



Use of Peer Feedback to Improve Collaborative Learning in Year 5 Mathematics Students

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Further Information
This poster and further information is available at <http://www.theibsc.org/>

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Introduction

During Term 3 of 2016, twenty-six ten year-old boys from Brisbane Grammar School engaged in four collaborative peer-feedback sessions during their Mathematics classes. Boys were grouped heterogeneously with respect to mathematics ability and worked together to provide their peers with help and advice aimed at improving their scores on weekly review tasks. Our action aimed to improve student collaboration and encourage meaningful dialogue between students about their mathematical errors.

The Research Question

How might a focus on peer feedback improve collaborative learning in Mathematics for Year 5 boys?

Research Context and Participants

Brisbane Grammar School is a non-selective, independent day and boarding school catering to 1,675 boys from Years 5 to 12. The School's motto, *nil sine labore*, translates from Latin as "Nothing without Labour" and reflects the commitment to endeavour. The School is committed to offering a broad liberal education philosophy, encouraging boys to engage in a diverse range of cultural, intellectual, sporting, and other outdoor activities. The participants in the project were boys in one Year 5 Form Class (twenty-six students aging from ten to eleven years).

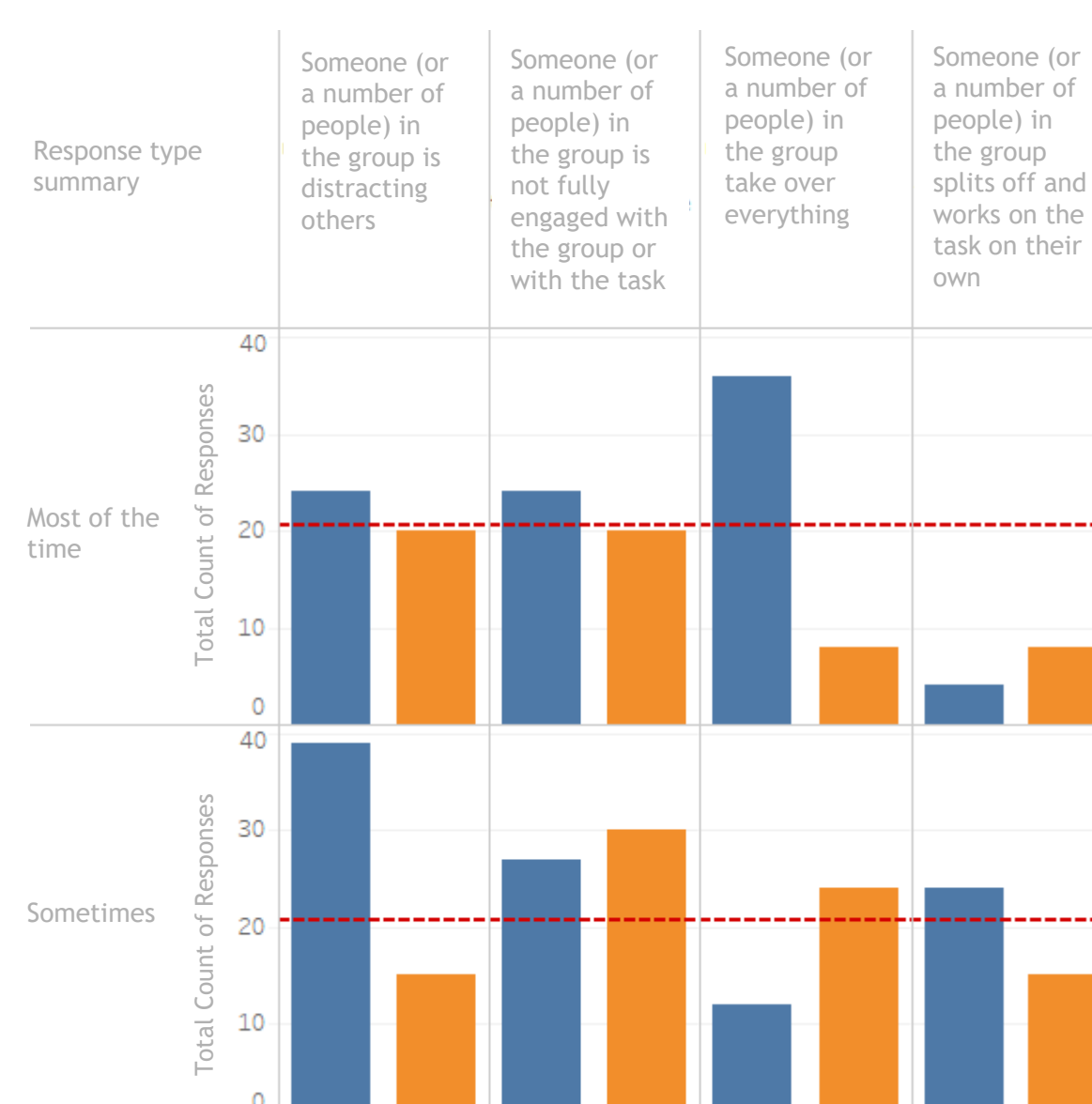
The Research Action

We implemented our action in the final four weeks of Term 3, 2016. The focus was a weekly peer feedback session during which students worked together to identify and categorise mathematical errors and assist one another to avoid similar errors in the future. Groups were formed in an intentional manner with consideration being given to mathematical ability, quality of reflective thinking, and previous knowledge of each boy's characteristics as a learner and collaborator. Boys tracked their scores each week and completed session logs in which they reflected on their collaborative experiences.

To support their discussions, a set of categories for classifying student errors in Mathematics was developed. We hoped this would form the basis of a shared language that boys could use to discuss and describe the errors they had made.



Analysis of data captured from pre-action and post-action student surveys



Survey Time
■ Pre-action
■ Post-action

"I felt a lot more positivity coming from them. It wasn't all rough and mean, it was nice and understanding. My peers helped me; they put more detail into it and they were much more understanding."

"I used the advice from last week to not get more questions wrong. I think this is because of the great advice from my fellow peers. A good thing about my experience is my score has increased."

