Program Assessment in the Natural Sciences Education Minor :

Scaffolding instruction to improve student learning

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UCMERCED

About the NSED minor

✤ Program housed in School of Natural Sciences

✤ Designed to introduce students of all majors to a career teaching science and/or math

✤ 24 units of coursework

✤ Covers all of the prerequisites for a post-baccalaureate teaching credential program

✤ Provides student financial support in the form of testing reimbursement, travel reimbursement to and from fieldwork and scholarships

- Coursework:

  - Introduction to teaching elementary, middle or high school science and math (NSED 23/33, NSED 43/53, NSED 63/73)

  - Introduction to elementary, middle or high school fieldwork in science and math (NSED 24/34, NSED 44/54, NSED 64/74)

  - Adolescent Psychology

  - Course covering US Constitution (POLI 1 or HIST 16)

  - Upper Division Writing

  - Classroom Interactions-Focus on Equity and Diversity in Rural schools (NSED 120)

  - Project-Based Instruction (NSED 100)

How do you begin to create a "teacher identity" in undergraduate students?

(And how do you know you are successful?)

1. Begin with introductory fieldwork/seminar series to build confidence
2. Develop skills in upper division credential coursework
3. Encourage participation in conferences, workshops, and other professional development experiences
4. Work with mentors who give them valuable advice and guidance

The difference between school and life? In school, you're taught a lesson and then given a test. In life, you're given a test that teaches you a lesson.

—Tom Bodett

Introduction to teaching elementary, middle or high school science and math

Includes a seminar and 30 hours of fieldwork in the local area schools. (Students in minor are required to do two semesters)

At first students just randomly completed any two of the three offered courses.

Problems: (2007-2011)

✤ No common lesson plan rubric for all lower division classes

✤ No way to measure growth of student from one class to the next

✤ No commonality between courses

Upon evaluation of student success and progression, we instituted a scaffolded system to improve student success.

Scaffolding instruction in lower division courses

* **Tier 1 student -** first lower division course - common readings, begin with observations, working in small groups with mentor teacher lead, develop first 5e lesson plan

* **Tier 2 student -** second lower division course- common readings, help with instruction (warmups), lead group discussions, develop second 5e lesson plan

Changes made to course curriculum

✤ Common readings for Tier 1
✤ Common readings for Tier 2
✤ Common lesson plan rubric for Tier 1
✤ Common lesson plan rubric for Tier 2
✤ Common Tier 1 fieldwork assignments
✤ Common Tier 2 fieldwork assignments

Results from first year of deployment

All students were considered Tier 1 for the first year

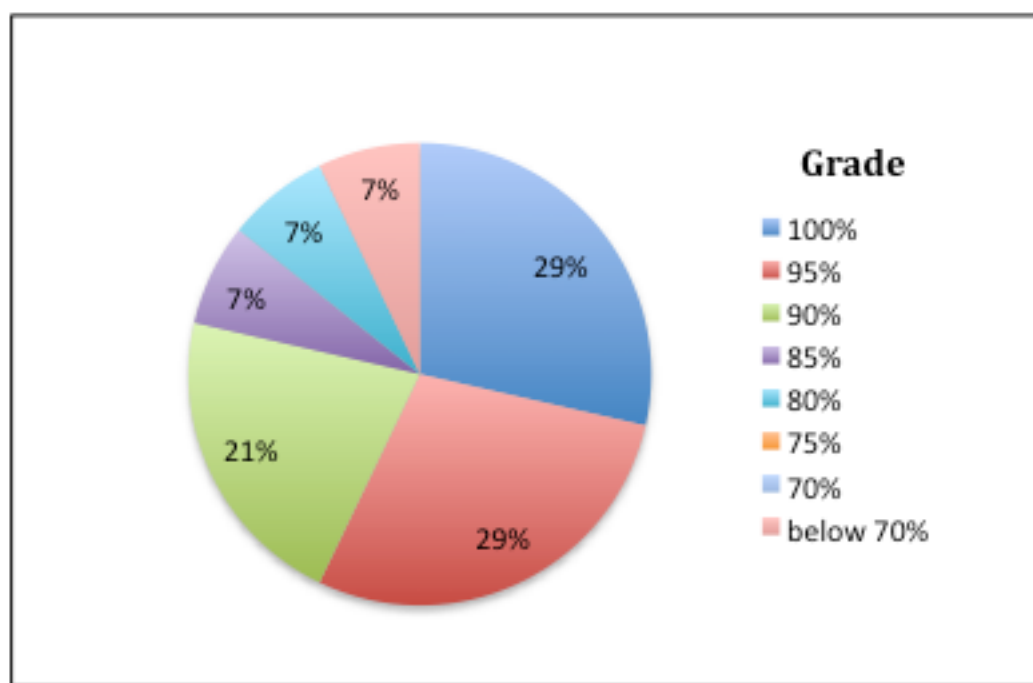Lesson Plan Development Assignment (PLO 2a, 2b)

