



The Impacts of Blending the High School Advanced Placement Chemistry Classroom on Student Engagement and Performance

Jennifer Owen, Kiel High School
Kiel, Wisconsin



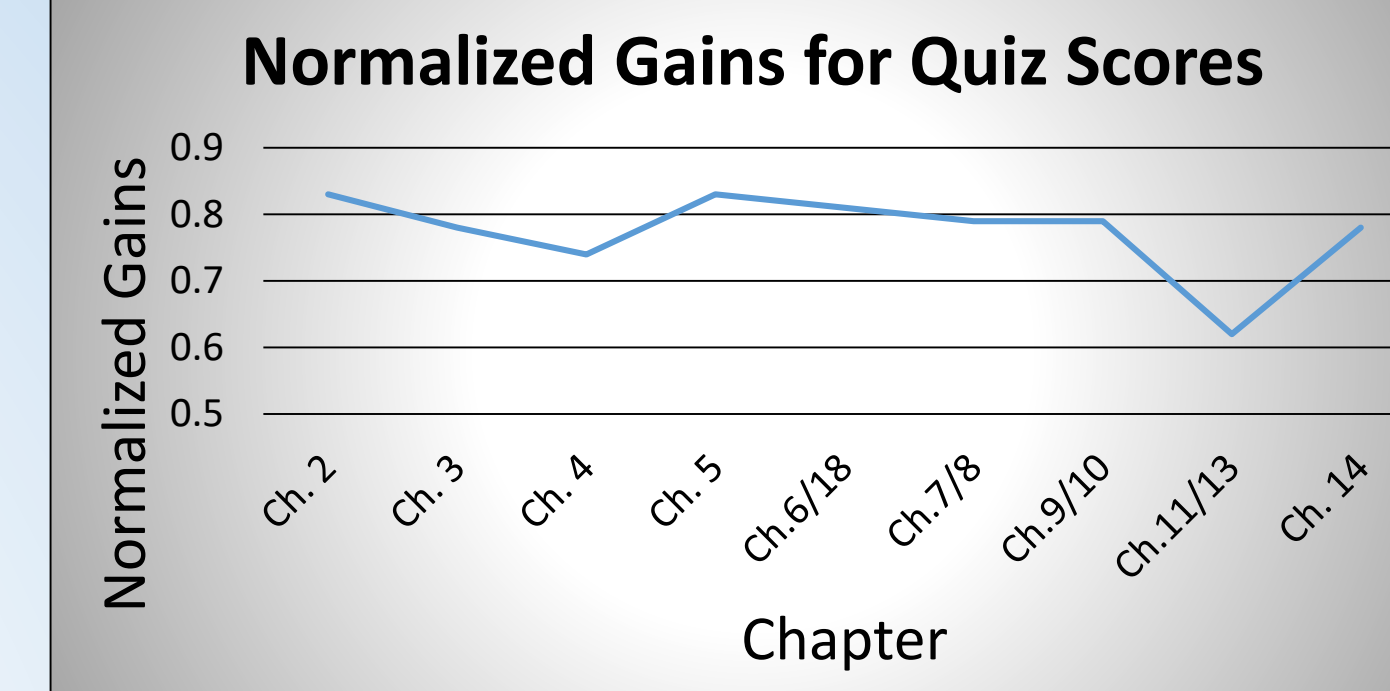
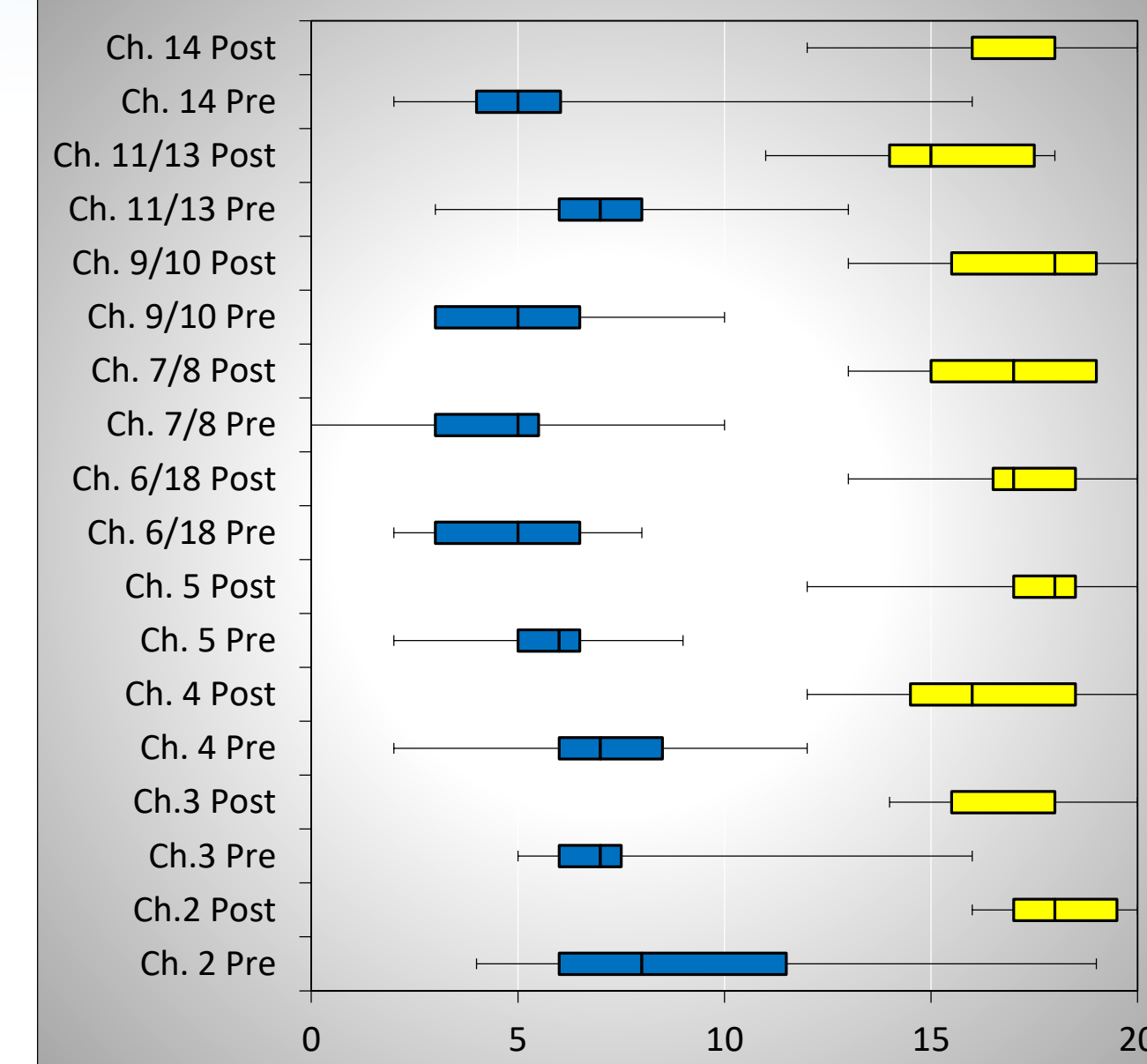
Background

