

Interactive comment on “School students from all backgrounds can do physics research: On the accessibility and equity of the PRiSE approach to independent research projects” by Martin O. Archer

Martin Archer

m.archer10@imperial.ac.uk

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Overview - This paper and provides a more comprehensive and thorough analysis of a school engagement project than is typically done. The detail involved is welcomed, and it is excellent to see such evaluations being published.

We thank the reviewer for their time in reviewing the manuscript and for their comments. We have considered each carefully.

Section 2 - Participation Regarding Independent schools who fail to initiate part-

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nerships: were they allowed to continue with the programme? And were there any common reasons for not being able to set up partnerships? This information would be useful for anyone trying to replicate the work.

We thank the reviewer for this suggested inclusion. In the first instance of this policy (academic year 2019-2020) any school which refused to even try and form partnerships was not allowed on the programme, even if they had worked with us before. However, those schools which had agreed to the policy but then failed to form a partnership were allowed to participate, with the expectation that they try again to form such a partnership for participation a year later. Typical reasons for this failure were not being able to draw from existing local partnerships, limited time from the application to the summer holidays, and poor communication between teachers at different schools. We will add these points to the manuscript.

Appendix A: how should a reader interpret the missing information about admissions policies? Is it simply not available publicly?

The reviewer is correct, missing information is due to it not being publicly available. We will make a note of this in the revision.

Background metrics: - It would be worth clarifying the difference between the full catchment area and the "local census area" for schools. My assumption is that it is just the area immediately surrounding the school's location/postcode

The reviewer is correct, we will add this clarification using the reviewer's suggested wording.

There is considerable variation between the local and full catchment data for indices of multiple deprivation, as noted in the text and the caption of Figure 3. The author discusses the difference in the data sources, though the text gives the impression that full catchment data is "better", when in fact the local data is in better agreement with the national average.

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We believe that full catchment area data is more reflective of a school's student base as schools will draw students from a wider range of locations than simply the census area within which they are located, thus taking account of the full range of locations will yield more reflective metrics about a school's students. We will add this point to the manuscript.

- Is it due to the London/non-London locations, and if so does restricting the samples with local data to just those schools give more consistent results? In effect, are the differences because there are significant differences between the local/catchment data for a school, or is it because there is variation between the schools in areas where catchment data is/isn't available? (Or is there insufficient data to tell?!)

There are significant differences between local and catchment data in general. This was investigated in Appendix C, where we compared the local and catchment data for all schools in London (the only schools for which both sets of data are publicly available). This showed that while the local and catchment data certainly correlate, this correlation is not particularly strong (coefficients ranging from 0.64-0.85). We will make a reference to this fact in the main text.

Another approach may be to use national data for the relevant region (e.g. London/SE), but such data may not be available.

We did consider this. However, we felt that benchmarking against only London data would have implications on how we compare PRiSE to the other programmes, which are not located in London. Including national data as well as data across all of London (both local and catchment) on Figure 3 would make it far too busy. For simplicity, we therefore decided to only benchmark against national data.

The clause "perhaps the issue lies in their targeting of and engagement with schools" regarding IRIS would benefit from clarification about how the approaches differ. It seems unbalanced to declare this as the issue with IRIS, but

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not HiSPAC. There are many, many other factors, such as the amount of teacher time required, the pupil time commitment etc., and it seems risky to attribute this to such a small subset. Perhaps wording along the line of "Such biases may be due to the cost of participation, the targeting of schools, or the engagement with schools, though it is noted that IRIS, like PRiSE, is free to schools".

We have decided to remove these conjectures about other programmes from the manuscript as they are not vital to the results presented.

Section 3 - Retention - It is mentioned in the text that participating in more than one year increases the retention of schools, and that the SCREAM data in Fig4a is perhaps an illustration of that. It would be interesting to see whether there is any more evidence of this - perhaps a similar plot to Fig 4a/b but with the data split by number of previous years completed (perhaps 0 years / ≥ 1 years).

The reviewer raises an interesting point. We will add further evidence of this from data given in Appendix A. In the attached figure, the top panel shows a scatter plot (blue) of the number of years each school was involved and the number of years they completed. Schools tend to lie near the two possible extremes (solid lines) of either completing the projects every year they were involved or not completing the projects at all. This is exemplified in the bottom panel, showing the distribution of the proportion of years that schools completed. This has a clear bimodal form peaked close to zero and one. Another point is that in the top panel, as the number of years involved increase the number of years completed tends towards the positive extreme further. This is shown most clearly in the red plot which shows the mean number of years completed and its standard error as a function of number of years involved. We will add this figure and these points to the paper.

Section 4 - Feedback - One of the reasons for teacher/school drop-off is the work required. What would be useful to see (either here or in the introduction) is an estimate of the role/tasks required of the teacher, or an estimate of the time

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involved. Experience (and the feedback in this paper) suggests that this is something that can have a big impact on school involvement.

A discussion of the role of the teacher in assisting with these projects is given in more detail in the paper introducing the framework (M.O. Archer et al., 2020). However, we can add a note to the introduction highlighting the key points of this discussion. Under PRiSE the teacher's role is chiefly one of encouraging their students to persist, providing what advice they can, and then communicating with the university. Teachers are not expected to fully manage the projects, which is why numerous modes of support are provided from active researchers who have the expertise and skills in the areas of each project.

Archer, M. O., DeWitt, J., and Thorley, C.: Transforming school students' aspirations into destinations through extended interaction with cutting-edge research: Physics Research in School Environments, *Geosci. Commun. Discuss.*, <https://doi.org/10.5194/gc-2020-35>, in review, 2020.

Interactive comment on *Geosci. Commun. Discuss.*, <https://doi.org/10.5194/gc-2020-37>, 2020.

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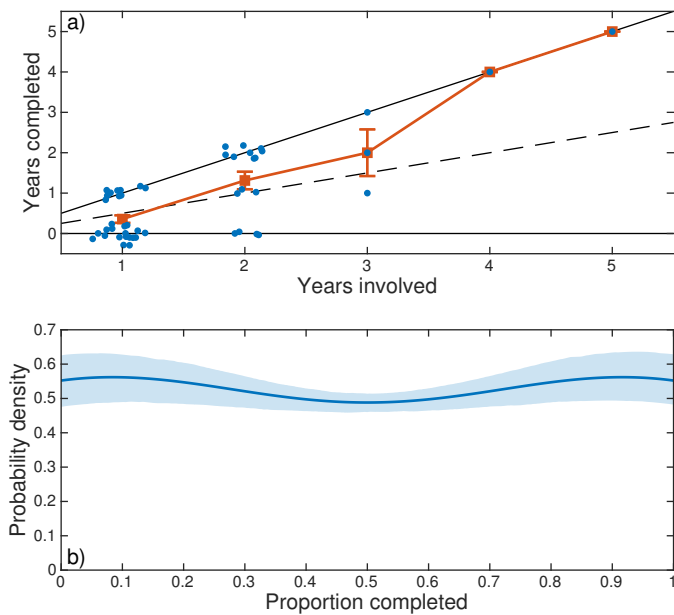


Fig. 1. Years completed against years involved

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