PRACTICUM-BASED PROFESSIONAL DEVELOPMENT MODELS: CONSIDERING IMPACTS FROM MULTIPLE PERSPECTIVES

DISCOVERY RESEARCH K-12

DR K–12 PI Meeting
June 1–3, 2016

Washington Marriott Wardman Park
Washington, D.C.

Community for Advancing Discovery Research in Education

Goals for today's session

- Clarify essential features of 'practicum-based' professional development programs
- Provide a rationale for practicum-based PD
- Examine preliminary evidence supporting impacts of practicum-based PD models
- Explore issues & solutions to implementing and studying practicum-based PD

‘Practicum-Based’ PD Programs

PRACTISE: Practicum-based Academy to Improve Science Education

University of California-Berkeley
Craig Strang and Emily Weiss

Stanford Graduate School of Education
Jonathan Osborne and Hilda Borko

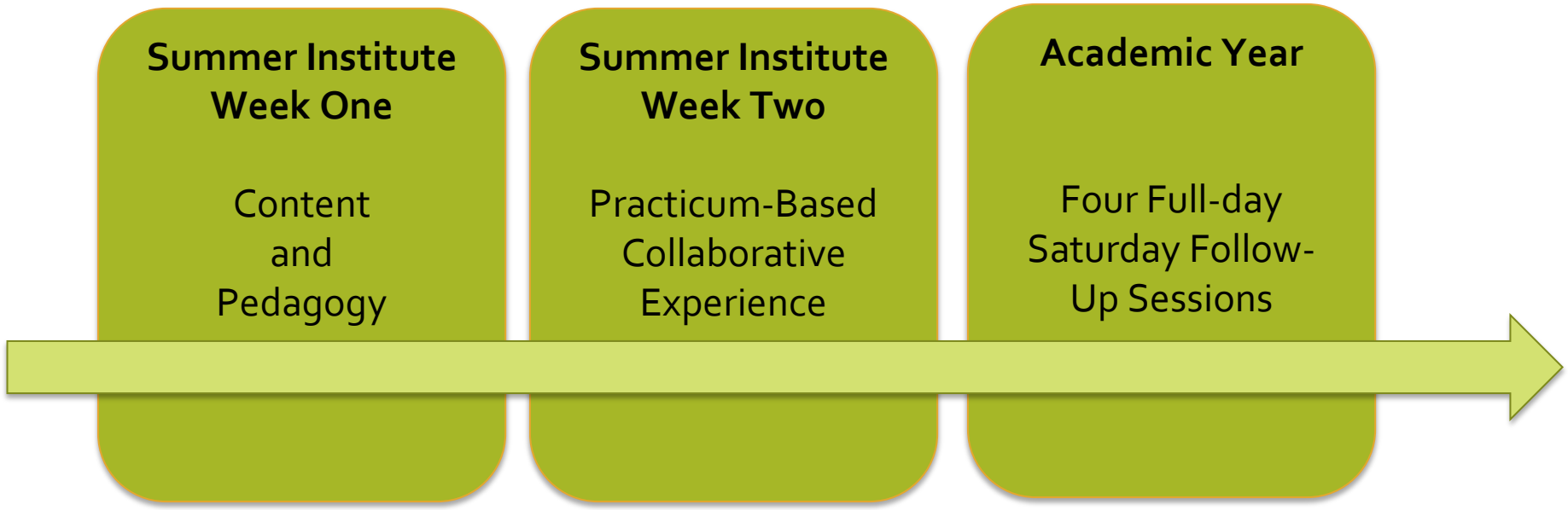
QuEST: Quality Elementary Science Teaching

University of Missouri
Deborah Hanuscin, Delinda van Garderen, Mark Ehlert, Zandra de Araujo, Cathy Thomas, Dante Cisterna

MU QUEST

Community for Advancing Discovery Research in Education

NSF DRK12 project that explores the impact of a practicum-based PD model on teacher and student learning in elementary science.



QUEST

Practicum-Based Professional Development Model

Community for Advancing Discovery Research in Education

Week One

- Teachers learn physical science content using a curriculum developed for *adult learners* that is framed using the 5E Learning Cycle and incorporates principles of Universal Design of Learning (UDL).
- Teachers then 'unpack' their experience as learners to develop their pedagogical knowledge of the 5E Learning Cycle, formative assessment, and UDL.

QUEST

Practicum-Based Professional Development Model

Community for Advancing Discovery Research in Education

Week Two

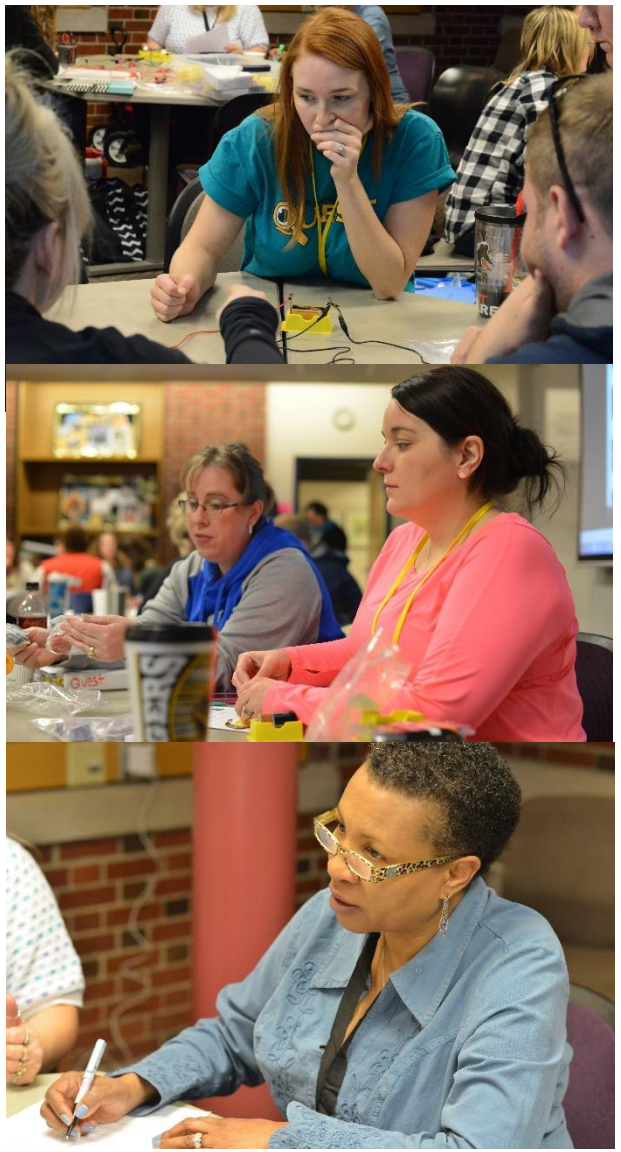
- Teachers work in collaborative teams to design and instruct a week-long, half-day summer science program for students (15 hours). They spend the remaining half of the day analyzing their practice, examining student work, and planning next steps.
- Students pay a modest tuition fee ($75) which subsidizes scholarships awarded in conjunction with the local Voluntary Action Center and Columbia Housing Authority.

