Reviewer's report

Title: An Analysis of Reported Motivational Orientation in Students undertaking Doctoral Studies in the Biomedical Sciences

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Reviewer: Frances J Kelly

Reviewer's report:

1. The question posed is well defined. The focus of the article is on the motivational orientations of doctoral students in the biomedical sciences, gaining an understanding of these has potential to influence improvements to PhD programs in that discipline. Understanding motivations for doctoral study is also an area of research that demands further research, both at the level of the discipline which, as the authors outline, is consistently growing its numbers of doctoral candidates, and in the field of doctoral education research. Although there is some research into motivations of doctoral candidates in the latter, as the authors identify, it is by no means exhausted. The contribution of the article is therefore twofold: to the discipline of biomedical science, and to the field of doctoral education. The aims of the research are clearly articulated, the potential benefits are identified.

2. Methodology: the article clearly outlines the methodology (including methods used) of the study and gives appropriate detail. The methodology is appropriate to the study. The account of the theoretical framework that is employed is also detailed, and for the most part is clear although it borders on being overly complex. The use of self-determination theory to analyse motivations is one of the paper's contributions and the authors make a good case for its application in this context.

3&4. The data are sound and reported appropriately. The findings are clearly identified and categorised, and although the differentiation between categories ii) and iii) in the initial brief explanation was not quite clear, this did become clearer once the detail is included. The quotations from the data for the most part fit or support the categorisations – yet not every quotation does. For example the quotations from students A and D at the top of page 11 are not as clear an example of instrumental motivation as preceding comments are – they are more nuanced, and perhaps require commentary; further or expanded analysis of these could assist in demonstrating how they fit the category, when it is not self-evident.

5. The discussion and conclusion are well-handled. The authors' argument regarding the complexity of doctoral education and that external motivations combined with strong internal motivations intimate a positive outcome for the student, are articulate, clear, and supported by the findings. An initial question that was raised in reading this paper – how might identifying motivational
orientations assist in improving learning outcomes or reducing attrition – is not answered, nor perhaps can be, and questions remain (as the authors indicate) regarding the means by which a balance of motivations (such as are identified as being beneficial) could be fostered. There are references to research into socialisation and promoting agency, the work of the Carnegie Foundation, and I agree with the authors that these are important issues requiring further research.

6. Limitations of the research are identified and the authors are suitably cautious regarding generalisations – this is a ‘snap shot’ of a particular cohort, in particular context (disciplinary, institutional, and geographical-national). The section on distribution may be a requirement in this journal or field but seemed an unnecessary addition in this instance; I am not sure that distribution for this limited cohort (of 17) is that useful. It would strengthen the paper to have this section omitted and replaced with further analysis in the results section (see above), if it is a matter of word limit.

7. The authors clearly identify prior work in this area on which they are building. They draw here on a range of recent studies, as is appropriate to this research, including publications from other disciplines where similar studies investigating motivations for doctoral study are discussed. The research on attrition dates from the 1990s which could suggest that this dimension is of less interest in recent doctoral education research than it has been previously (last century).

8. The title and abstract are appropriate. The abstract is detailed and conveys the contributions of the paper, as well as the methods employed and the theoretical framework.

9. Writing and presentation: the article is very well-written, articulate, concise and clear with only a few minor typos (scholarship of doctoral learning (p.16)). Although I am not familiar with the journal (being in doctoral education, not biomed) from my brief survey the style and format of the article seems appropriate to it.

Discretionary Revisions (which are recommendations for improvement but which the author can choose to ignore):

The authors could consider clarifying the theoretical framework as it borders on being overly complex.

The differentiation between categories ii) and iii) in the initial brief explanation could be clarified.

Several quotations (e.g. students A and D at the top of page 11) could benefit from further commentary or expanded analysis to better demonstrate how they fit the category.

The section on distribution adds little to the argument and could be omitted.

If there is more recent research into attrition in doctoral education the authors could include this (or if not, speculate on why this is not a current research interest in the field).
Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct):
Check for minor typos: e.g. scholarship of doctoral learning (p.16).

Major Compulsory Revisions (which the author must respond to before a decision on publication can be reached):
No major compulsory revisions.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare I have no competing interests.