Author's response to reviews

Title: Effectiveness of interprofessional education by on-field training for medical students, with a pre-post design

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Author's response to reviews: see over
Dear Editor,

Effectiveness of interprofessional education by on-field training for medical students, with a pre-post design

Thank you for the consideration reserved to our work. We are grateful to the reviewers for the valuable suggestions to improve the quality of our manuscript. In revising the manuscript we considered all the reviewers’ suggestions as indicated in the point-by-point reply. The manuscript has been extensively revised and also checked by a native English speaker.

We hope that our paper is now acceptable for publication as an Original Article in your Journal.

We look forward to hearing from you.

Yours sincerely,

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Editorial Comment:

We read your article with interest. Both reviewers have a number of helpful comments to assist in strengthening the article. In addition to their comments I would like you also to consider the two further points.

First your research question which is stated as an aim of measuring improvements in attitudes towards teamwork among medical students after the introduction of the new training program. I would like to see this restated as a question which anticipates your findings.

Thank you for this suggestion. We have restated the aim of the study to include a secondary aim as you suggested later (Background page 5).

“This study, using a pre-post design and the IEPS as the instrument for evaluation, aimed at measuring whether attitudes towards interprofessional teamwork among medical students improved after the introduction of the new training program and if such improvements were homogeneous as regards students’ individual characteristics.”

The second issue is the presentation and interpretation of the statistics. You graciously concede that there is no control group, and therefore the results have to be taken with a degree of skepticism.

We have included a comment about this limitation in discussion (page 13).

“However, as our study design did not include a control group, the results must be taken with a degree of scepticism.”

There may be something lost in translation with the phrase “Each of the 18 items was classified into four subscales, identified and labelled by Luecht and adding up to the values of the individual items of the corresponding factor: “Competency and Autonomy” (subscale 1; items 1, 3, 4, 5, 7, 9, 10 and 13 in Additional file 1). Luecht and others more clearly describe the scale for the reader who has not come across it before.

Thank you for the suggestion. We have rephrased the whole paragraph (Study instrument and data collection, page 7, 8):

“Each of the 18 items was classified into four subscales, identified and labelled according to Luecht (23), adding up to the values of the individual items (reported in Additional file 1) of the corresponding factor. Subscale 1, labelled by Luecht as “Competency and Autonomy” (items 1, 3, 4, 5, 7, 9, 10 and 13; minimum score: 8; maximum score: 40), measures how highly students respect their profession, in the sense that it is well taught and contributes significantly to improving the healthcare field, and to what extent they believe that other professions are respected in a similar fashion. Subscale 2, “Perceived Need for Cooperation” (items 6 and 8; minimum score: 2; maximum score: 10), reflects students’ perceptions of the need for teamwork which typically respects and works well with other professions. Subscale 3, “Perception of Actual Cooperation” (items 2, 14, 15, 16 and 17; minimum score: 5; maximum score: 25), reveals students’ perception that their profession typically respects and works well with other professions. Subscale 4, “Understanding Others’ Values” (items 11, 12 and 18; minimum score: 3; maximum score: 15), reflects the degree of respect for contributions from all healthcare professions (23,25).”
I am unclear why you used both non-parametric and then parametric tests for essentially the same analysis. Using one or the other and justifying it would be a more consistent approach.

As we noted in the Material and Methods section, since the IEPS items are not continuous variables, parametric tests cannot be used. We therefore used Wilcoxon's signed rank test to analyse single-item differences pre- and post-training. However, in order to evaluate any improvements to the overall scores on the IEPS and the four subscales, Student's two-tailed paired t-test was used, after verification of assumptions of normality. Parametric tests are generally more powerful in detecting differences, and we think that, as these assumptions were not violated, there was no reason not to use them in the analysis.

Given the claimed instability of the scale by some authors, it would be helpful to report the internal consistency of the whole scale and each of the subscales.

Thank you for pointing out this. We have added analysis of internal consistency according to Cronbach's alpha (Data analysis pag. 8, Results pag 9, Discussion pag. 10).

As previously reported, this instrument shows high overall reliability (alpha 0.84), although the reliability of the subscales ranged from 0.26 (subscale 4) to 0.84 (subscale 3) (subscale 2: 0.55, subscale1: 0.74).

In any case, we decided to include subscale 4, which was omitted in the McFadyen version, because it reflects an important aspect of interprofessional education related to understanding the contribution from all healthcare professions. However, the results from this scale should be treated with caution. Furthermore the subscale 1 modified by McFadyen (subscale 2 and 3 are instead the same as Luecht) showed a worse internal reliability (alpha 0.64) than the Luecht version (alpha 0.74).