QUEST Practicum-Based Professional Development Model

Community for Advancing Discovery Research in Education

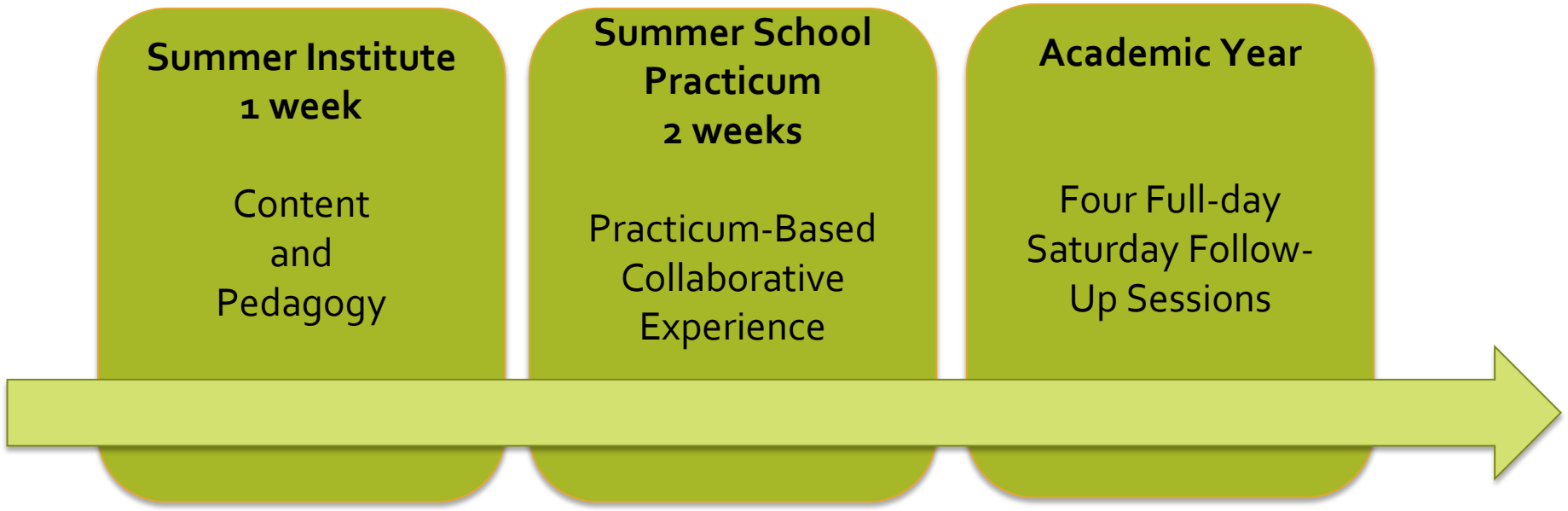
Academic Year

- Four Saturday Sessions (full day) focus on extending teachers' knowledge and application of what they learned in the summer institute and analyzing student assessment data to inform their teaching
- Activities are informed by classroom observations of teachers' implementation, evaluation data, and teacher input



PRACTISE: Practicum-based Professional Learning Model

NSF DRK12 project that explores the impact of a practicum-based professional learning model on teacher and student learning in elementary science (grades 3-5).



PRACTISE: Practicum-based Professional Learning Model

Summer Institute (1 week)

- Teachers engage in exemplar ocean science experiences, including arguing from evidence; PL leaders make explicit their instructional goals and instructional decisions.
- Teachers explore ideas related to establishing a culture of talk, supporting ELLs, and developing students' argumentation skills.
- Teachers plan for upcoming practicum experience to enact what they have learned.

Community for Advancing Discovery Research in Education

PRACTISE: Practicum-based Professional Learning Model

Summer School Practicum (2 weeks)

- Team teaching & planning using exemplary curriculum (same as during Institute) to support pedagogical learning goals
- Daily 90-minutes of instructional time (whole class and small group)
- Coaching
- Video reflection groups
- Just-in-time PL input

PRACTISE: Practicum-based Professional Learning Model

Academic year follow-up days

(4 full days)

- Video reflection groups
- Planning time
- Additional PL experiences to align with academic year needs (informed by formative evaluation data)

Community for Advancing Discovery Research in Education

Characteristics of 'Practicum-Based' PD

Essential feature:

- Provide a 'low risk' instructional environment in which teachers can 'practice' (i.e., rehearse) new teaching approaches and iterate immediately based on feedback and reflection on student work prior to returning to their own classrooms

Variable features:

- Length of practicum experience
- Specific teaching practices and curriculum
- Collaborative teaching and planning
- Coaching
- Video-stimulated reflection
- Repeated teaching of the same lessons

Community for Advancing Discovery Research in Education

Question for the audience:

What other features of practicum-based PD do you see as essential or possible variants?

Why do we think practicum-based PD is important for teachers?

Situated Perspectives on Learning

- Pedagogical Content Knowledge (PCK) develops through teaching experience, but the nature of that experience matters

Why embed practicum in PD versus embed PD in teachers' own classrooms?

