

A comparison of paired teaching models in large-scale introductory physics courses



Jared Stang[†] and Linda Strubbe Department of Physics and Astronomy, UBC

Introduction

Paired teaching is an arrangement in which two faculty are collaboratively responsible for all aspects of teaching a course. By pairing an instructor experienced in research-based instructional strategies (RBIS; the "expert") with an instructor with little or no experience in RBIS (the "novice"), paired teaching can be used to promote the adoption of RBIS [1].

Goal: What factors make for effective professional development in teaching via paired teaching?

Method

We focus on four novice instructors: A, B, C, and D.

Post-course interviews were analyzed for:

- 1. The relevant "input" factors that characterize paired teaching arrangements.
- 2. The novice instructors learning about teaching.
- 3. Specific connections between the input factors and faculty outcomes.

Evidence for learning comes in different forms. Strong evidence of learning: The transfer of teaching techniques to an antagonistic scenario (i.e. a course for which there exists barriers to using RBIS).

Moderate evidence of learning: The use of RBIS while teaching the same course again individually or a development in professed attitudes towards RBIS. Weak evidence of learning: Using RBIS while pairteaching—the existing course structure means that novice instructors are very likely to teach in a reformed style while pair-teaching.

FAQ

Do instructors enjoy paired teaching? Yes! Described as "a lot of fun" and "one of the best

does paired teaching take? Same to less! Described as "about the same workload as the second time I taught the course, entirely myself" and

Do students like having two instructors? Yes!

Overall, having two instructors in this course was...

an advantage	neutral	a disadvantage
75%	14%	11%
		2015 courses. N = 26

Novice instructor Course (year) Context* Novice prior experience* Approach of **Expert** instructor Relationship*

Teaching

assignment

sequence*

Support*

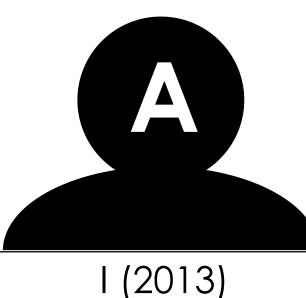
2. Novice

instructors

learning

about

teaching



<1 year teaching. No experience

Intention to learn "tried and tested"

Taught course I individually in next

methods.

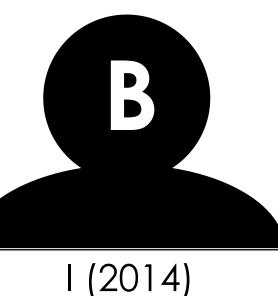
two years.

course I.

instructor.

teaching.

"Incredibly friendly."



< 5 years teaching. Some previous

Instructor Y, teaching stream tenured, 20 years teaching experience, 10 years PER experience.

Taught both course I and other similar

"... I do like them as [a person]."

Saw paired teaching as an

courses in subsequent year.

exposure to RBIS.

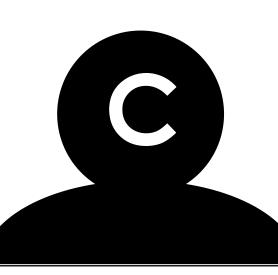
"apprenticeship."

No science education specialist (SES) support.

courses.

instructor Y.

instructor.



I (2015)

10 years teaching at all levels. Some

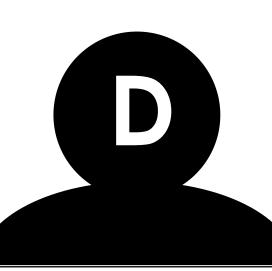
Sought feedback from expert, but

"most of the things weren't new."

previous exposure to RBIS.

"It was very collegial."

course III next year.



First-year large-scale calculus based physics course using active learning techniques. Multiple sections and instructors. Structure and materials established. 10 years teaching at all levels. Some

II (2015)

previous exposure to RBIS. Focused on in-class product and not professional development.

Instructor Z, teaching stream tenuretrack, 20 years teaching experience, 10 years PER experience.

"... we all got along."

Taught upper division course III at the Will teach course II individually next same time as pair-teaching. Will teach course I individually and

SES provided feedback from classroom observations and student interviews.

Continued use of RBIS in teaching

Interest in research basis: "I didn't

in the why of the questions."

really expect to be that interested

"Vital" to their development as an

Developed overall confidence in

Discussed specific teaching skills

adapt) and a higher level

approach to teaching (the

(i.e. lecture preparation, crowd

management, and the ability to

importance of active learning).



undertaken projects with expert

"Apprenticeship" was important

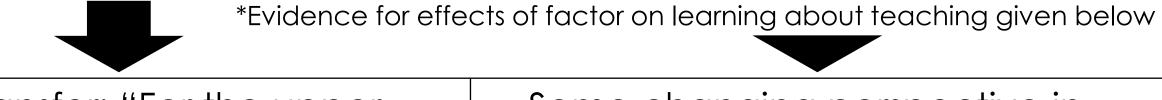
Discussed specific teaching skills,

including the need for adaptation.

for their development as an

Continued use of RBIS in next

Active in PER group; has



 Plan to transfer: "For the upper level class... I will try to see if I can develop guided worksheets."

Plan to teach course I "exactly the same.'

Positive and reflective about the use of RBIs. "I can't be argumentative about the use of classical lecture versus more interactive class [sic]."

Discussed specific teaching skills, including pacing and adaptation.

When in charge, taught in the same overall style as expert instructor Y.

Some changing perspective in "thinking a little bit more like a student as opposed to just thinking like a lecturer."

Some reservations about the lack of content covered.

Conflated adding active learning techniques with removing challenge: "I'd still like to learn... the blending of slightly more challenging aspects with still this way of being very interactive."

When in charge, taught in the same overall style as expert instructor Z.

teaching experiences I ever had." Ctors Compared to teaching individually, how much time

"a quarter time savings."

3 transfer.

Approach of novice instructor

Instructors A and B were deliberate about learning about teaching, and took advantage of both observing the expert and receiving feedback from them. In contrast, there was comparatively little evidence of learning for instructor D, who did not focus on professional development.

Teaching assignment sequence

Instructors A and B went on to teach the same (or similar) courses; both instructors continued use of RBIS. Teaching an upper division course at the same time and being scheduled for it next year—provided instructor C a concrete example to think about

Novice prior teaching experience

Overall, the relatively less experienced novice instructors (A and B) reported learning more skills than the more experienced novice instructors (C and D).

Course context / structure

The established course structure created a low barrier to using RBIS; instructors C and D taught in a manner consistent with the reformed structure.

Support of SES

The support of the SES was important for instructor C's developing attitude towards in-class activities: they conclude that ``there is no doubt that they [worksheets] improve engagement."

Relationship between instructors

Instructor B observed that "compatibility really makes a big difference when you're doing this kind of work." A positive relationship—which all four of cases had may be a necessary condition for positive outcomes.

Future work

- Follow A—D: Does it transfer to new situations?
- More pairs, more examples, more data

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[1] C. Henderson, A. Beach, and M. Famiano, American Journal of Physics **77**, 274 (2009).