Although not to be included, I would have liked to know if in your data set and context, whether you got the expected number of factors and the expected question numbers for each of the factors.

As suggested, we carried out a simple factor analysis with the Varimax rotation method. Four factors emerged: two were clearly consistent with subscales 2 and 3, and subscales 1 and 4 were spread between the other two, thus proving a not perfect consistency with Luecht’s framework but also with the McFadyen version.

I am unclear why you stratified the results by gender and whether there was a health worker in the family. These seemed to raise more questions than they answered. However I note you make a big point of these in the discussion. If you have a particular hypothesis, then you would need to state a research question to test it. I suspect that a regression model using all of the data would have been a better way to look at this. Might be helpful just to check with the statistician, but again depends on your research questions.

We noted at the end of the Background (pag. 5) that our aim, mainly explanatory, was to measure “whether attitudes towards interprofessional teamwork among medical students improved after the introduction of the new training program and if such improvements were homogeneous regarding students’ individual characteristics.” We also clarified in the methods(data analysis pag. 8) that “Analyses were subsequently stratified by students’ individual characteristics as gender, previous training in the medical field, work or voluntary experience in the healthcare field, having a
family member working in healthcare, and any previous history of hospitalisation.” We only presented results regarding gender and the presence of a family member working in healthcare where we found differences in improvement after training, adding in the Results (pag. 10) section that “Other student features, such as previous training in the medical field, work or voluntary experience in the healthcare field, and previous history of hospitalisation did not modify improvements in attitudes after the IPE training.”

In terms of the results lines 171-178, these could be clearer.
You say that “The 277 students included in the study had similar age and gender distributions to the 116 out of the 144 students with personal data available who were not included in the analyses (data not shown).” Was this a chi square you did, then a statistic could be included as representativeness is an issue.

Thank you for spotting this missing information. We did in fact formally test distributions in the two groups. We have now added the following statement to the Methods: “χ² and Student’s t-test for independent samples were used to compare the gender and age distributions of the students included and not included in analyses” (Data analysis, page 9).

I am not really sure what you want to do with additional file 1? Are you wanting to see this as part of the manuscript?
We would like to see this file about single-item results as online material.

I look forward to seeing the revised manuscript.
Thank you, we do appreciate that.

Reviewer: Margaretha Wilhelmsson
Reviewer’s report:

In Italy, recently a few Universities have included IPE in core curricula. The aim of this study was to measure improvements in attitudes towards teamwork among medical students in one University in Italy.

How was teamwork defined?
As the focus of our study was on “Interprofessional teamwork”, the main concept was not teamwork in itself but interprofessionsality.
We have added this information in the last part of the Abstract: “Our results indicate that IPE training has a positive influence on students’ understanding of collaboration and better attitudes in interprofessional teamwork.”

Were the percipients in the team from the same profession or were they from different professions? And were they teamworking or just working together?
Teams were usually composed of people from various health professions including nurses, nursing assistants, physical therapists, radiologists, and physicians. We have added this information in the “Training in Interprofessional Education (IPE) in a clinical setting” section which, thanks to the comments from you and the second reviewer, has now been extensively modified (page 5-7).

The intervention in the curricula were 10 hours theoretical training in IPE and 40 hours clinical setting, where the students were asked to observe relationships between professional teams and
compare the observations with the result from the theoretical training. The observed variables were; the working environment, knowledge of own professional competence, and relationships with various health professionals and the patients.

How did you choose the three observational grids from the references? Were the students involved in this process? Were the students able to choose references or had the lectures chosen the literature?

*Students received a selection of literature provided by the faculty and were not involved in choosing the references.*

We have now included under “Training in Interprofessional Education (IPE) in a clinical setting” the following clarification (pag. 6):

“The first educational strategy, on-field observation, was based on personal interactions and use of observational grids, derived from the literature adopted in the theoretical course. In that course, aspects such as gender, role, age, local traditions, cultural expectations and stereotypes were critically discussed and compared with the selected articles and students’ personal experiences and opinions.”

Were the students asked to write down their experiences?

*At the end of the clinical setting period, students were asked to provide a semi-structured report in which they gave details about their experience, evaluated their learning, and made comments on the quality of the observed relationships between professionals and with patients, based on the grid variables.*

We have added this information to the “Training in Interprofessional Education (IPE) in a clinical setting” section (pag. 6).

Or were the students asked to reflect the experiences before the review?

