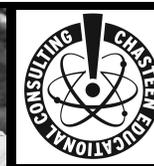


Assessment with Purpose: Evaluation of the New Faculty Workshop (NFW)

Stephanie Chasteen (Chasteen Educational Consulting), Rajendra Chattergoon (CU Boulder), Edward Prather (University of Arizona), Robert Hilborn (AAPT)



Abstract

We describe the current evaluation of the Physics and Astronomy New Faculty Workshop (NFW) as a case-study in evaluation of professional development workshops. We find that the Theory of Action of the workshop is only partially fulfilled: workshop experiences are positive, build on participants' prior knowledge, and increase knowledge about active learning, but participant gains in skill and confidence are low. We indicate how these results can inform the NFW program and evaluation.

About the NFW

- Since 1996
- Multi-day workshop
- Organized by AAPT, APS & AAS
- Attendees represent 48% of tenure-track hires in physics and astronomy (2008-2013)

Goals of the workshop

- Reach a large fraction of tenure-track faculty (*achieved*)
- Help participants develop knowledge about recent developments in pedagogy (*achieved*)
- Help participants integrate workshop ideas and materials in their classroom

Goals of the evaluation

- Track progress towards goals
- Speak for multiple stakeholders (participants, organizers, funders)
- Clearly inform organizers
- NOT to provide a validated study of research questions about the nature of professional development

Theory of Action

What is the rationale guiding the NFW?

Workshop inputs

- Information & access to experts
- Peer network
- Addressing common challenges¹
- Active engagement²

See pullout for workshop ratings

Participant outcomes

- Competence, Autonomy, & Relatedness (social connection) (i.e., self determination³) in use of active learning.

See pullout for participant characteristics

Long-term objectives

- Decision to use active learning
- Long-term effective use of active learning^{4,5}

Focusing on participant outcomes

Measurement

How do we measure and report progress?

Survey: Reported experience and attitudes towards active learning (pre/post)⁵

- Knowledge of
- Skill in using
- Motivation to use
- Belief in the effectiveness of
- Confidence in ability to support others in using
- Feeling supported by others in using
- Confidence in getting good student evaluations when using

We focus on median, not mean, scores and gains, since this is not an interval scale, and respondents cannot give answers between two response categories

Recommendations

What are the implications?

- “Convincing” faculty to use active learning should be (and has been) reduced as a focus
- Increase focus on building skill and self-efficacy (e.g., through practice, course design, and implementation tips and a focus on reflective practice)
- Consider differentiated instruction given differing levels of existing experience
- New aspects of the NFW are addressing many needs (e.g., online learning community⁵ builds social supports, interactive “practice” sessions with Peer Instruction build skill).

Data & Results

What did we find?

- Participants report many significant benefits
- Numerically, only “knowledge” increases
- “Skill” shows much room for growth
- Motivation, belief in the effectiveness, self-efficacy (confidence in supporting a colleague or getting good evaluations), and social support (from colleagues) shows some room for growth but little change from pre/post
- Prior experience matters: Increases in knowledge are greater for those with more teaching experience, who received undergraduate degrees outside of N. America, and who used less active learning pre-workshop.
- The greatest requests are for assistance with implementation and course design
- Newer “practice” sessions are working extremely well

	n	Pre-Survey		Post-Survey		Gain		Effect Size ⁶
		Mean (SD)	Median	Mean (SD)	Median	Mean (SD)	Median	
Knowledge	162	2.8 (0.7)	3	3.3 (0.6)	3	0.5 (0.8)	0	0.7
Skill	163	2.4 (0.8)	2	2.6 (0.7)	3	0.2 (0.7)	0	0.3
Effectiveness	155	3.6 (0.6)	4	3.6 (0.6)	4	0.0 (0.8)	0	0.0
Motivation	119	3.5 (0.6)	4	3.5 (0.7)	4	0.0 (0.8)	0	0.0
Supported by Others	109	3.4 (0.7)	3	3.1 (0.9)	3	-0.3 (0.9)	0	-0.3
Supporting Colleague	112	3.1 (1.0)	3	3.0 (0.8)	3	0.0 (1.2)	0	0.0
Evaluations	96	3.2 (0.7)	3	2.9 (0.8)	3	-0.3 (0.8)	0	-0.3

⁶ Respondents' gain scores are computed by subtracting their post-survey response from the pre-survey response. The mean gain is the average of the individual gain scores for each item. The median gain is the median of the individual gain scores for each item. The effect size is computed by dividing the mean gain by the pooled standard deviation across all pre- and post-survey responses.

