to the open question which are summarised in Table 1. These show consistent feelings that the module helps the students find out if teaching is the right career for them, in keeping with the realistic job preview intentions of the module. This is also supported by there being no references to a sense of fun or enjoyment in the responses after the end of the placement and a trend toward more responses acknowledging the difficulties of the job with words used like 'thankless', 'draining' and 'requires patience' in addition to 'hard' and 'stressful' that were anticipated before.

Question	Pre-placement	Post placement
Why did you choose the module?	Fun (2) Personal satisfaction To find out if teaching is for me (4) Classroom experience (2) Use physics knowledge	To find out if teaching is for me (4) Module different to other options (2) Improve communication skills Improve confidence
What is it like to be a physics teacher?	Busy Interesting Varied Hard Stressful Rewarding (2) Adapting physics knowledge for children	Hard (3) Stressful / draining (2) Rewarding (2) Requires patience Thankless Enables children to learn physics

Table 1 Written responses to free text questions with numbers showing the amount of times a theme is mentioned

Two overarching themes were identified in thematic analysis of the interview data: 'Difficulty of explaining physics to children' and 'Encouraging children to enjoy physics'. The relationship between these overlapping themes and the contributing comments are shown in Figure 2. Areas of difficulty observed by students on their placements around negative pupil behaviour, onerous school administrative demands, inadequate pay and workplace stress are familiar but importantly are realistic parts of the experience of teaching physics. To the extent to which this module provided a realistic job preview, perhaps the question in the minds of students considering their future careers is; do the benefits of physics teaching outweigh the challenges?

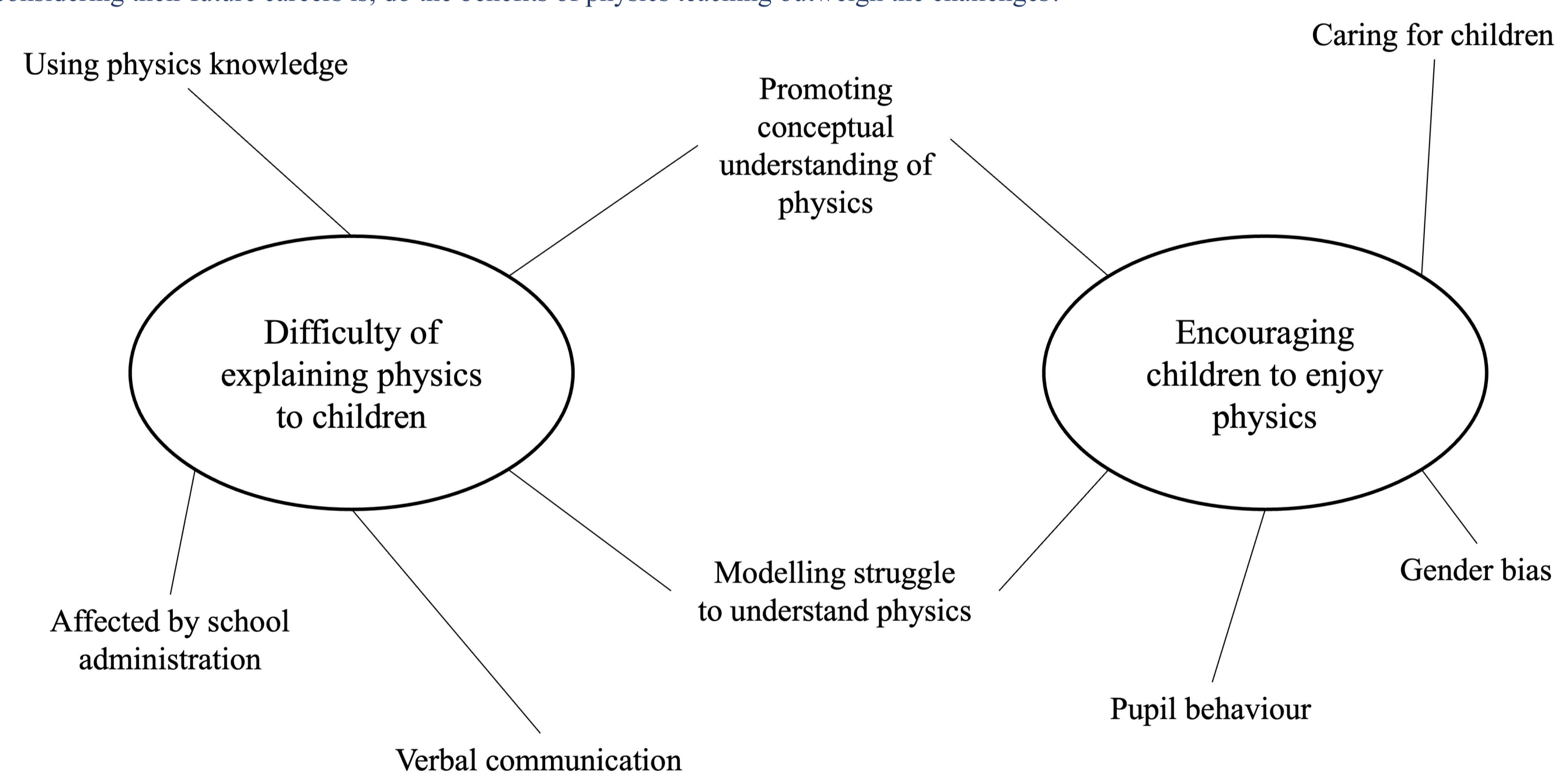


Figure 2 Thematic analysis of post-module interview data

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