Author’s response to reviews

Title: Student motivation to learn: Is self-belief the key to transition and first year performance in an undergraduate health professions program?

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Author’s response to reviews:

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Dear Editor BMC Med Ed

Thank you for the review of this manuscript. Responses to feedback are detailed point by point below with changes also marked in text in red and bolded.

1. Please apply correction for alpha inflation (i.e. multiple comparisons) and present the results with and without the correction. Please amend the discussion in accordance to the above-mentioned corrections.
Response: The statistical analysis was undertaken in consultation with Prof Max Bulsara, Professor and Chair, Biostatistics, the Institute for Health Research, Fremantle. There are no fixed between-subjects factors, hence post-hoc comparisons are not required when utilising the GLM univariate model. In the model utilised, the dependent variable is the course mark, fixed factor is ‘sex’ and covariates are age and motivation factor.

Reviewer reports:

Rashmi Kusurkar (Reviewer 1): Overall comments:

2. Overall this is an interesting paper. I was a bit surprised with the choice of using the motivation-engagement wheel, especially when there are several theories of motivation which could have been
Multiple theories as well as dimensions or factors of motivation have been presented in the literature [6, 8-15]. Cook and Artino’s review [8] recommended additional research on academic motivation specific to health professions education and enhanced transparency with researchers identifying the ‘lens’ of motivation they are investigating, to improve clarity, application and replication. The lens or conceptual approach that has been adopted for this research is the model of academic motivation developed by Martin and represented in the Motivation and Engagement Wheel [5, 16-18]. The Motivation and Engagement Wheel (20) is a framework representative of positive and negative motivation and engagement dimensions. Positive motivation or cognitive dimensions include self-belief, valuing and learning focus. Pajares (1996) noted that a person’s efficacy beliefs are linked to their effort, perseverance and resilience when completing tasks. These behavioural outcomes are also present in the adaptive behavioural dimensions of the Motivation and Engagement Wheel represented by Task Management, Planning and Persistence. Negative motivation dimensions include anxiety, failure avoidance and uncertain control. Negative engagement dimensions include self-sabotage and disengagement. The Motivation and Engagement Wheel and associated scales are supported by contemporary motivation theories [21], resulting in a broad, comprehensive instrument.

3. The sample size is too small for the conclusion drawn from the study. The introduction, research questions and discussion need to be re-written. Please see my specific comments below. A statement about ethical approval for the study is missing.

Response: See responses to specific areas below and revisions made. The ethical approval statement is noted under Declarations. Please advise if this should also appear in the body of the text.

4. Introduction: The introduction does not include the theoretical framework of the MES-UC. This is an absolute necessity for understanding the rest of the paper. The structure of the introduction is strange. In the middle of the introduction there is a section called "Background", which is not really the background of the study.

Response: The heading ‘Background’ has been removed. This section presents information on the validity of the MES-UC for this population and follows on from the review of literature on the implementation and previous studies utilising the MES-UC. See response to 2. regarding theoretical background.

5. Aims and research questions don’t have to be reported in a separate section.

Response: The heading ‘Aims and Research Questions’ has been removed.

6. The introduction does not lead to the first research question. I think only the second research
question should be included in this manuscript.
Response: This study is looking at the period of transition into university and as such consideration of admissions criteria have been included. This study also builds on research conducted by Wurf and Croft-Piggin who included entry scores when looking at the influence of academic motivation early in a degree program. The introduction highlights that the transition to higher education is a period of significant psychosocial adjustment with the influence on motivation, perhaps key to achievement and retention early in higher education.

7. The third research question is really looking at the recommendations that come out of this study. It is not a research question.
Response: The third research question has been removed

8. Methods: I did not find the exact period of data collection for the data included in this particular study.
Response: Under Population and recruitment, this has been clarified with the addition of ‘in this study’ and ‘in 2015’:
This research is part of an observational longitudinal study with one cohort of undergraduate physiotherapy students from a Western Australian university, surveyed on entry into the four-year program in 2015. The cohort were subsequently surveyed every year until program completion in 2018. Participants in this study were recruited at the end of a teaching activity in week three of semester one in 2015, allowing maximal separation from assessment items to minimise any influence of assessment stress.

9. As noted under Methods, I found the sample size really low. ES and IS are not very well-chosen short forms. I suggest to write the whole variables in the entire manuscript.
Response: The whole variables have been re-written throughout the manuscript for Interview Score and Educational Score. The discussion has been edited to further acknowledge the sample size.

10. Results: There is no theoretical background for some of the results found. Why should ES be correlated with disengagement? There is a high probability that this is a chance finding.
Response: It has been noted that this could be a chance finding although previous research with a similar finding has now been included.

11. Discussion: The discussion needs complete re-writing. The authors have not considered all limitations of their study. This section needs to be more expansive.
Response: The discussion has been rewritten with more clarity around answering the two research questions. The limitations of the study have been expanded. Multiple references to the utilisation of the MES-UC have been removed with more focus on the specific study findings.

The framework used by the authors to study motivation and engagement is not a theory of motivation. It is a hybrid model which has been developed by Martin AJ. The authors need to reflect on their choice of this model and the limitations of not choosing one of the well-known and well-formed motivation theories.
Response: The Motivation and Engagement Wheel framework has been chosen however this is based
on contemporary models of motivation. The MES-UC instrument is valid for the population tested.