"The classroom is a powerful environment for shaping and constraining how practicing teachers think and act. Many of their patterns of thought and action have become automatic—resistant to reflection or change. Engaging in learning experiences away from this setting may be necessary to help teachers 'break set'—to experience things in new ways"

(Putnam & Borko, 2000, p. 6).

Why is practice important for elementary teachers, in particular?

Science Teaching Opportunities with the same Content	Student Teaching	Year 1	Year 2	Year 3	Total
Middle/ Secondary Teacher	1-3	2-5	2-5	2-5	7-18
Elementary Teacher*	?1?	1	1	1	4 at best*

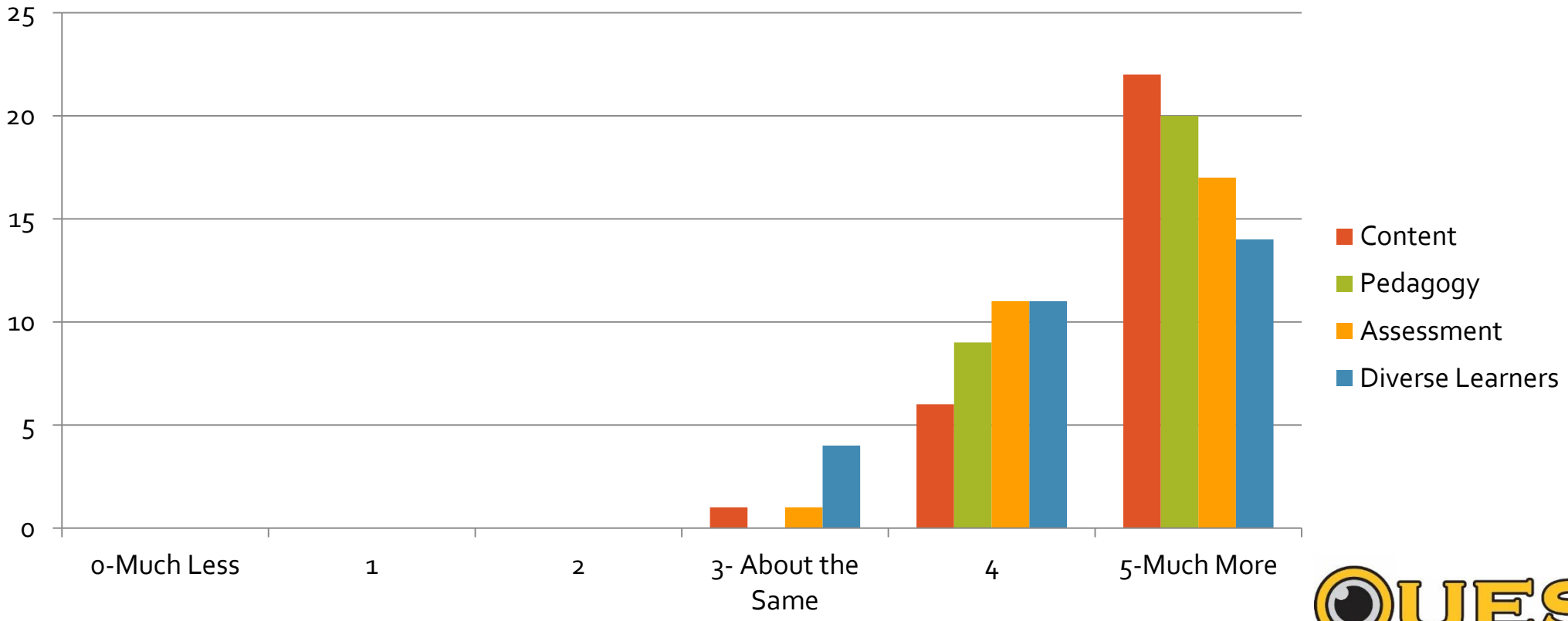
*Assuming the teacher remains at the same grade level and the same curricula are in place each year

What are teachers' perceptions of practicum-based PD programs?

The most valuable part of the professional development experience was implementing the strategies we learned about during the first week with the children the second week. What good is learning about how to do something with children if you cannot practice it?

Community for Advancing Discovery Research in Education

QUEST Participants' Perceptions of the Amount They Learned in Comparison to Other PD



QUEST

Community for Advancing Discovery Research in Education

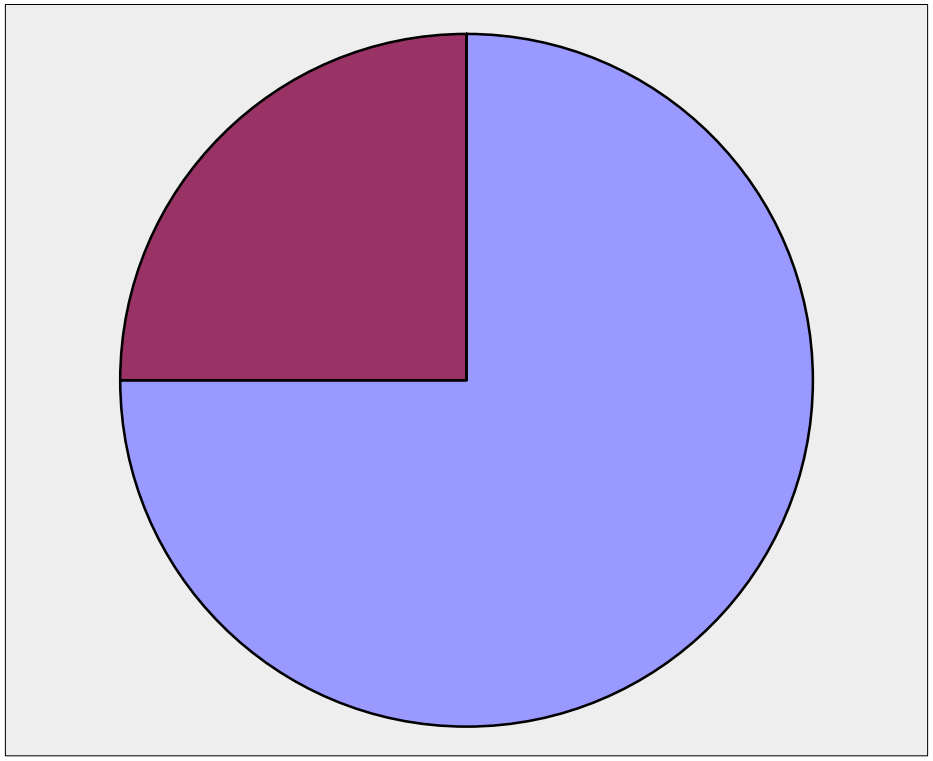
What are teachers' perceptions of practicum-based PD programs?

