

# Self-Perception of Teaching Fellows and Learning Assistants in Introductory Physics Classes

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## Introduction

- PhD students serve as teaching fellows (TFs, or equivalently TAs) for undergraduate physics classes, discussion and lab sections.
- Learning assistants (LAs) as near-peer instructors transform the classroom experience in which teaching fellows teach [1].
- At Boston University TFs and LAs lead discussion groups together or alternatively are engaged together with the professor in the studio or “SCALE-UP” setting [2].
- Outcomes for undergraduates who become LAs and the impact of teaching on graduate students have been studied [3, 4].

## Research Objectives

1. What is the the perception TFs and LAs have of themselves in the classroom and of their roles?
2. Do TFs’ and LAs’ experiences match their expectations?
3. Studio is favorable for student learning [5], what is the effect on TFs and LAs?

## Materials and Methods

- BU physics department teaches introductory physics courses for health science, life science, physical science and engineering majors.
- TFs and LAs were given two online surveys:
  - Asking about expectations for their teaching assignment, given at the beginning of the Spring 2016 semester.
  - Asking about their experiences that semester after teaching
- 20 TFs and 15 LAs filled out both surveys.

Our analysis will focus on the following 5 of 9 questions we asked:

- How much responsibility do professors, TFs, and LAs have for student learning? (Q2a)
- To what extent can professors, TFs, and LAs positively influence how well students learn? (Q2b)
- How much authority do professors, TFs, and LAs have in the classroom? (Q3b)
- In your view, how much do students think of professors, TFs, and LAs as a helpful resource? (Q5a)
- In your view, how much do students think of professors, TFs, and LAs as a relatable resource? (Q5b)

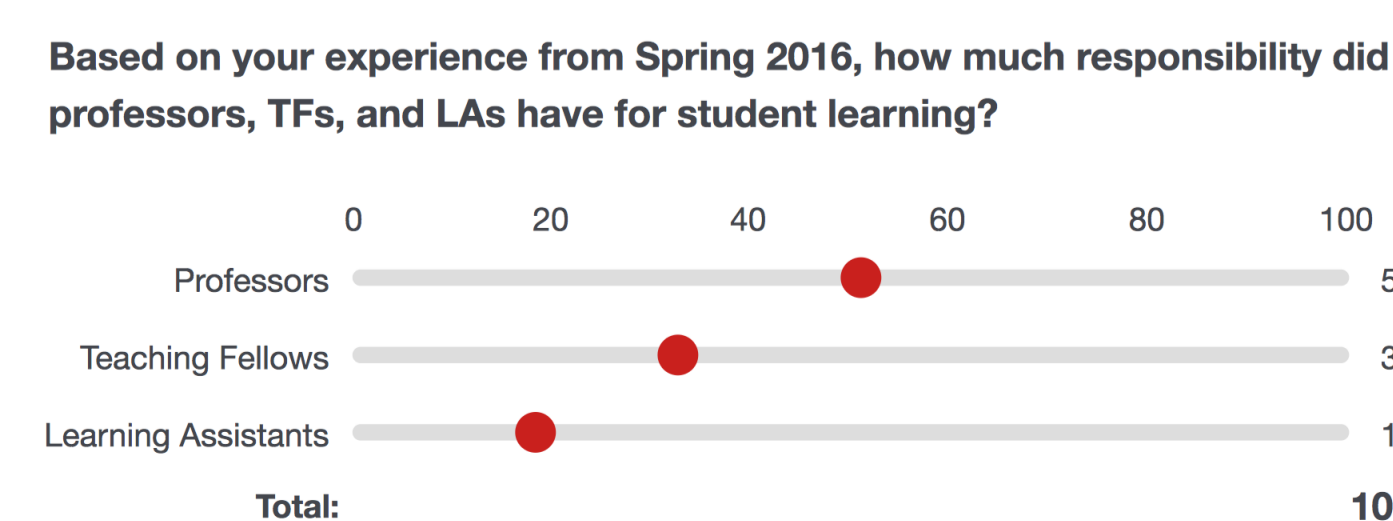


Figure 1: Screenshot of the online survey.

Figure 1 shows a screenshot of the survey; each of the possible variables (professors, TFs and LAs) was to be assigned a numerical value with a slider. Their sum had to equal 100.

## Results

The average values TFs and LAs assign in the pre-semester survey are comparable to those they assign in the post-semester survey. For questions dealing with the instructor-student interaction in the classroom, respondents assign roughly 40-60 percent to professors, 25-35 percent to TFs and up to 25 percent to the LAs, with one notable exception, Q5b (Table 1).