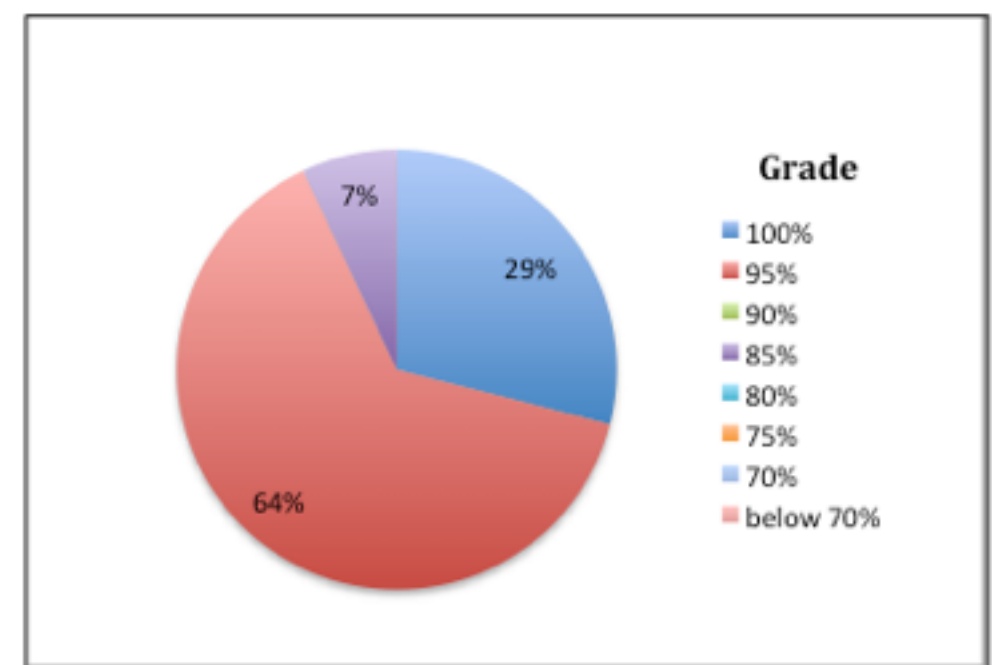| Grade	
■	100%
■	95%
■	90%
■	85%
■	80%
■	75%
■	70%
■	below 70%

Figure 2: Student scores on the lesson plan development assignment in NSED 63/73 in Fall 2013. Total number of students enrolled in the course was 14.

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Figure 1: Student scores on the lesson plan development assignment in NSED 23/33 in Fall 2013. Total number of students enrolled in the course was 14.

Problem: we realized that instructors graded very differently even though rubrics were common….

Results from second year of deployment

Rubrics were calibrated for consistency and had to be adjusted to reflect faculty expectations
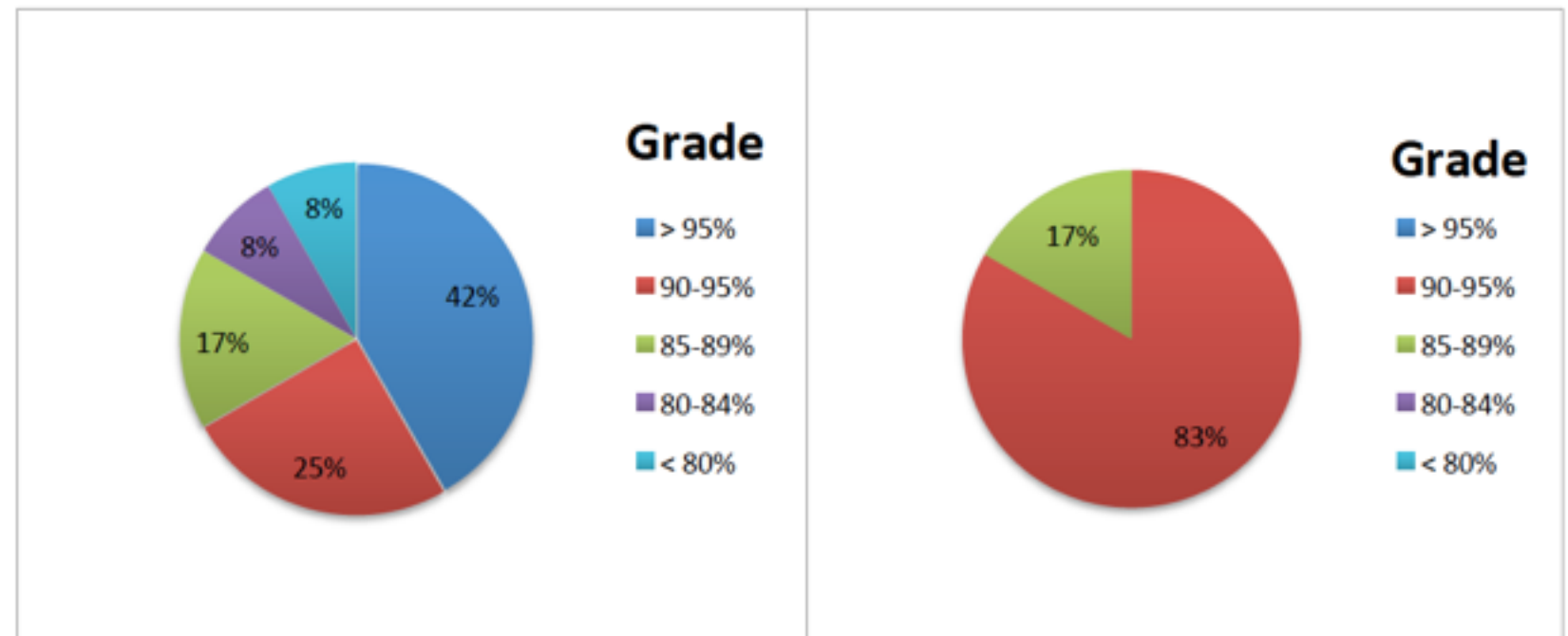