…being able to put the new information into practice immediately helped me make better sense of it. The practicum helped solidify the concepts and made the experience more effective. Having a coach to help us with the lessons was useful to get back on track when we strayed (immediate feedback!) … I really learned a lot from watching the videos (even if the lesson did not go as planned). I always got something out of the discussion that followed.

What are teachers' perceptions of practicum-based PD programs?

Practicum Academy to Improve Science Education
PRACTISE
Lawrence Hall of Science & Stanford Graduate School of Education

How does your experience in the PRACTISE two-week Practicum compare to other professional development activities that were intended to improve your teaching practice?



- The PRACTISE two-week Practicum was much more effective than other professional development experiences I have had.
- The PRACTISE two-week Practicum was more effective than other PD experiences I have had.
- The PRACTISE two-week Practicum was about the same as other PD experiences I have had.
- The PRACTISE two-week Practicum was less effective than other PD experiences I have had.
- The PRACTISE two-week Practicum was much less effective than other PD experiences I have had.

QUESTIONS FROM THE AUDIENCE?

(Our research is next!)

Community for Advancing Discovery Research in Education

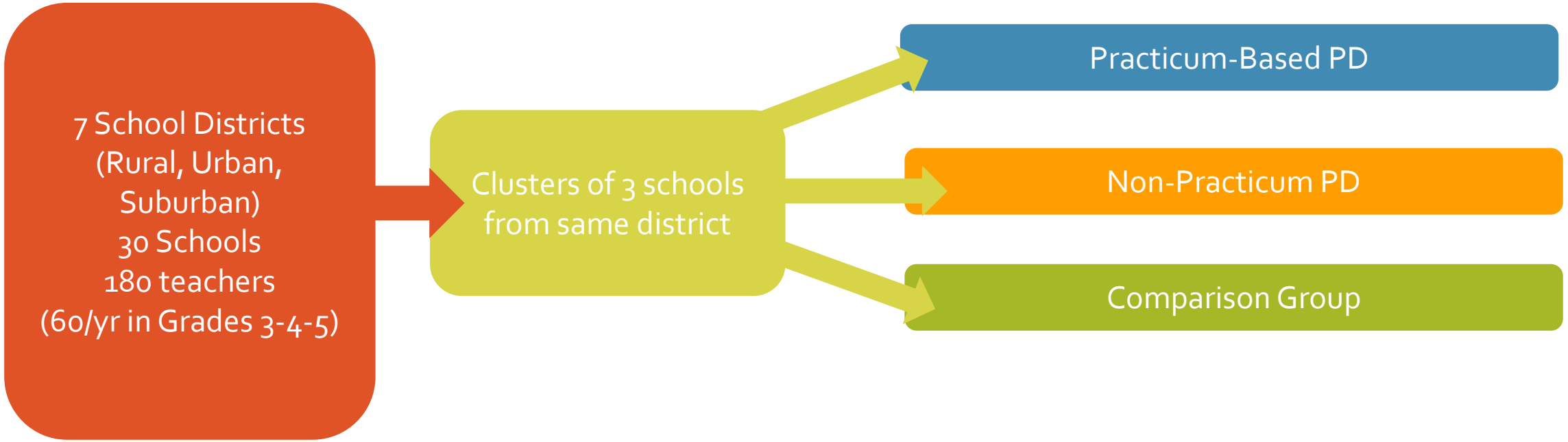
Research on Practicum-Based PD

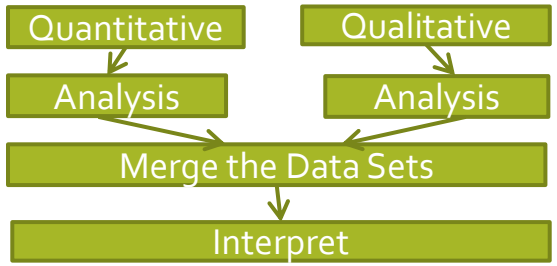
- How are we understanding and measuring impact?
- What impacts have we achieved?
- What else is influencing our ability to measure and detect impacts?

Practicum-Based Professional Development Model

Community for Advancing Discovery Research in Education

Quasi-Experimental Study





Mixed-Methods Convergent Design

Community for Advancing Discovery Research in Education

Quantitative Strand

Do **teachers** who participate in different models of PD demonstrate differential growth in content knowledge (CK), pedagogical knowledge (PK), and pedagogical content knowledge (PCK)?