Question	Group	Pre-Survey	Post-Survey
Q2a	P	54	51
	TF	31	32
	LA	15	17
Q2b	P	48	46
	TF	31	33
	LA	21	21
Q3b	P	56	60
	TF	31	28
	LA	13	12
Q5a	P	44	42
	TF	36	36
	LA	20	22
Q5b	P	31	35
	TF	34	35
	LA	35	30

Table 1: Comparing pre- and post. Results do not differ greatly: expectation and experience were similar.

## TFs and LAs disagree on roles in teacher-student interaction

- TFs assign themselves more responsibility and authority than LAs do.
- Values for LAs are the same from either group.
- While agreeing on the role of LAs, TFs and LAs have different impressions of the role of TFs vs the role of professors.
- TFs think they are viewed as significantly more helpful than LAs.
- LAs also think they are viewed as least helpful, but believe the difference to be less.
- LAs assign more points to themselves on helpfulness in the post- than in the pre-survey. In both pre- and post-survey TFs assign the same values for all groups.

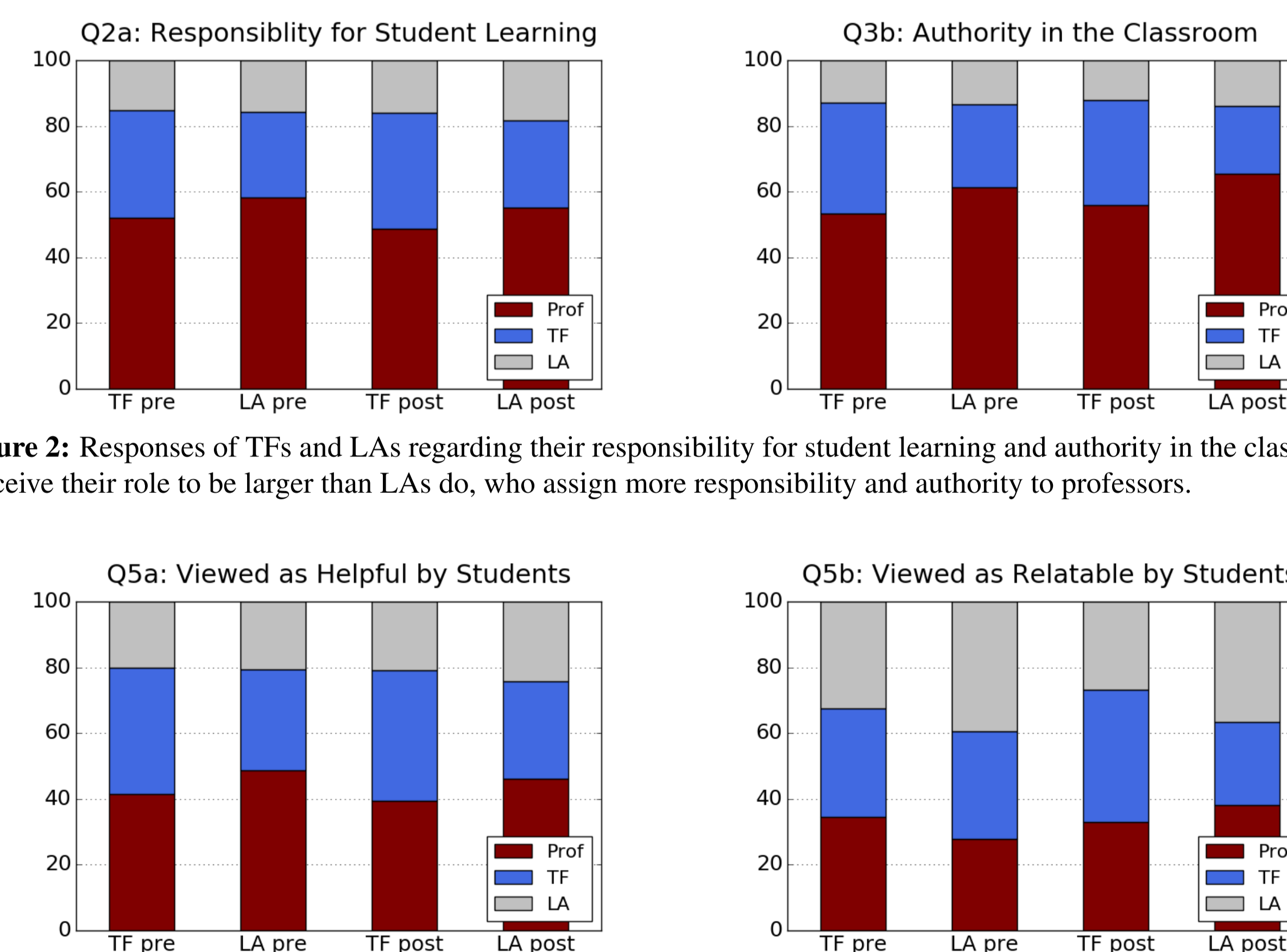


Figure 2: Responses of TFs and LAs regarding their responsibility for student learning and authority in the classroom. TFs perceive their role to be larger than LAs do, who assign more responsibility and authority to professors.