Summary

The evaluation addresses needs of multiple stakeholders (participants, organizers, funders), guided by the ToA. The NFW is successful in many ways, with many challenges being proactively addressed in response to evaluation results. Increased focus on skill-building and self efficacy may further increase quantitative gains.

Acknowledgments

This work is supported by NSF DUE number 1431638 and Chasteen Educational Consulting. Special thanks to: Charles Hayward, Marilyne Stains, Charles Henderson, Alice Olmstead, Chandra Turpen, and the NFW team.

References

- [1] See prior work by Henderson and Dancy
- [2] NFW presenter tips: <http://bit.ly/1tsYoCc>
- [3] E. Deci & R. Ryan, *Psychology Inquiry*, 11, 227 (2000).

[4] In progress, one year survey includes PIPS instrument from Henderson et al. Outputs align with E.M. Rogers.

[5] C. Hayward, M. Kogan, and S. Laursen, *Int. J. Res. Undergrad. Math. Ed.*, 2 (1), 59 (2016)

[6] Rundquist et al., PERC 2015



CHASTEEN EDUCATIONAL CONSULTING
Stephanie@Chasteenconsulting.com
Chasteenconsulting.com

Measurement

How do we measure and report progress?

- Survey: Workshop feedback (open-ended questions used to generate multiple-choice of common critiques), plus session ratings
- Observation
- Future: Observation tool (R-PDOT)¹

Results

What are the findings?

- Excellent ratings, particularly in exposure to broad techniques.
- Interactive sessions popular
- Exhaustion and overwhelm an issue
- Complaints about “over-selling” reduced
- Some interest in more practice but broad exposure is a plus

Recommendations

How does evaluation inform NFW?

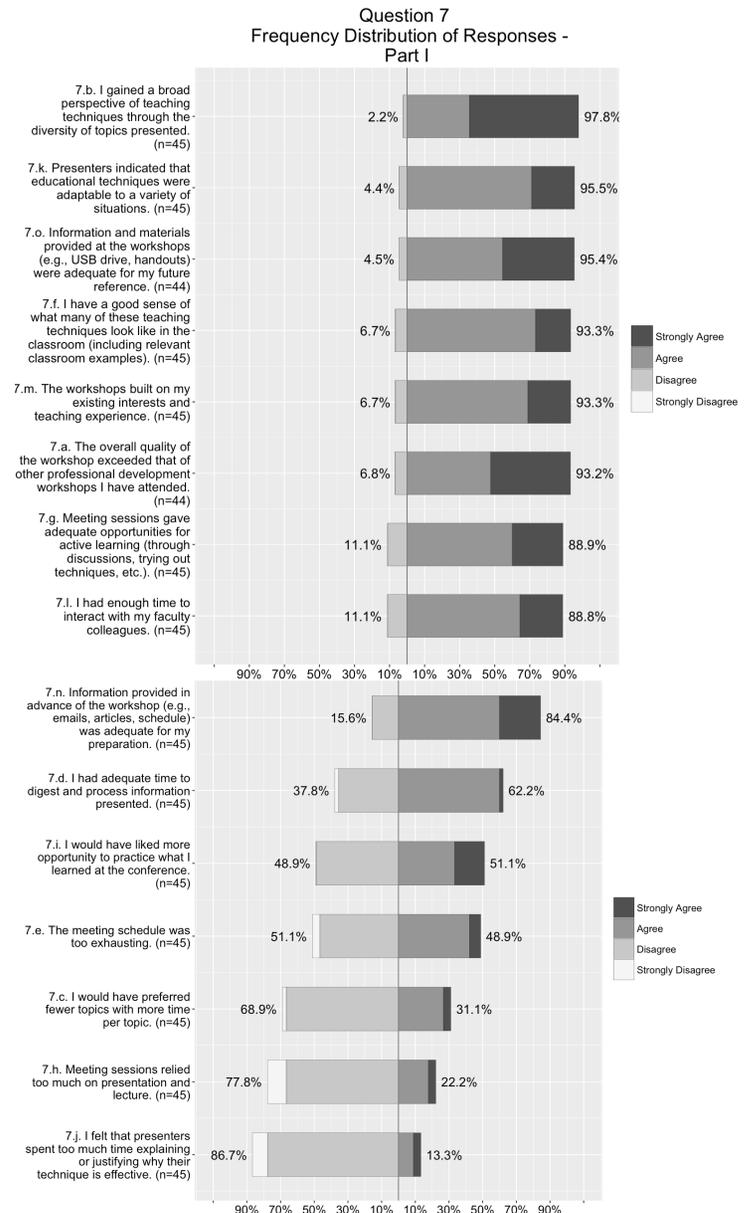
- Continue to offer a broad introduction to techniques
- Consider whether focus is on motivation, or building skill
- Increase attention to implementation details, course design, and facilitation
- Work to reduce exhaustion