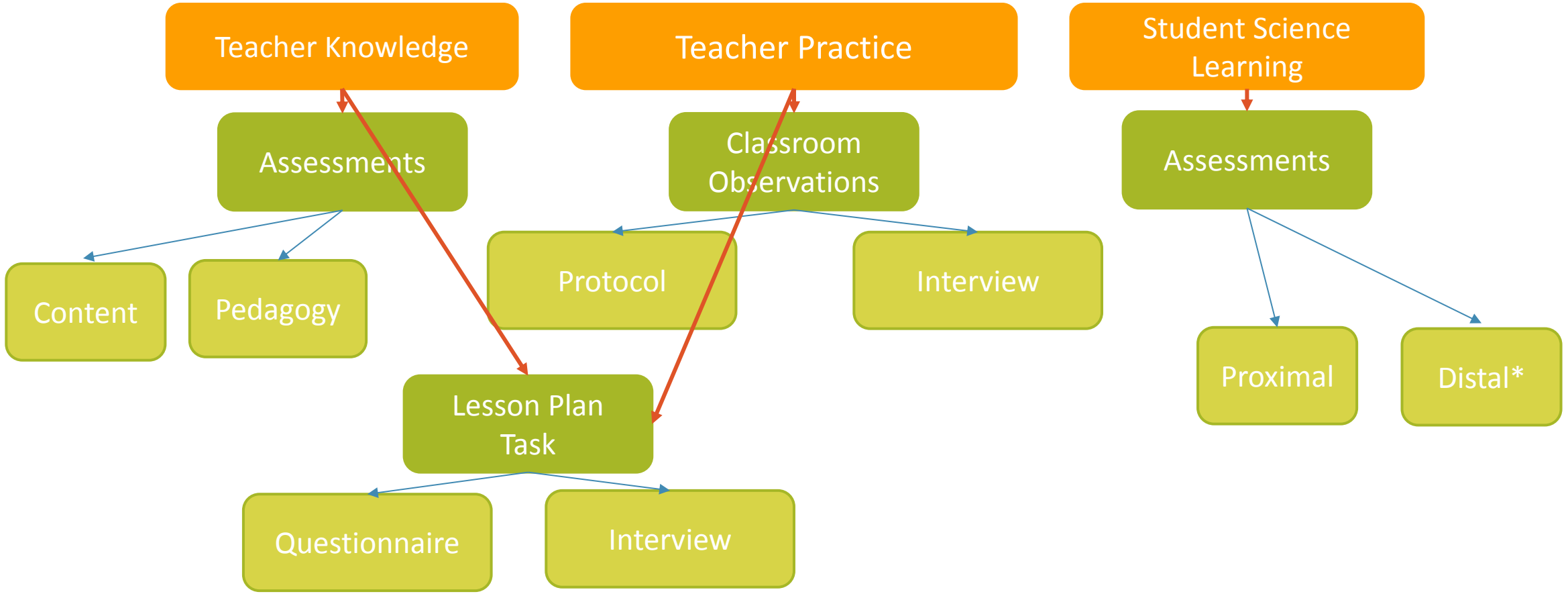
Do **students of teachers** who participate in different models of PD demonstrate differential performance on measures of science knowledge and skills?

Qualitative Strand

- How does participation in different models of PD support the **development and enactment of teachers' PCK** in their classroom practice?
- How does participation in different models of PD support teachers in **utilizing strategies to meet the needs of diverse learners** (in particular, struggling learners, students from culturally and linguistically diverse backgrounds, and students with disabilities)?

Practicum-Based Professional Development Model

Community for Advancing Discovery Research in Education

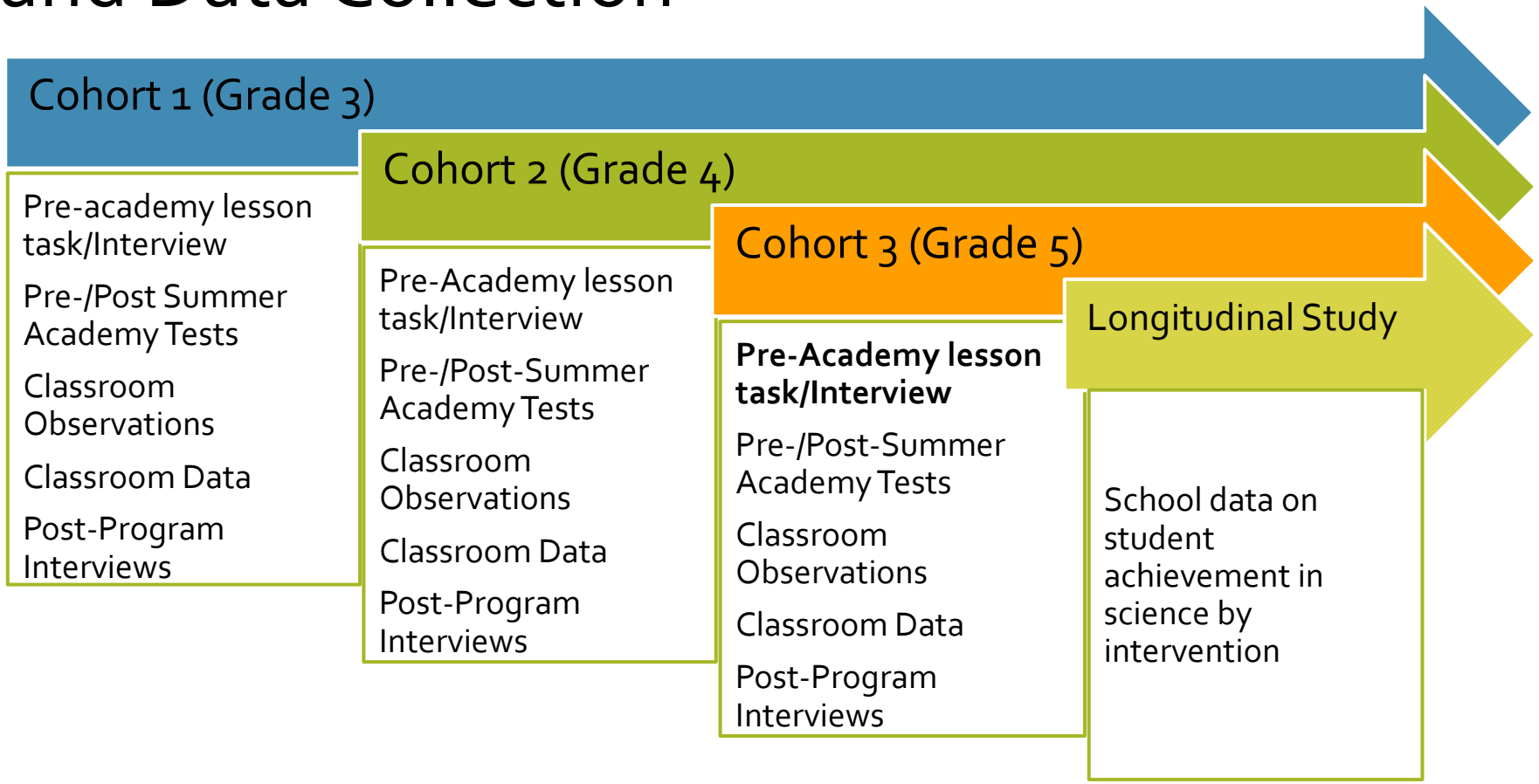


QUEST

Practicum-Based Professional Development Model

Community for Advancing Discovery Research in Education

Timeline and Data Collection



Quality Elementary Science Teaching

NSF DRK12 Program. DRL-1316683.

