

# Problem Based Learning (PBL): An Investigation of the Link to Student Motivation

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## Background

Much research has been published on the positive effects of active learning methods over traditional lecture such as increased test performance and decreased failure rates (Wieman, 2014). As learning assistants, we have dealt with the difficulty of motivating students to learn. We believed that heightened student motivation can result from applying problem based learning methods in the classroom and result in increased student retention rate and time dedicated to studying outside of class. We wanted to investigate the validity of this perceived link in hopes of better informing both instructors and students so as to increase student motivation and its known benefits. This poster is an examination of current research on this topic.

## Case 1

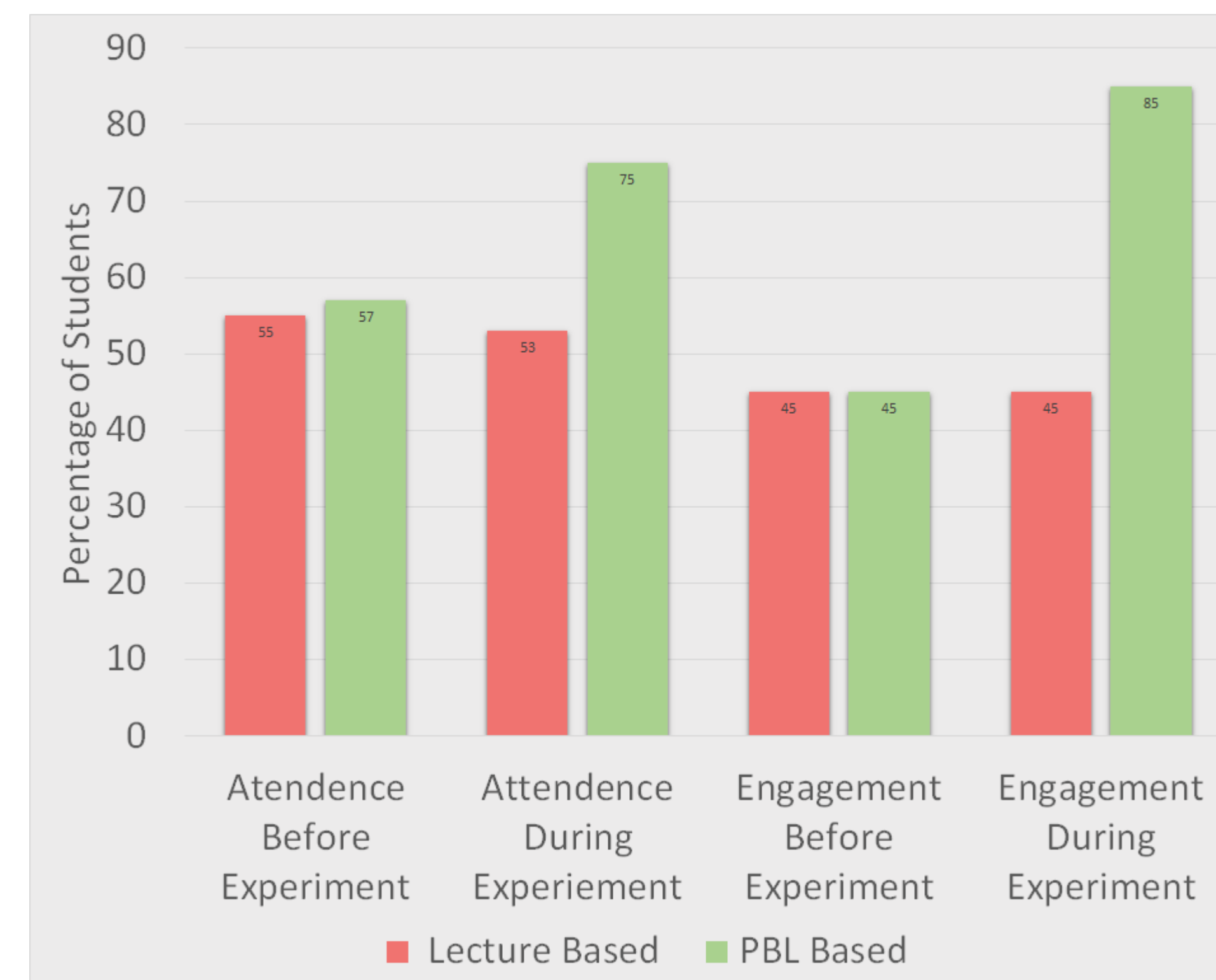
Study conducted in introductory psychology class with one class in a PBL environment and the other in a lecture-based classroom (Wijnia; Loyens; Deros, 2011)

- Insignificant difference found in the intrinsic motivation between the two groups
- Focus groups were organized and asked about motivational and/or detrimental aspects of PBL
- Respondents found certain aspects motivating and others detrimental (summary in Figure 2)
  - Most motivational was peer collaboration
  - Most demotivational was mandatory attendance

## Case 2

- Study conducted in two sections of an introductory physics class (~260 students per section) (Deslauriers; Schelew; Wieman, 2011).
  - One section used a PBL approach consisting of pre-class activities and in-class discussion and group work. The aim was to keep students actively thinking about problems throughout the entire class time.
  - The control section used a traditional lecture method utilizing clickers.
- A survey showed that 90% of students agreed that they enjoyed the PBL approach.
- A test showed that the PBL section scored 33% higher than the traditional lecture section.

