



# Effects of Student Peer Review on a Research Proposal Assignment in an Introductory Undergraduate Biomechanics Course

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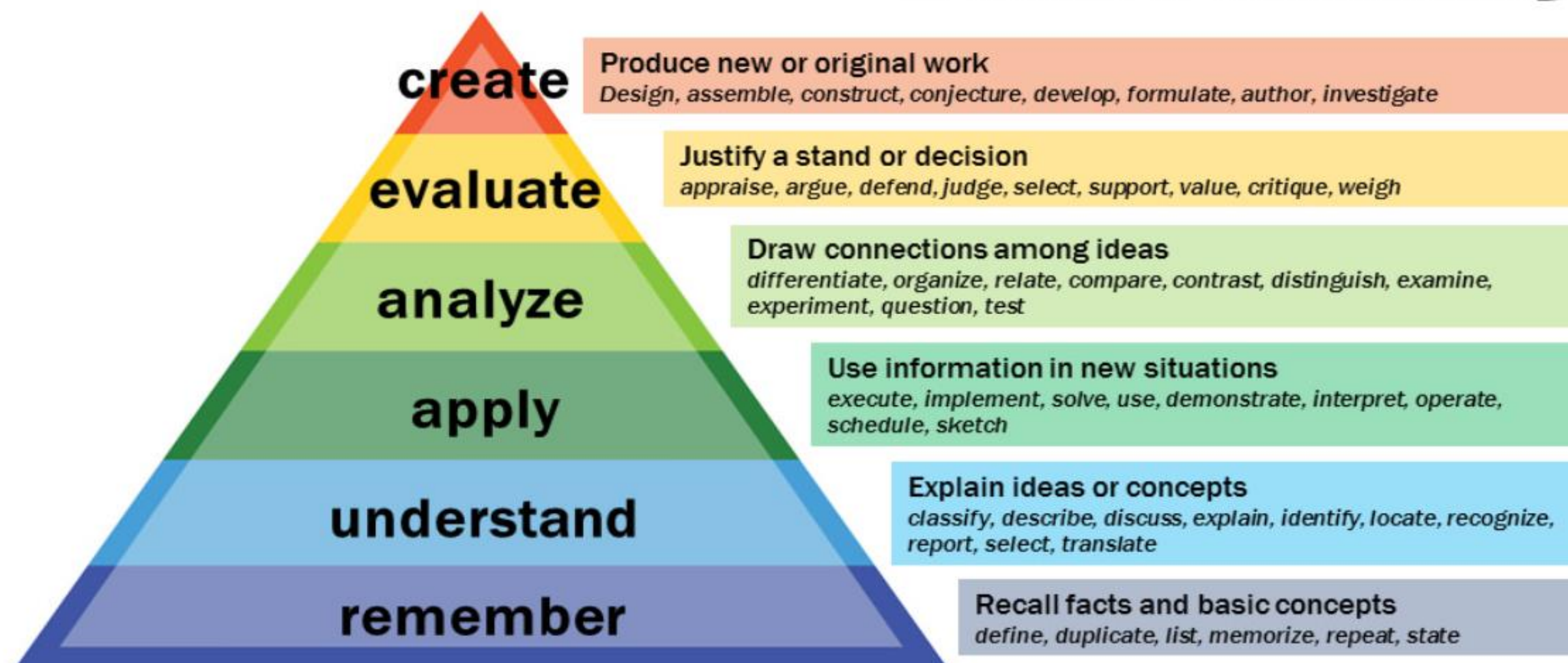
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## Introduction

Peer assessment has shown positive effects on students' learning outcomes including critical thinking skills, creativity, feasibility, and suitability which lead to promote a better outcome on students' writing assignment<sup>1-2</sup>. This study investigated how the segmental and the entirety peer review methods affected on a final research proposal paper in undergraduate introductory biomechanics course.

- NUTR 384 Biomechanics of Human Movement (32 undergraduate, junior and senior students)
- A small group research proposal paper was assigned as a part of NUTR 384 Biomechanics of Human movement undergraduate course.
- The research proposal paper assignment exposes students to biomechanics researches.
- Students were challenged to develop their own unique research proposal based on their interest and literature review. This would hopefully stimulate the students' highest hierarchy of learning, "create" in the Bloom's Taxonomy

### Bloom's Taxonomy



- Research Proposal paper format:
  - Part 1: Title page, Introduction and Background (during the sixth week)
  - Part 2: Review of Literature and Research Questions and Hypotheses (during the tenth week)
  - Part 3: Proposed Research and Reference page (during the fourteenth week)
- At least 10 peer-reviewed original experimental studies must be used
- APA style of writing, 12 font size, and double-spaced formatting

## Purpose

- To gain a better understanding of how peer review process should be used in an undergraduate courses. In addition, the peer review process may provide students a profound analysis and understanding of a topic while maintaining an instructor's workload manageable.