Comparison of Means for MOSART Scores for Treatment Groups

Group	Pretest Mean	Posttest Mean	Normalized Gain Score Mean
Practicum (16)	11.8	12.8	.08
NonPracticum (17)	11.1	11.2	-.02
t-test of Difference Between Means	$p < .43$	$p < .07$	$p < .43$

Quality Elementary Science Teaching

NSF DRK12 Program. DRL-1316683.

Comparison of Means for Content Test Scores for Treatment Groups

Group	Pretest Mean	Posttest Mean	Normalized Gain Score Mean
Practicum (16)	10.6	17.7	.55
NonPracticum (17)	8.6	16.5	.52
t-test of Difference Between Means	$p < .10$	$p < .42$	$p < .63$

The differences between pretest scores and posttest scores within groups were statistically significant at the *p < .001* level.

Quality Elementary Science Teaching

NSF DRK12 Program. DRL-1316683.

Comparison of Means for Pedagogy (5E) Scores for Treatment Groups

Group	Pretest Mean	Posttest Mean	Normalized Gain Score Mean
Practicum (16)	9.6	11.7	.33
NonPracticum (17)	8.5	11.2	.35
t-test of Difference Between Means	$p < .08$	$p < .57$	$p < .81$

For both groups, post-test scores were significantly higher than pre-test scores at *p< .002* and *p < .001* levels for the practicum and non-practicum groups, respectively.

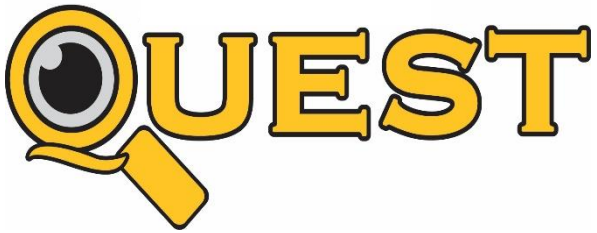
Quality Elementary Science Teaching

NSF DRK12 Program. DRL-1316683.

Comparison of Means for Pedagogy (UDL) Scores for Treatment Groups

Group	Pretest Mean	Posttest Mean	Normalized Gain Score Mean
Practicum (16)	14.0	18.3	.47
NonPracticum (17)	13.5	17.2	.32
t-test of Difference Between Means	$p < .58$	$p < .31$	$p < .24$

For both groups, post-test scores were significantly higher than pre-test scores at *p < .001* levels.



Practicum-Based Professional Development Model

Community for Advancing Discovery Research in Education

Preliminary Results:

- Both practicum and non-practicum versions of the PD produce significant impacts on proximal measures of teachers' content and pedagogical knowledge

