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Discussions

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.

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My co-authors and I have been carefully considering the editorial comments on our manuscript over the past several weeks. We certainly do think that we can improve the manuscript by making its purpose clearer and adding elements that reviewers felt were lacking. However, we feel that we would greatly benefit from some further clarifications on the comments in order to proceed to the best of our ability with these revisions, without which we foresee potentially even more rounds of lengthy revisions which I'm sure neither the editor or the reviewers want if can be avoided.

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Discussion paper

Firstly, I would like to make sure we on the same page as to the purpose of the manuscript – a point raised in the comments. We have revised the title and abstract as follows to hopefully make our intentions clearer.

Title: Developing a framework aimed at bolstering school students' aspirations through extended interaction with cutting-edge research: 'Physics Research in School Environments'

Abstract: Recent educational research has highlighted the distinction between "school" and "real" science, particularly acute in physics, and how this disparity may contribute to low and inequitable participation in science at higher education. 'Research in schools' initiatives which enable students to experience taking part in cutting-edge research within their school over several months are a relatively new form of independent research project which have emerged that may have some role to play within this. However, at present the different models of provision within 'research in schools' projects and whether they are sufficient remain unclear. This paper explores the development of a scalable framework for 6-month-long 'research in schools' projects which has now been running for 6 years. By constructing a Theory of Change, we break down the aims of this extended programme into a series of realistic intended outcomes for diverse groups of participating 14–18 year old students, their parents/carers, and teachers and wider school environment. Based on this Theory of Change, we discuss the considerations made within the developed framework, in particular detailing the structure, support, and resources offered by active researchers. The framework is evaluated through feedback from participating students and teachers. This illustrates that the model appears to provide highly positive experiences that are otherwise not accessible to schools and that the level of support offered is deemed necessary with all elements appearing equally important. Researchers and public engagement pro-

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fessionals seem receptive to the framework and we suggest that it could be adopted at other institutions applied to their own areas of scientific research, something which has already started to occur.

The material included in the submitted manuscript to align to this focus was based on discussions not only amongst co-authors, but those acknowledged at the end of the manuscript as well as editors and reviewers of a previously submitted paper, which recommended distributing the full discussion of PRiSE across several papers and outlining specifically what should be included within each of them. Therefore, we really need more guidance as to what the editor thinks we should cut. On our own re-reading, while there are certainly some sentences or paragraphs which we think could be removed, largely our opinion is that all the sections need to remain in some form. We briefly detail why

1. Introduction: Sets the background context
2. PRiSE framework
   (a) Aims: A programme must be developed with clear aims in mind and we present these through a Theory of Change
   (b) Reach: We will reframe this section to be more explicitly about scalability, as was intended, moving it later in the manuscript.
   (c) Approach: We will split this up into more explicit subsections and ensure we tie these back to the Theory of Change, but the content explores ethical considerations and roles of teachers and researchers.
   (d) Structure: This details the structure, interventions and resources developed for this 6-month-long programme with each element only getting a paragraph. Even with a graphical representation (which we have made and attached) we feel all these elements still need some discussion.

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(e) Current projects: We could summarise these in a table and relegate specifics about current projects to supplementary material, as we still think they are useful details to practitioners.

3. Methods: Outlines the surveys and analysis techniques used to evaluate the developed framework
4. Feedback from participants: Results on experience and support within our framework.
5. Feedback from the university sector: Perceptions from other researchers and practitioners as to scalability.
6. Conclusions

Therefore, we would really appreciate further input.

Finally, the editor comments say we should incorporate the most relevant reviewer comments. To our mind these concern:

- Detailing how each element of the framework aligns with our Theory of Change
- More explicit discussion of the scalability of the framework

We will endeavour to make these changes as they will improve the manuscript. However, we are concerned with the contradictory nature of RC5 to RCs 1-4 and thus how to respond accordingly. More direction from the editor would therefore be most helpful.

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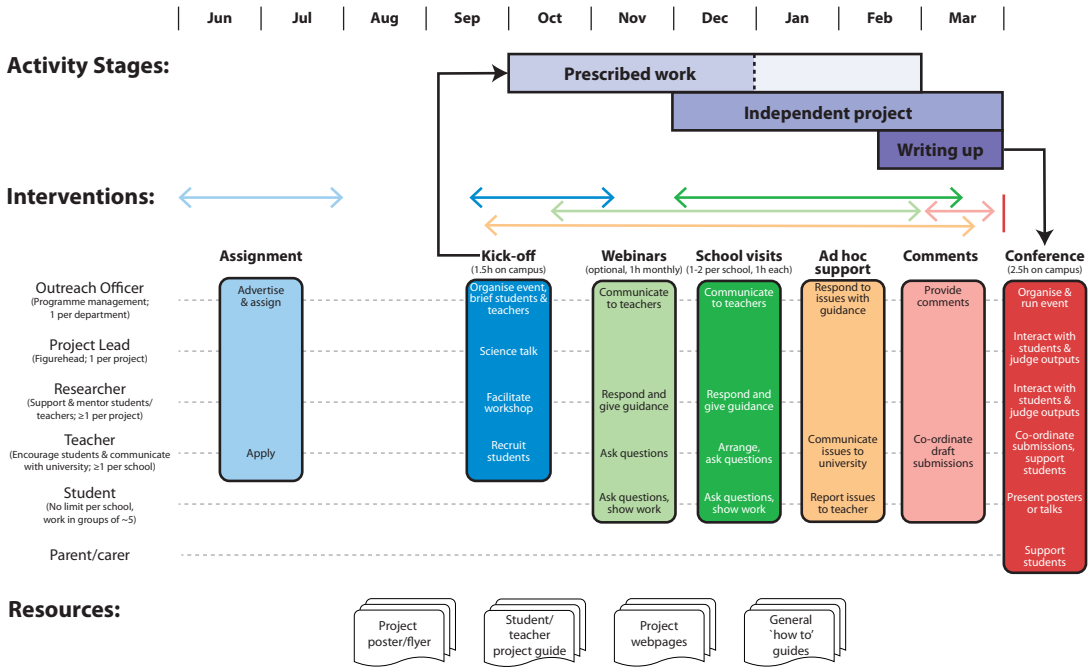

Fig. 1. Framework diagram

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