*Students were also asked to complete the report with critical comparisons between their observations and the literature provided. However, this was considered optional, in order to stimulate students without exceeding in formal requirements after the clinical experience.*

We have now added this information to the “Training in Interprofessional Education (IPE) in a clinical setting” section (pag. 6).

Asked about what they have learned, evaluating the IPE curricula?

*See above.*

Could the scenarios in the review situation vary with the students' experiences? Differences in the learning/training situation?

*There were differences based on the clinical specialty and unique social context. However, several students had interprofessional training in each clinical setting. The possibilities of reaching the most attractive settings were few, since students' allocations were based on slots available over a very short period of time.*

The results are interesting and due to others. Although this is a beginning of an introduction of IPE in Italy, probably the most interesting result is the negative one.

I would have liked the authors, to focus the result that students with a doctor or healthcare workers in the family did not change the attitudes to the need of teamwork with other professions or understand other professions values. This issue is a big challenge to the society.
We had previously discussed this point, and have now included it in the Conclusions (pag.14): “However, interestingly, the results showed a lack of effectiveness of our educational strategies among students with a doctor or healthcare worker in their family, which did not change the perceived need for teamwork with other professionals or improve understanding of the other professionals’ values. “

Allover
Defining teamwork is central and even more important is, have you measured teamwork/collaboration in teams or interprofessional teams in your study? I also agree with the authors that attitudes could be influenced of other factors and by active take part in multiprofessional teamwork and using the instrument “Readiness for Interprofessional Education” you could determine the student’s readiness for interprofessional learning, perhaps more relevant then measuring attitudes.

We agree with the importance of using another instrument. This was in fact already stated in the Limitations of our study (pag. 13-14).

Reviewer: Dr Gillian Nisbet

This study is a valuable addition to the interprofessional learning literature as it broadens our perspective on teaching and learning approaches to interprofessional learning and our understanding of what constitutes interprofessional learning activity. Most interprofessional education programs reported in the literature focus on student-student interactions incorporating students from a range of health professions. In contrast, this study reports on an interprofessional learning program whereby an individual profession (medical students) learn from and about other professions through interactions with qualified health professionals from a range of professions. This, I believe is the unique value of this paper and should be emphasised more.

Thank you for these positive comments. We agree with the reviewer regarding the unique value of our study and we have emphasised it both in the Introduction (see also comment 2) and Discussion (page 13).

Specific comments

Major Compulsory Revisions

Abstract

1. Under background I think it is important to state that this study evaluate the effectiveness of IPE in changing attitudes. It is unclear what is meant by “pathways”.

   We have replaced the word “pathways” with ‘collaborative practice’.

Background

2. This section presents a sound argument leading to the aim of this study. However, as stated above, a stronger argument for studying this broader perspective to interprofessional learning/interprofessional education could be incorporated – perhaps in
the second paragraph where the authors discuss the definition of interprofessional education being an “open issue” (that terminology is unclear) and then this could be revisited in the discussion.

*We have added some of these suggestions to the Introduction (pag. 4), as follows:*

“Most interprofessional education programs reported in the literature focus on student-student interactions from a range of health professions (10, 16-17, 19-20). Although some studies have included medical students (8,10,17,19,21), none of them has presented an IPE course tailored specifically for medical students only.

At the University of Padova, following several years of discussions, in 2013 a new observation- and practice-based IPE program specifically designed for medical students was set up. It was not only based on on-field structured observations about relationships among health professionals, but also introduced mandatory clinical activities and operational skills, whereby medical students learn from and about other professions through interactions with qualified health professionals in the following areas: working environment, knowledge of own professional competence, interprofessional relationships, and relationships with patients. As this is an innovative IPE program, knowledge of its effectiveness is lacking.”

3. It is unclear how the statement “… integration as requirements in clinical pathways” fits in with this study.

*We have rephrased the sentence (pag. 3): “However, this definition appears to focus too much on relational aspects in practice, neglecting other important dimensions such as the integration of active educational methods in the social dimensions of health organisation and daily routine.”*

**Methods**

This section is well set out under the sub headings and methods appear appropriate to the study. However, further clarification is required in some sections:

4. The first paragraph outlining the two programs and who was eligible for the study is unclear. For example, if both were mandatory, why do you need to state “… only students applying for the training part were considered eligible for this study”. Why would not all students be eligible? Did some students not do both? It is unclear what is meant by “… roster of applicants for training was used for enrolment.

*Thank you for spotting this inconsistency. We have deleted the above sentence, and have tried to clarify this point better in the Methods (page 5).*

5. When describing the IPE program in the clinical setting, you refer to “the reference framework” (line 112). What is this and should it be referenced?
Followed the suggestion from reviewer 1, the “Training in Interprofessional Education (IPE) in a clinical setting” section has been extensively modified (page 5-7). We have replaced the term “reference framework” with “literature adopted”.