**Figure 1 - Case 2 Study Results** (Deslauriers; Schelew; Wieman, 2011)

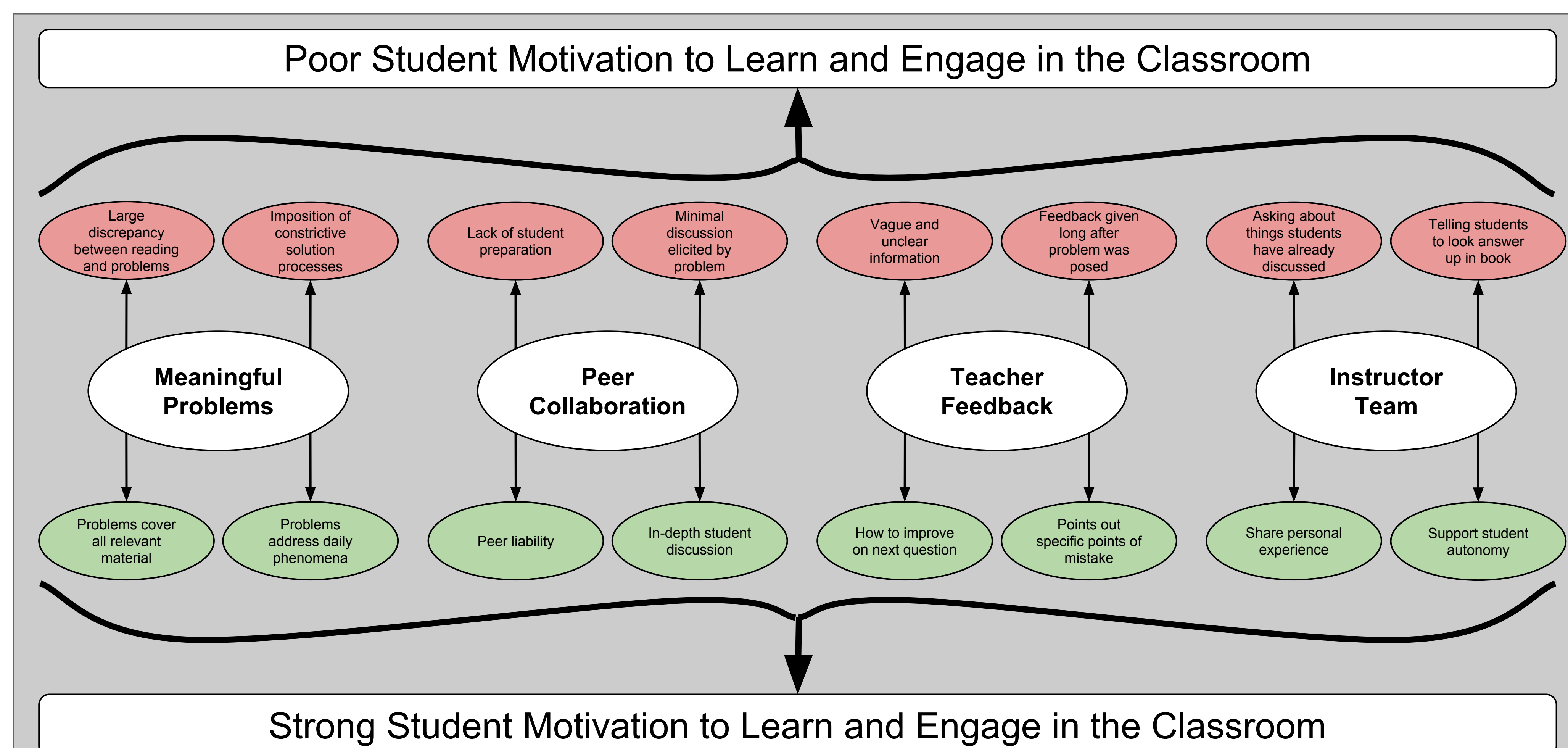


## Case 3

Study investigated feedback in a PBL environment (Van den Bergh; Ros; Beijaard 2014). Motivating instructor feedback was found to be:

- Understandable - Clear and concise feedback that the student can follow
- Reasonable - Feedback makes recommendations that student can actually act on relating to their learning
- Specific - Points to specific errors, not vague comments at the end of the assignment
- Timely - Feedback given in time for student to adjust next assignment to better match what is expected
- Learning Based - Given feedback focuses on learning goals, not simply performance-based comments

**Figure 2 - Student Testimonies on Various Aspects of PBL (Cases 1 and 3)**



## Conclusions

Cases in which PBL had a positive impact on learning and those which had no impact on learning were investigated. However, upon further examination, it appeared that certain aspects of PBL have a positive effect on student motivation, while others are detrimental to student motivation. Thus, it is important for professors to implement PBL deliberately, with purpose, giving students an appropriate amount of freedom to learn independently while providing effective guidance to keep them on track. The subjectivity inherent in this judgement makes a professor's awareness of students' experiences vital in PBL implementation. To conclude, PBL can be beneficial to professors and students if implemented cautiously.

## References

- Wieman, C. (2014). Large-Scale Comparison of Science Teaching Methods Sends Clear Message. *Proceedings of the National Academy of Sciences of the United States of America*, 111(23), 8319-8320.
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