Workshop inputs

- Information & access to experts
- Peer network
- Addressing common challenges¹
- Active engagement

Data

How are results conveyed? Frequency graph



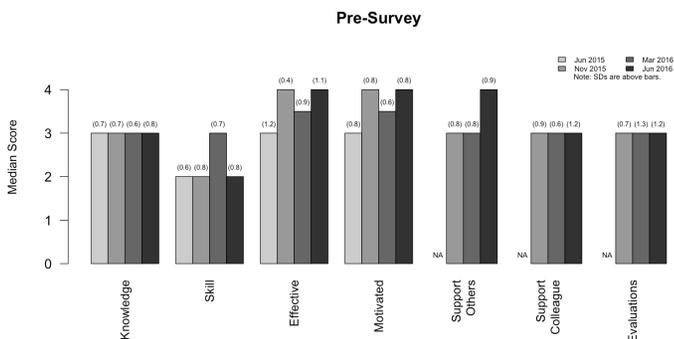
[1] A. Olmstead and C. Turpen, PERC 2015 and <https://arxiv.org/abs/1606.07126>

Participant incoming characteristics

Have changed considerably over time, especially in awareness/use of active learning

Demographics and teaching

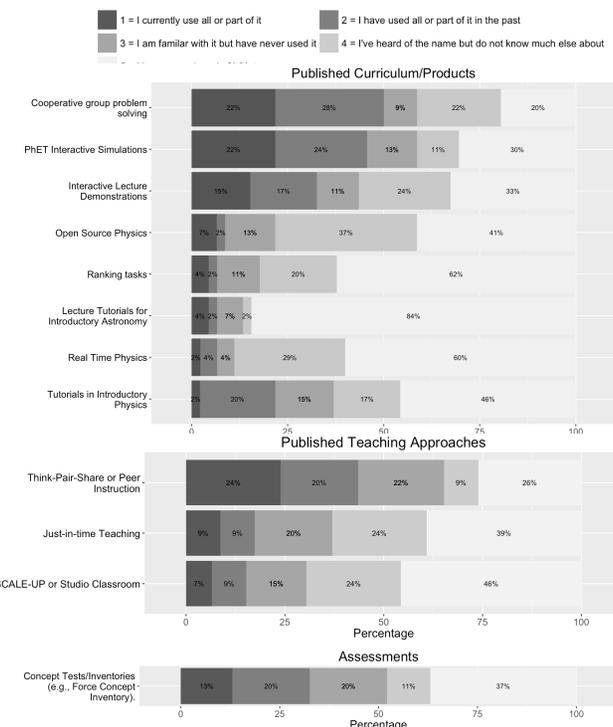
- 1/3 female
- 1/2 undergrad only institutions
- 50-60% white, 23% Asian
- 65% undergrad degree in N. America
- 2 years' median teaching experience
- 50% report using high levels of active learning (20% or more of class time)



Belief in the effectiveness, and motivation to use active learning show NO room for growth (based on median scores; 4 across all NFW participants). See page 18 for histograms. **Skill in using active learning shows the MOST room for growth** (median of 2 across all cohorts)

Knowledge of published curricula

About 1/2 of participants have used one of the following techniques (and about 1/2 of those still use the technique): Cooperative group problem solving, PhET Interactive Simulations, or Peer Instruction. About 1/3 have used Interactive Lecture Demonstrations or Concept Inventories. A large fraction of participants are not familiar (or only passingly so) with the vast majority of other techniques..



Below are results of the July 2016 cohort compared to Henderson and Dancy (2009)

Technique	Used it (now or previous)		Have at least heard of it	
	2016	2009	2016	2009
Peer Instruction	44%	43%	74%	75%
ILDs	32%	24%	67%	62%
Coop. problem solving	50%	30%	80%	65%
Open source physics	17%	4%	72%	39%
JiTT	18%	18%	61%	65%
Tutorials in Intro. Phys.	22%	20%	54%	62%
SCALE-UP	16%	9%	54%	51%
Ranking tasks	6%	25%	38%	47%

Participant Characteristics

Workshop Ratings