Figure 3: Estimate by TFs and LAs for how helpful and relatable students perceive their instructors. Helpfulness mirrors previous results, but LAs receive highest and professors lowest scores of all questions on relatability.

- Highest scores for learning assistants in Q5b, asking about relatability. LAs assign themselves the highest score for this question and overall.
- TFs find themselves to be viewed relatively more relatable than expected and LAs less; LAs find professors to have been viewed as more relatable than expected and TFs much less so.

## TFs and LAs believe they play a smaller role in studio

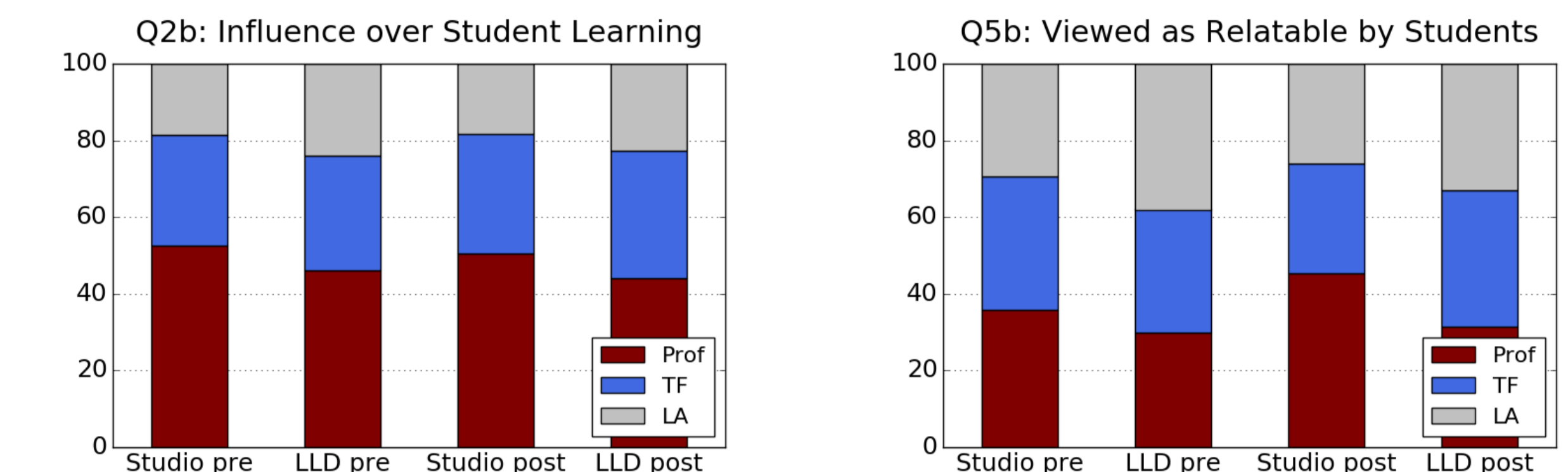


Figure 4: Disaggregation of perceived influence over student learning and relatability by class format. TFs and LAs teaching in studio assign themselves smaller influence over student learning and believe students find them less relatable compared to professors than in the classical format.

- TFs and LAs teaching in the format with lecture, lab and discussion believe that LAs are viewed as most relatable by the students, while professors are thought to be viewed as least relatable.
- Even split for the studio format in the pre-survey and the opposite result from LLD in the post-survey.

Format	Enthusiasm Before	Enthusiasm Change	Semester Experience	Improvement
Studio	4.0	3.4	3.4	3.4
LLD	4.2	3.4	3.1	4.0

Table 2: Self-assessment of enthusiasm before the semester as well as change in enthusiasm, reflection on how teaching went and self-assessment of improvement as a teacher.

Table 2 shows TFs’ and LAs’ self-assessments which were also polled in the survey. We observe that TFs and LAs in studio generally had a slightly better than expected teaching experience. However, TFs and LAs in the classical format are more likely to think they improved as teachers than TFs and LAs in studio.

TFs and LAs in the classical format are more likely to think they improved as teachers than TFs and LAs in studio.

## Conclusions and forthcoming research

- Overall, TFs and LAs have very similar perceptions of their roles in the classroom.
- TFs feel they are perceived as more helpful and relatable than LAs, and vice versa. LAs assign a greater role to professors. These results are even more pronounced in the post-survey.
- While improving students’ learning gains, studio classrooms may be less helpful in terms of teaching development, especially for LAs.

We suggest that further research on active-learning classrooms should not only be dedicated to student outcomes, but also to the effects on the development of TFs and LAs as instructors, since many LA programs are installed as a means to produce more physics teachers.

## Acknowledgments

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