## Methods

- A total of thirty-two undergraduate students who enrolled in an introductory biomechanics course were divided into one of two groups randomly, the OTPR group and the MPR group.
- The effects of one-time peer review (OTPR) feedback for the entire research proposal paper vs. multiple (three-time) peer review feedback for smaller sections (MPR) were examined.
- Informed the students about the study on first day of the class by a TA.
- All of the participants were divided into one of two groups randomly, the OTPR group and the MPR group.
- Based on the peer review feedback they receive, they revised their paper. The final draft of the paper was submitted via Canvas during the fifteenth week.
- Throughout the semester, the instructor of the course encouraged each group of students to meet at least one time. The final drafts were evaluated based on the same rubric used during the peer review process. The rubric scores and analysis of the peer review comments were analyzed.
- At the end of semester, a peer review reflection survey was conducted to understand the students' experience with the peer review process.
- OTPR group: the participants received the peer review feedback only one time for their entire paper towards the end of the semester two weeks prior to the due date.
- Canvas' peer review assignment function was used to record each student's feedback. All of the peer feedback were anonymously recorded. The students in the OTPR were required to respond to the peer review feedback as a group.
- MPR group: the participants received the peer review feedback 3 times throughout the semester, one for the each part (Part 1, 2, and 3) was reviewed and students in each group received feedback based on a rubric available on Canvas.
- The students in the MPR were also required to respond to the peer review feedback as a group.
- Regardless of which group the participants were in, they were required to provide constructive feedback to each part with a minimum of 150 words.

Table 1. Timetable for the peer review feedback and research proposal due dates

Groups	4 <sup>th</sup> week	5 <sup>th</sup> week	6 <sup>th</sup> Week	8 <sup>th</sup> week	9 <sup>th</sup> week	10 <sup>th</sup> week	12 <sup>th</sup> week	13 <sup>th</sup> week	14 <sup>th</sup> week	15 <sup>th</sup> week
OTPR	Part 1 due			Part 2 due			Part 3 due	Peer review for the entire parts	Response to the peer review	Final paper due Reflection Survey due
MPR	Part 1 due	Peer review for Part 1 due	Response to the peer review	Part 2 due	Peer review for Part 2 due	Response to the peer review	Part 3 due	Peer review for Part 3 due	Response to the peer review	Final paper due Reflection Survey due

## Results

- The subjects in the MPR group's final research proposal paper mean score ( $M = 92.5$ ,  $SD = 6.19$ ) was significantly greater ( $t(13) = 2.43$ ,  $p = .05$ ) compared to the subjects in the OTPR group's final research proposal paper mean score ( $M = 83.75$ ,  $SD = 8.07$ ). In addition, a majority of students who participated in the MPR group expressed more positive comments for their experiences based on a reflection survey after the final paper was submitted.
- Qualitatively, students in the MPR group stated positively such as "I really enjoyed the peer review process because I felt like it made my paper better and I liked the multiple group because it broke the large paper into smaller chunks" as opposed to more negative in the OTPR group such as "There is just too much content required in the paper to review all at once and still get/give quality advice."

## Conclusion

Receiving peer feedback for a small section at a time may result a better score in a research proposal paper in an undergraduate biomechanics course. This notion was supported by the post-reflection survey.

## Practical Application

If you are an instructor teaching an introductory undergraduate biomechanics course the data suggest that a smaller segmental method should be used to promote a better writing assignment outcome.

## Acknowledgements

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## References

1. Falchikov, N., & Goldfinch, J. (2000). Student Peer Assessment in Higher Education: A Meta-Analysis Comparing Peer and Teacher Marks. *Review of Educational Research*, 70(3), 287-322.
2. Harland, T., Wald, N., & Randhawa, H. (2017). Student Peer Review: Enhancing Formative Feedback with a Rebuttal. *Assessment & Evaluation in Higher Education*, 42(5), 801-811.

