

# Does Peer Instruction enhance students understanding in Europe ?

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## Rationale

Many studies show the great efficiency of Peer Instruction as a collaborative learning strategy. However, most of these studies have been done in American or English universities (T. Vickrey *et al.* 2014), and literature about the success of PI in European universities is very uncommon.

PI is distinguished because the students construct their knowledge through dialogue with peers (Mazur, E. 1997). Europe and the United States have distinct cultures. This makes the class an international environment with different behaviours. In particular, European students are considered more reserved than their American counterparts.

This study analyzes the success of peer instruction methodology in the EPFL's context, oriented towards the possible cultural differences.

## Method

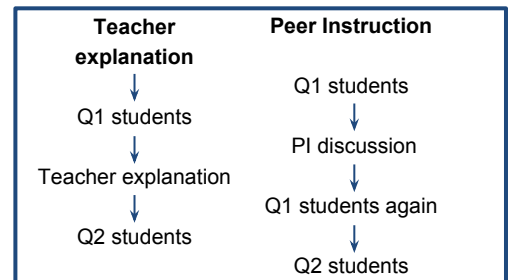
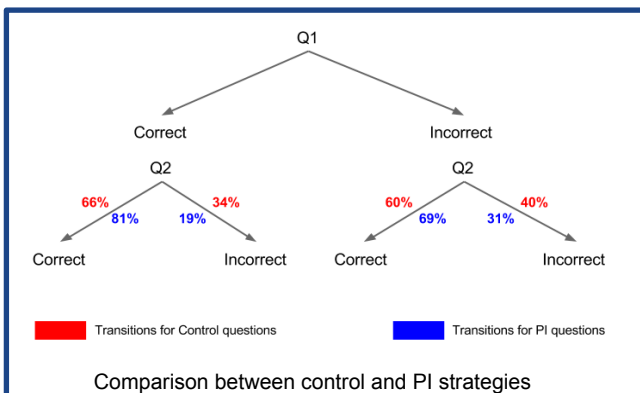
The study consisted in two items: An in-class study of peer discussion's impact on student understanding and a survey to know their perception of the technique.

### In-class study :

We use clicker questions to measure the effect of peer discussion on student understanding. For this, we use pairs of questions dealing with the same concepts and with the same level of difficulty (called Isomorphic questions by Smith *et al.* 2009). They allow us to measure the effect of the teaching technique.

We compare two different teaching techniques, **each time applied to the whole class** : a typical explanation from the teacher (Control) and the Peer Instruction (PI) strategy.

"I cannot imagine asking a question directly to a student during the class, while it is common practice in the US" (Anonymous professor)



The experiment has been conducted in a General Chemistry bachelor course, during the *spring* semester 2015. It consists of **7 PI and 4 Control** pairs of questions, during **5 weeks** with **60 to 120 answering students**.

### Survey :

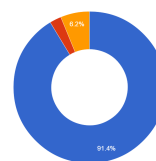
At the end of the study we carried a survey in order to analyze students perception of the techniques. We received answers from 108 students.

## Results

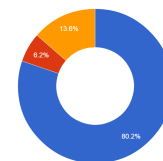
**Does PI enhance student understanding?** Our analysis shows a clear increase in student understanding after each peer discussion. However it reveals no significant difference between peer discussion and teacher's explanation (p-value > 0.1). Our results, both from the quizzes and the survey, confirmed that the concept questions allow them to better understand the content of the course.

**Does European shyness affect PI discussions?** On a panel of 108 students questioned, 64% do not consider that it is easy to discuss with other students they do not know. Only a few of them (14%) actually discuss the questions with people they do not know.

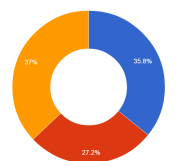
We also discovered that the students were often **naturally discussing** during the control session. While this mitigates our results, this also shows that clicker sessions create by themselves an environment of mutual emulation.



« Explain to my neighbours what I understood is interesting to me. »



« Discussing with my neighbours helps me understand. »



« Discussing with my neighbours is more effective than the teacher's explanation. »

● Agree ● Not Sure ● Disagree

## Implications

- No significant difference between PI and teacher's explanation.
- Conceptual questions allow students to be more attentive during lectures.
- Students are prone to naturally discuss with their friends during clicker quizzes.

### More about this study

This study was completed by EPFL Master students as part of a Social and Human Science course called *How People Learn II*. We would like to thank Prof R. Beck for allowing us to run this experiment in his class, and Cécile Hardebolle for supervising this project alongside Roland Tormey.

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### References

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