"The team could have done all of the questions again and have gotten them right."



Data Collection and Analysis

The research focus on peer feedback mechanisms as a potential vehicle to improve collaborative learning required us to regularly capture boys' voices as our action progressed. This was achieved using a number of mechanisms:

- 1) An initial survey that focussed on past experiences with collaboration and peer feedback
- 2) Session logs that asked structured, but open questions to encourage reflection
- 3) Transcriptions of student interviews
- 4) Video footage of student collaboration during the action phase
- 5) A follow-up survey that contained many of the same questions as the initial survey, providing a ready point of comparison

We analysed Likert Scale data using a spreadsheet, while session logs, interviews and other video footage were transcribed into documents to be further analysed. We developed a set of categories and coded the data to identify emerging themes and supporting observations.

Key Findings and Discussion

From the analysis, four apparent themes emerged. These were:

- Improved collaboration and group cohesion
- Increased levels of feedback and use of a shared language
- Appreciation for feedback
- Improved student results

Within the collaborative groups, there was a real sense of accomplishment when peers were able to celebrate each other's success.

Student reflections recorded in the session logs each week revealed improved collaboration, rising levels of empathy, and the increasing value boys placed on the contributions of others.

Improved scores were evident for most students. Those who did not record improvements had already earned excellent results in the first week.

Conclusions

The intentional focus on peer feedback led to improvement in both collaborative learning and student achievement. Boys involved in this action research project enjoyed the opportunity to work collaboratively with their peers and increased levels of promotive interaction helped to ensure the peer-feedback sessions were a positive learning experience for most boys.

The pairing of intentional heterogeneous groupings with highly structured feedback routines was a success. Boys who struggle with their Mathematics regularly reflected upon how their understanding of some concepts had improved with the assistance of their peers. Although there was no clear evidence of improved scores for high achieving students, these boys reflected positively on the assistance they were able to provide others and felt that their participation had deepened their own understanding.

Data-collection during the implementation of our action was difficult at times. Student absences, incomplete reflections, and low task completion rates for some boys resulted in the collection of partial data for these students in some sessions.

