

***Interactive comment on* “Transforming school students’ aspirations into destinations through extended interaction with cutting-edge research: “Physics Research in School Environments”” by Martin O. Archer et al.**

Anonymous Referee #3

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General comments

This paper makes a valuable contribution to the available literature on undertaking projects that involve school students in research. It is generally well-constructed and well written, leading the reader through the premise, structure and success of the programme. The detailed exposition of the workings of PRiSE is especially welcome as it facilitates the successful replication of such a programme without a duplication of the evidently extensive effort and multiple trials that have been required to bring the programme to its current level.

There are some points in the paper (as will be addressed in the specific comments below) that would benefit from further consideration; however, these comments are mostly fairly minor, and are noted in a spirit of bringing the level of every part of the paper to the high standard it exhibits overall.

The authors give a thorough depiction of the landscape in which this work sits, taking care to give details of other similar projects distinct from PRiSE. Nevertheless, as noted below, these other projects are not always considered in a positive light. It might be wise not to be over-critical at the risk of sounding petty rather than constructive. However, proper credit is given where appropriate, both to work outside this project and to the researchers and other staff involved in PRiSE, which was heartening to see.

The title seems fair, although there is an emphasis on ‘destinations’ that is less apparent within the body of the paper. Although this is mentioned within the section on the Theory of Change, there seems to be little further discussion or evidence of the destinations of students that take part in PRiSE. Nevertheless, the abstract provides a concise, complete and clear summary of the contents of the paper.

The language is largely fluent and precise. On occasion, some of the sentence structures are a little hard to follow on a first reading. In particular, there is substantial use of possessive apostrophes that on occasion impede initial comprehension. It may be worth reconsidering some of these to aid the flow of the text (as opposed to the text’s flow).

The paper is well-referenced throughout, with many recent publications cited, demonstrating a laudable grasp of current best practice and educational research. This is to be highly commended.

Specific comments

The specific comments are given with line references relating to the pre-print (pdf) of

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the paper.

- Line 9: 'with all elements appearing equally important.' – it would be useful (perhaps later in the article) to have a simple list of all the elements that are being encompassed by this phrase.

- Line 66 on: The discussions of other similar projects, while not obviously straying from factual, nevertheless read as ungenerous. E.g. line 73: 'other memberships are seemingly justified to ensure that schools make a commitment to working with the university'; line 88: 'While some researchers/academics have designed or consulted on some IRIS projects, they appear in general to have little involvement supporting students or teachers'. This could perhaps be construed as criticism of the other projects (with the aim of elevating PRiSE) which may or may not be considered constructive at this juncture.

- I understand that the Theory of Change as presented here is discussed in more detail in another publication. Nevertheless, I would query a couple of aspects that are here presented without substantial examination (though I recognise this review comment may not be the best home for this remark and the authors may feel that no response or alteration is merited.) ** Figure 1: The implication that 'Know other people interested in physics' leads to 'See themselves as equals in physics to those from different backgrounds'. I don't know that this follows. I think you can quite easily know other people interested in physics and *not* see yourself as "equal in physics" to those other people. ** Line 163: 'By interacting first-hand with "real physics" through the projects and working with active researchers, students (especially those from under-represented groups) should feel included'. I think it is perfectly possible to do physics research and yet feel excluded. I am not convinced that under-represented students will automatically feel included, simply by virtue of doing "real physics", especially if they do not recognise themselves in the active researchers they are connected with or are a minority in the group taking on a project in their school.

- Line 201 -205. How do the other IRIS physics projects compare here? As it stands, it reads like a cherry-picked list of worst performers, highlighted to make PRiSE look good. If further data on the numbers of researchers / schools is not available for other IRIS projects, then this is worth noting here to avoid this impression.
- Line 196: It becomes apparent here that some schools have taken part but then dropped out. It might be worth pointing this out explicitly, and possibly signposting the later short discussion of this (e.g. around line 806)
- Line 240 – 242: teachers decide who to offer the PRiSE projects to. Do you have any thoughts on how successful teachers are at selecting students who excel on the projects?
- Line 248: ‘We allow teachers to determine how best to integrate the projects within their school, though provide advice on this.’ From the perspective of an outreach practitioner hoping to replicate the success of PRiSE, it would be interesting and useful to see this advice – perhaps included in an appendix?
- Line 286 on: How much drop-off do you typically see between teachers applying for projects and then not taking up an offer come the new academic year?
- Line 309: ‘though this latter approach often proves unsuccessful’ – thank you for including this kind of helpful detail
- Line 463: What is ‘the UK coding agenda’? This phrase needs further explication and / or a reference
- Line 534: Feedback from the university sector. This is a bit confusing – it’s a little unclear what the university sector is being asked or why, and how that connects with the previous discussion of participant feedback. Although there will be further detail given later, it might be worth clarifying some of it at this stage. Maybe it’s simply the mention of “the workshop” (line 535) without context that is disconcerting.
- Line 589: I enjoyed the inclusion of the negative words in the word cloud, and appre-

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ciated that they were highlighted here.

- Line 791: 'The ethos behind PRiSE is to transform current scientific research methods' This could be read as though you are trying to alter the way the scientists undertake their research. Perhaps consider re-phrasing this, if that is not your intention.

Technical corrections

- Line 143: 'with standard one-off (or even short-series of) intervention(s)' – this doesn't quite read right to me

- Line 169: 'Experience from physics outreach officers ... have shown' – grammar error. Should either be 'Experiences ... have shown' or 'Experience ... has shown'

- Line 174: 'the impacts of PRiSE can be felt much wider' – grammar. Suggest 'can be felt much more widely'.

- Line 183: 'another major influence on young people's aspirations are family' – grammar error. Should be 'another major influence ... is family'.

- Line 213: 'One might think it is feasible that students' work on PRiSE projects contribute to novel research.' - Grammar: contributes - This sentence is generally hard to follow – consider revising

- Line 423: 'organic semiconducters' – typo: semiconductors

- Line 502: 'and responsibilities have remained largely been falling to only a few people per PRiSE project' – grammar. Remove 'remained'?

- Line 803: 'and have relished the challenge of working differently to in their regular school experience' – grammar. Remove 'in'?

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