Figure 1: Student scores on the lesson plan development assignment in NSED 23/33 in Fall 2014. Total number of students enrolled in the NSED 23/33 course was (12) tier 1 students and (6) tier 2 students. One student did not complete the assignment.
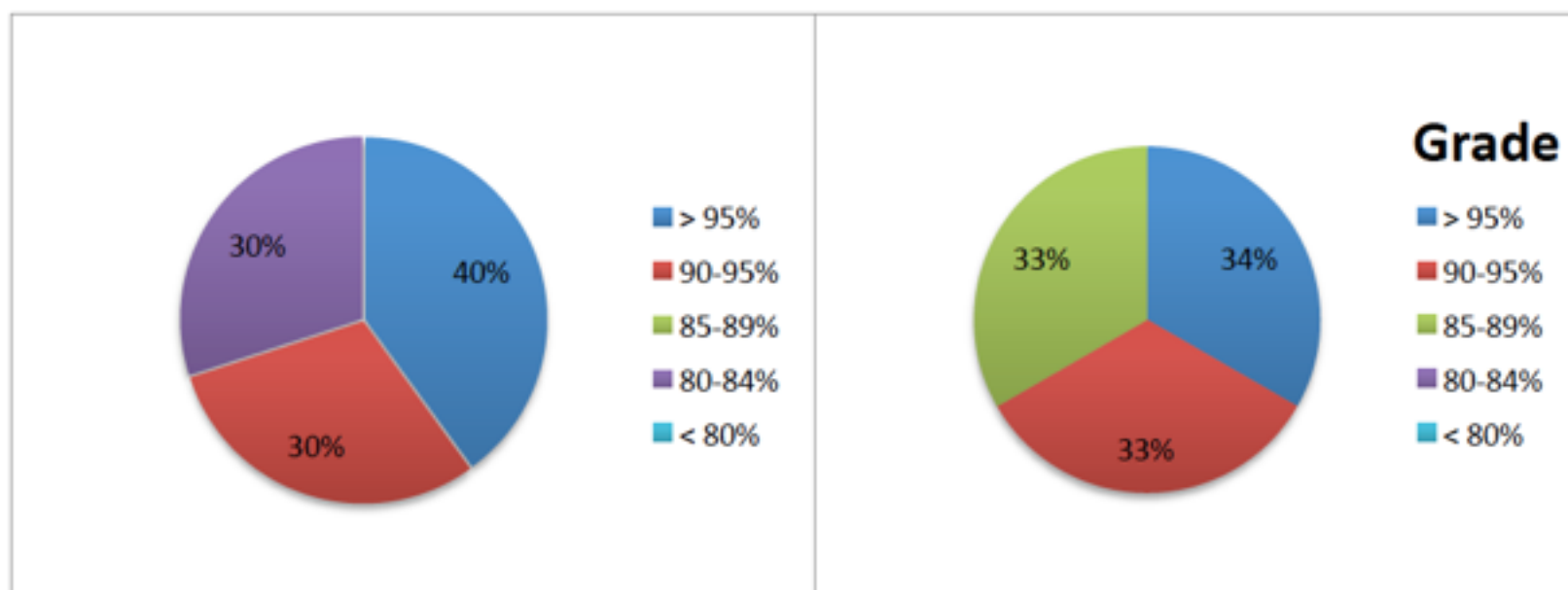

Figure 2: Student scores on the lesson plan development assignment in NSED 63/73 in Fall 2014. Total number of students enrolled in the NSED 63/73 course was (10) tier 1 students and (3) tier 2 students.

Starting to see a shift to higher grades indicating progression from Tier 1 to Tier 2

Concluding remarks

Scaffolding instruction creates an environment of growth

This growth can be documented by both direct and indirect evidence

Creation of a "teacher identity" in part relies on meaningful sequential experiences that help build confidence and understanding

Future plans

✤ Capturing student growth in other meaningful ways
  ✤ Tier 2 assignment where students reflect on their Tier 1 lesson plan and feedback from their mentor teacher with their Tier 2 lesson plan/feedback
  ✤ Building of a "portfolio" of student work to show growth