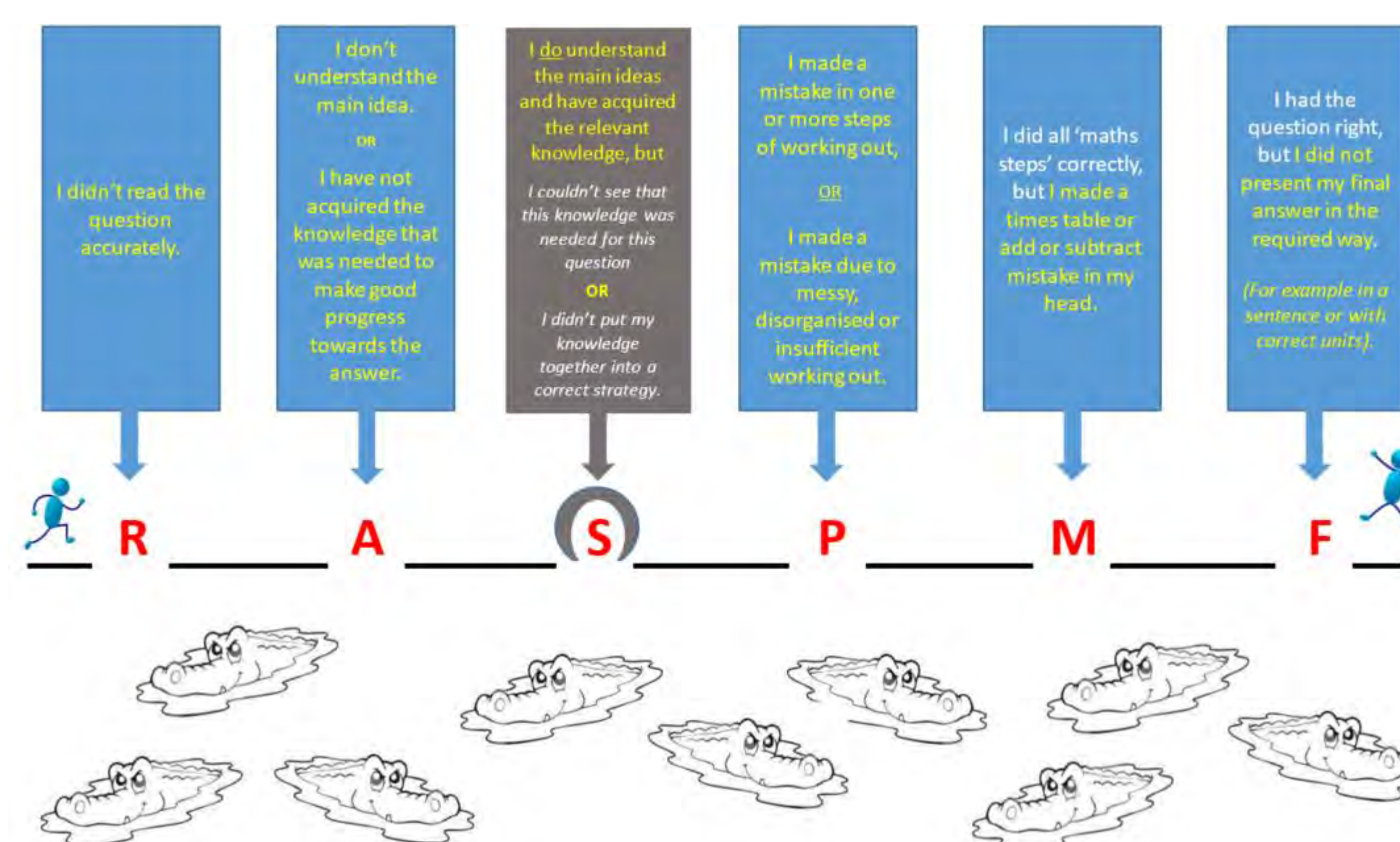
We enjoyed the opportunity to work closely with our boys to improve collaboration in our classroom. They showed a willingness to participate as interested stakeholders in their own learning and to discuss factors affecting collaboration with honesty and sincerity.

Key Readings

- Buchs, C., Wiederkehr, V., Filippou, D., Sommet, N., & Darnon, C. (2015). Structured Cooperative Learning as a Means for Improving Average Achievers' Mathematical Learning in Fractions. *Teaching Innovations*, 28(3), 15-35.
- Gillies, R. r. (2014). Cooperative Learning: Developments in Research. *International Journal Of Educational Psychology*, 3(2), 125-140.
- Webb, N. M., Farivar, S. H., & Mastergeorge, A. M. (2002). Productive helping in cooperative groups. *Theory Into Practice*, 41(1), 13-20.



Visualising Error Detection in Mathematics



**International Boys' Schools Coalition Action Research Program 2016 - 2017:
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