12. Conclusion: The conclusion is too strong for a study that includes only 55 students. Response: The first sentence has been modified to note the sample from one Physiotherapy program and the recommendation regarding the utility of the MES-UC has been toned down.

In a sample from one Physiotherapy undergraduate program, there is a relationship between the admissions interview on entry and motivation to learn as measured by the MES-UC applied at week three of the program.

Further ‘the key to a successful transition’ has been replaced with ‘influential in the transition’: Motivation to learn and specifically self-belief with learning, may be influential in the transition into higher education.

13. Ethical Approval: Ethical approval has not been sought. Response: As noted in the Declarations: Ethical approval was gained for this study from the institution’s Human Research Ethics Committee (reference number: 014168F). Students consented to participate through completion of a consent form and recorded their student number as an identifier. Consent to add admissions data to the study was sought retrospectively following initial data collection.

14. Chris Roberts, PhD (Reviewer 2): This is a well written study aiming to determine the relationship between a student's motivation to learn on entry into an undergraduate physiotherapy program and a) their admissions scores and b) their progress and performance through first year. This is a relevant area of study. However, the evaluative data presented does cover other possible research questions. Since, there is much made in the results and the conclusions of the subscale results, e.g. self-belief, I would suggest clarifying the research question to more tightly align with the presentations of the results, and the representation of the results in the tables. Response: The research questions have been modified to two questions with better linkage to the Results and Discussion.

15. The theoretical model around motivation is reasonably well documented. However, given the speculation in the discussion about possible uses of the scale in curriculum planning and (presumably in admissions) more detail in the background would be useful on the research evidence base about the link of motivation to self-regulation, student agency and engagement and performance. Response: As per 2. greater clarity and background on the framework has been provided in the Introduction.

The MES-UC is noted as a useful adjunct in ‘curriculum review and feedback’ given the finding that courses where students scored lower were not delivered by the School of Physiotherapy or had already been flagged for review by traditional processes (additional wording has been added to note the role of traditional course review processes concurring with MES-UC findings). Given the link between both ‘processes’, it is not overstating the utility of the MES-UC as an adjunct for curriculum review and feedback based on the findings.

Two out of three of the courses where there was no link between self-belief scoring and student
performance, were not delivered by the Physiotherapy program, with the third course since undergoing substantial changes due to student feedback on curriculum provided through traditional course review processes. This may indicate that the MES-UC is a useful adjunct to assist with curriculum review and feedback.

16. As a statistical query, should a multi univariate analysis of variance also been undertaken to determine the final significance in the main variables in the model? Response: A univariate general linear model was chosen to determine the effect of each co-variable inclusive of individual motivation factors and age (included as co-variables) and gender (included as a fixed factor) on the dependent variable which was the academic results for individual courses.

17. Table one is presumably part of the process of exploring the data prior to the uni- and multi-variate analysis. I think it could be omitted. If included, it should have the significant correlations starred? In terms of table three, no prior mention had been made in the research questions as looking at gender differences in motivation, and this needs clarifying if it is a secondary research question. Was gender included in the univariate model as potentially significant variable? Response: Gender is now included in the aim of the study. Significant correlations have been starred in table one.

The aim of this study was to determine the relationship between a student’s motivation to learn on entry into an undergraduate physiotherapy program and their progress and performance through first year, controlling for gender and age. The relationship of co-variables, including admissions scores and educational background, to motivation to learn on entry, were also considered.

Gender was included as a 'fixed factor' in the general linear model. The sentence regarding variables has been changed from ‘other variables’ to ‘variables of age and gender’:

A univariate analysis of variance was performed adopting a general linear model, to determine the effect of variables including each motivation factor, on subsequent performance, controlling for the variables of age and gender.

18. In the lit review it suggested that the anxiety and disengagement might be gendered. I assume examination scores were also gendered. What does the lit say about gender and motivation, and is this the right study to address that question? Response: This study did not find significant differences between genders, in examination results. Literature is included on specific dimensions noted as having differences between genders e.g. anxiety.

19. In following the results, it would be helpful to link their presentation directly to the primary and the secondary research questions. It is otherwise easy to get lost in an array of modest correlations. Response: The sub-headings in the results have been altered to better reflect the two research questions

Admissions scores and Motivation to learn

Motivation to learn and Student performance in first year
20. If the focus is on the univariate/multivariate analysis for the predictive elements of the study, is the correlational findings between elements of the subscale and the assessment scores sufficiently robust? Response: the correlational findings are moderate as reported, acknowledging the small sample size.

21. Given the claim that "Motivation to learn and specifically self-belief with learning, may be the key to a successful transition into higher education" were the authors surprised there was no link in motivation with admission criteria. Is it equally plausible that admission procedures are failing to assess for motivation, and could/should be modified? Response: As noted in the Results and then expanded on in the Discussion, there was a link between the admissions interview and three of the four global motivation scores of the MES-UC.

22. Given the gracious acknowledgements of the studies limitations, the authors should tone down the claims about the utility of the motivation scale, and focus on implications from the data they have. Response: References to the MES-UC have been mostly removed from the Discussion with more focus on the findings and their link to first year performance.