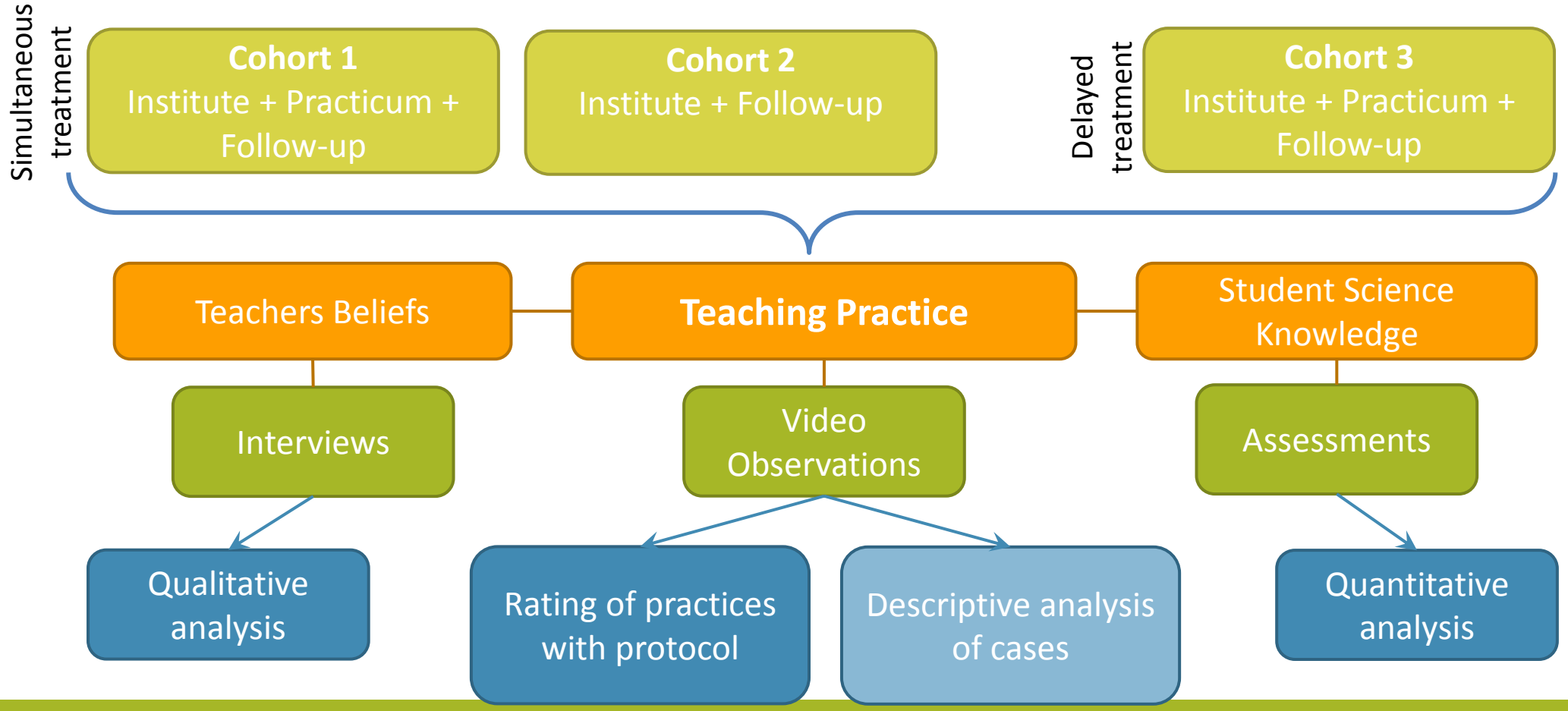
Ongoing Analyses

- Practicum impacts on knowledge-in-use

Community for Advancing Discovery Research in Education

PRACTISE: Practicum-based Professional Learning Model

Research design



Practicum Academy to Improve Science Education
PRACTISE
Lawrence Hall of Science & Stanford Graduate School of Education

Community for Advancing Discovery Research in Education

Research Questions

Study of effectiveness of PL models

In what ways, if any, does teachers' participation in a PD program focused on discourse and argumentation influence classroom discourse practices?

What differences in discourse practices, if any, are associated with teachers' participation in the practicum and non-practicum versions of the PD program?

Study of teaching practice in cases

In what ways do teachers change their practice to enhance classroom discourse and improve students' ability to argue from evidence?

What professional development experiences are associated changes in instructional practice?

Practicum Academy to Improve Science Education
PRACTISE
Lawrence Hall of Science & Stanford Graduate School of Education

Community for Advancing Discovery Research in Education

Data Collection	Year 0 (2012-13)	Year 1 (2013-14)	Year 2 (2014-15)	Year 3 (2015-16)
Cohort 1	Baseline interviews Baseline video obs.	Video observations	Video observations Pre-post students assessments	Video observations Pre-post students assessments Exit interviews
Cohort 2	Baseline interviews Baseline video obs. Video observations	Video observations	Video observations Students assessments (pre-post)	Video observations Pre-post students assessments Exit interviews
Cohort 3 (Started on Year 2)			Baseline interviews Baseline video obs. Pre-post students assessments	**Video observations** **Pre-post students assessments** **Exit interviews**

Practicum Academy to Improve Science Education
PRACTISE
Lawrence Hall of Science & Stanford Graduate School of Education

Community for Advancing Discovery Research in Education

SCIENCE DISCOURSE INSTRUMENT (SDI)

Teacher Practices:

ASK: Nature of Teachers' Questioning

PRESS: Teacher Press

LINK: Teacher Linking of Student Ideas

Student Practices:

EXPLAIN/CLAIM: Nature of Students' Responses

CO-CONSTRUCT: Student Link/Build on Ideas

CRITIQUE: Student Challenge & Critique

Rated on a 0 to 4 scale (Fishman et al., under review)

Practicum Academy to Improve Science Education
PRACTISE
Lawrence Hall of Science & Stanford Graduate School of Education

Community for Advancing Discovery Research in Education

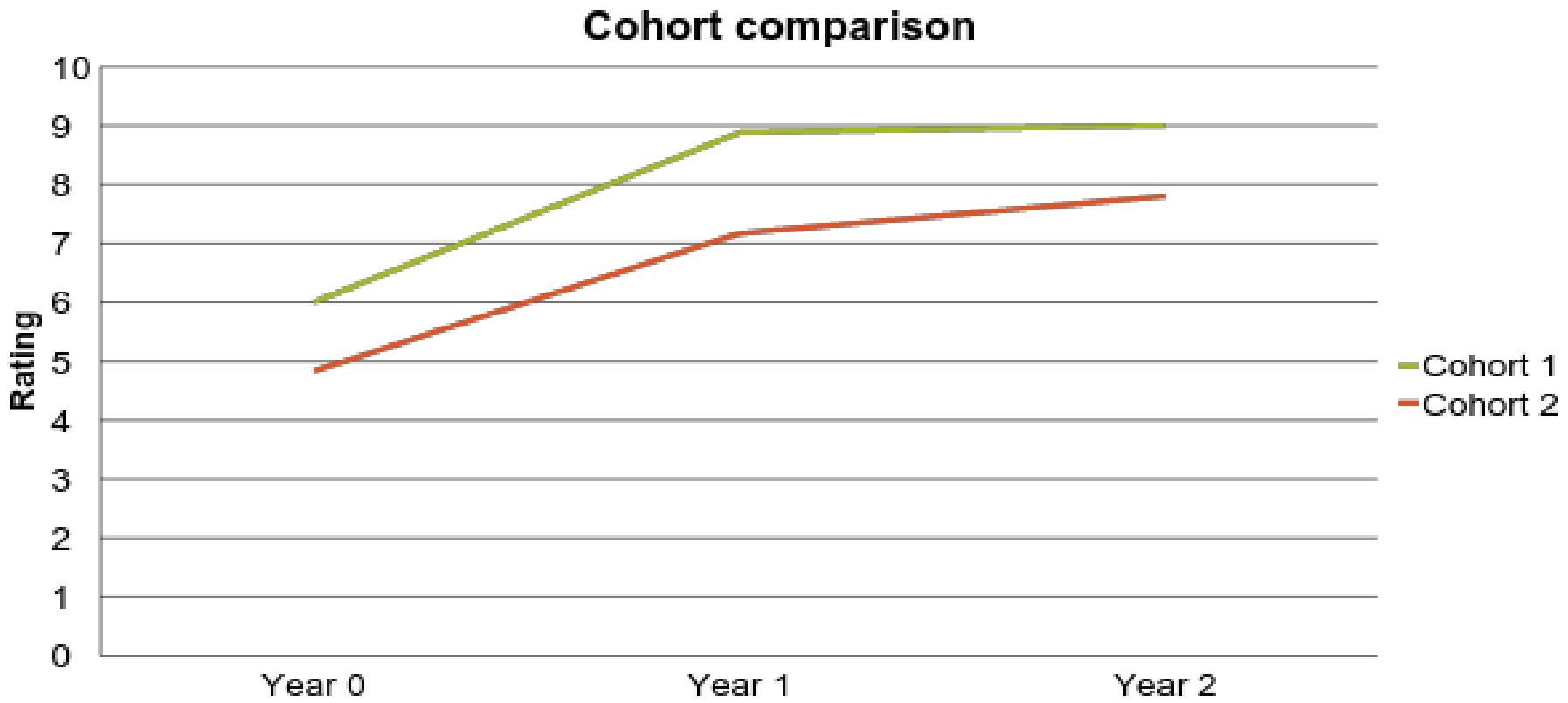
- Factor analyses revealed that it was best to aggregate the teacher and student scores to assess one TEACHER measure and one STUDENT measure