6. I would like to know more about the “various health care activities” the medical students undertook. This would help the reader to better understand the interprofessional nature of the program.

We have added this information (page x):

“The second educational strategy involved a review of students’ experience of various technical and healthcare activities, such as taking blood and other biological samples, examining and recording health readings, providing support for walking, personal hygiene and some minor therapeutic measures. Students were involved in these activities in an interactive way with various health professionals, including nurses, nursing assistants, physiotherapists, radiologists, and physicians.”

7. Please explain what you mean by “tutor pairings”.

We meant pairing tutors with students (replaced, page 7)

8. My understanding of the original IEPS is that it had low reliability—hence the re-modeling by McFayden.

We have added analysis of internal consistency according to Cronbach’s alpha (Data analysis pag. 8, Results pag 9, Discussion pag. 10), as also required by the editor, and they showed good reliability except for subscale 4. See comments to editor.

Results

The results appear sound and are generally clearly described.

9. The last paragraph is somewhat confusing. Can I suggest a re-wording to: “... 177 students without such figures showed improvements after training only on subscales 1 and 3. No significant change was found for subscales 2 and 4.”

Thank you for noting this. We have re-worded the paragraph (page 9).

Discussion and conclusion

The discussion nicely locates the results of this study with the literature, highlighting where this current study differs as well as supports others’ findings.

Conclusions are justified.

Thank you for this positive comment.
Discretionary revisions

My preference is to call the program described as a practice based interprofessional learning program (background, paragraph 5, line 78) as I think this better captures the broader definition of interprofessional learning that this study highlights. However, this is up to the authors. As we believe our IPE program is both observational and practice-based, we have kept the original definition.

10. The term “IPE training” may be unfamiliar to international readers (paragraph 2, line 97 and elsewhere). Perhaps a more suitable term that highlights the clinical setting aspect would be “the clinical setting IPE/ IPL component of the course” or something similar. This is up to the authors.

We have modified "IPE training" to “IPE training in a clinical setting” (see also comment 22).

Minor essential revision - not for publication

Under background:

11. First paragraph: Interprofessional Collaboration (IPC) – change Collaboration to lower case

Done.

12. Second paragraph: Interprofessional Team Work should be in lower case

Done.

13. Second paragraph, line 51: Change to “… among various healthcare groups”.

Done.

14. Line 51: Please clarify what you mean by “open issue”; Change Education in IPC to just Interprofessional education

We have deleted this vague statement.

15. Third paragraph, line 62 : add “Other formalised IPE programs were set up....

Done.

16. Paragraph 4 line 64: Change to “The literature on IPE is of increasing interest as regards to the effectiveness of educational strategies of such programs” as I think this more accurately reflects the content of the paragraph.

Thank you for this suggestion: we have changed the sentence.

17. Paragraph 5, line 79: Please clarify what you mean by “inter-role” relationships”
We have replaced "inter-role relationship" with “relationship between healthcare professionals”.

18. Paragraph 6, line 85: add “... in attitudes towards interprofessional teamwork...”

Done.

Under methods:

20. Participants and study design

21. Paragraph 3, line 103: remove “after sending their reports” unless this has particular significance.

Done.

Training in Interprofessional education

22. I suggest change this sub heading to “Clinical setting IPE/IPL and change the first sentence to “IPE/IPL in the clinical setting was based on two ....”

We have modified the sub-heading to “IPE training in a clinical setting”.

23. Paragraph 1, line 110: do you mean grounded theory? This requires a reference.

We have added the reference, as suggested.

24. Line 120. There is no need to repeat the hours of the program here. Earlier in the first paragraph you could add “...40 hours of training in interprofessional clinical settings over one or two weeks”.

Done.

Under Discussion

25. Paragraph 2, line 207: change to “grounded theory”

Done.

26. Paragraph 2, line 212: reword as “...interprofessional relationships from the perspective of young students ...”.

Done.

27. Paragraph 4, line 229: Change “peculiar” to “particular”.

Done.

28. Paragraph 8, line 280: Change “interdisciplinary” to “interprofessional” for consistency.
Conclusions

29. Paragraph 1, line 296: Suggest leave out “in a single experiment” or reword as this wording does not match study design.

Done.

30. Paragraph 2, line 302: suggest change “In any case, it seems desirable..” to “Subsequently...” or “as a result” or “as such”.

We have put: "As a result, ...".

Done.