- To address the research questions we ran a split-plot ANOVA with a Cohort x Segment x Time (2 x 2 x 3) design

Practicum Academy to Improve Science Education
PRACTISE
Lawrence Hall of Science & Stanford Graduate School of Education

Community for Advancing Discovery Research in Education

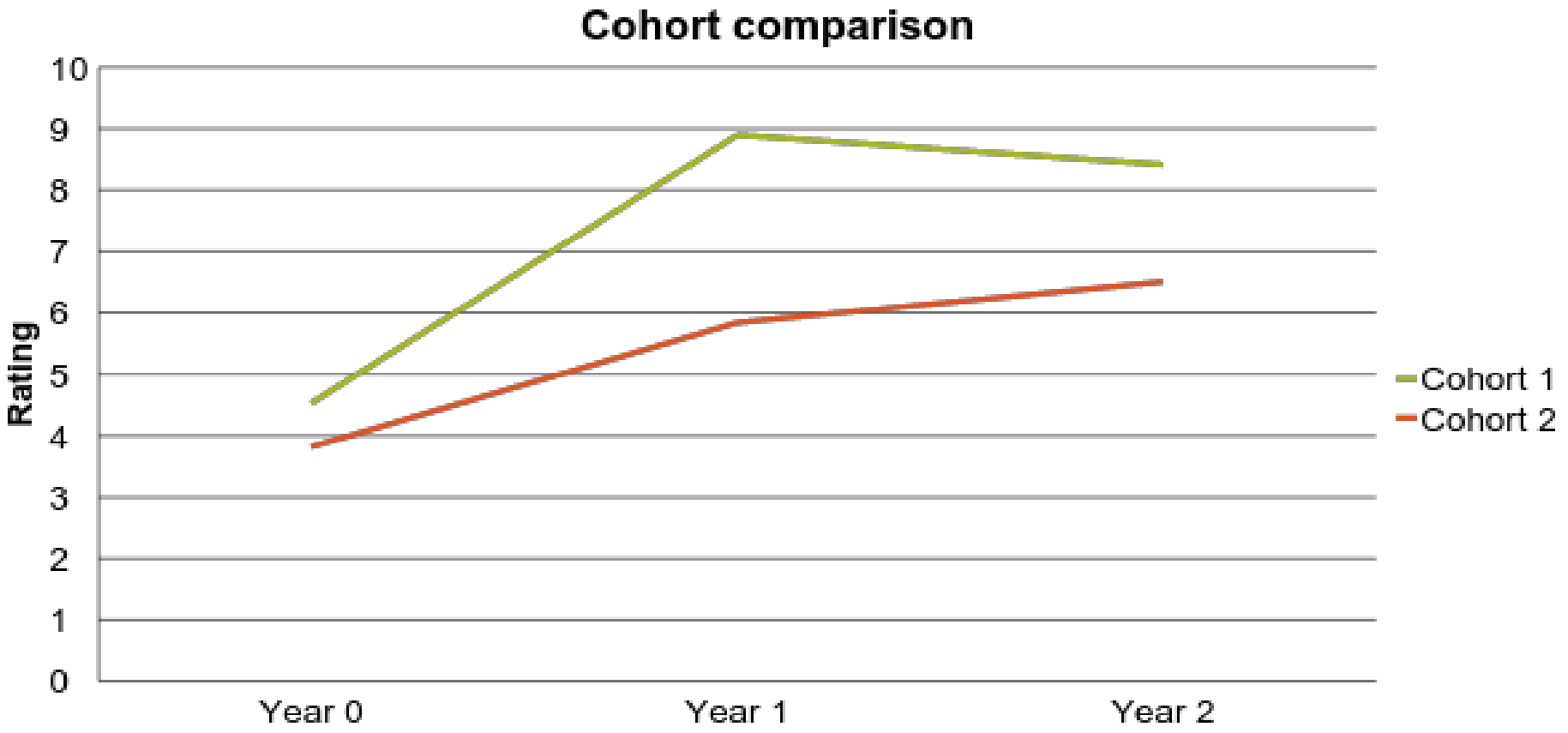
Results: Teacher Measure



Practicum Academy to Improve Science Education
PRACTISE
Lawrence Hall of Science & Stanford Graduate School of Education

Community for Advancing Discovery Research in Education

Results: Student Measure



Practicum Academy to Improve Science Education
PRACTISE
Lawrence Hall of Science & Stanford Graduate School of Education

Community for Advancing Discovery Research in Education

- All teachers in the project made statistically significant improvements in their argumentation practices, as did their students.

- We found that the practicum was a significant factor in improving students' argumentation practices.

QUESTIONS FROM THE AUDIENCE?

(Challenges & Issues are next!)

Challenges:

- Re-assignment of teachers to different grade levels, roles, schools, or districts
- Student mobility & teacher attrition
- Variation in curriculum adoption, lesson-planning requirements, etc.
- Changes to state standards and testing
- Administrative turnover and shifting priorities
- Sensitivity of proximal/distal measures
- Responses to video and observation
- Organic developments vs. controlled experiments

Community for Advancing Discovery Research in Education

Issues & Solutions Breakouts

1. Rigorous research designs vs. reality of change in schools and districts
2. Costs vs. Benefits of Practica: Potential for Scale-up & Sustainability
3. Understanding Impacts- Which are meaningful to measure?