- 2 credit course
- Full block for entire school year
- Burnout near end of term 2
- Disappointing performance on AP Exam
- **Objective:** provide students a path to *personalizing* their learning through *blended* practices
 - gain a *deep understanding* of content
 - *retain* the material
 - *apply* the concepts on the AP Exam and at the next level.

Questions

- **Essential Question**
 - How does a blended classroom impact academic engagement and student performance in a combined junior and senior level AP chemistry classroom?
- **Sub-Question 1:**
 - Does the blended format increase student *engagement* in a combined junior and senior level AP chemistry classroom?
- **Sub-Question 2:**
 - Does the blended format increase student *performance* in a combined junior and senior level AP chemistry classroom?

Data



Class pretest and post-test scores prior to treatment, chapters two and three, and during treatment, chapters four through fourteen and eighteen, (N=15).

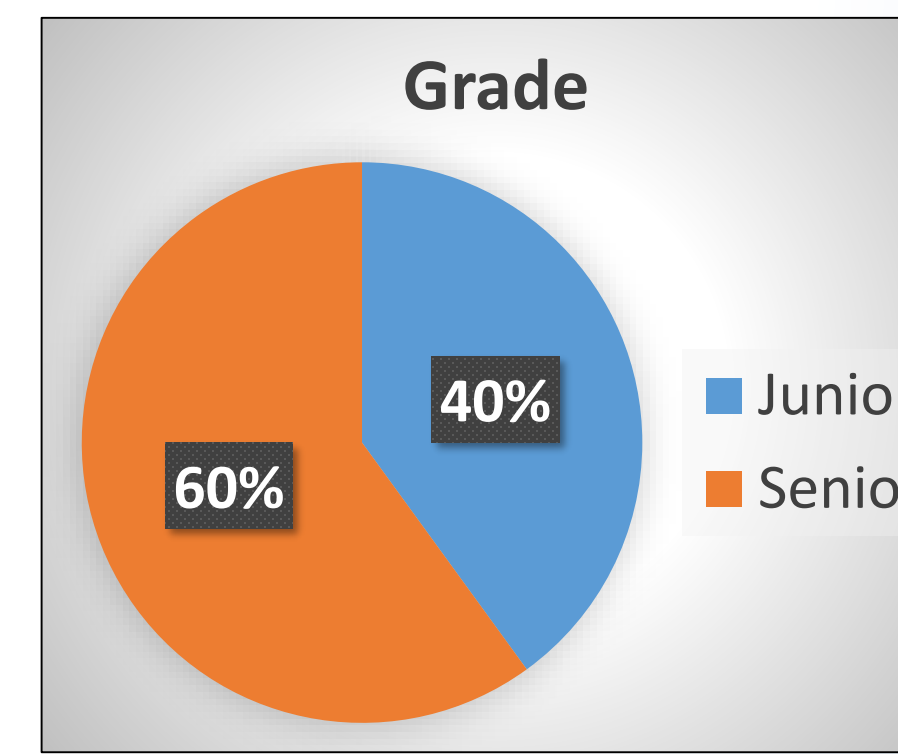
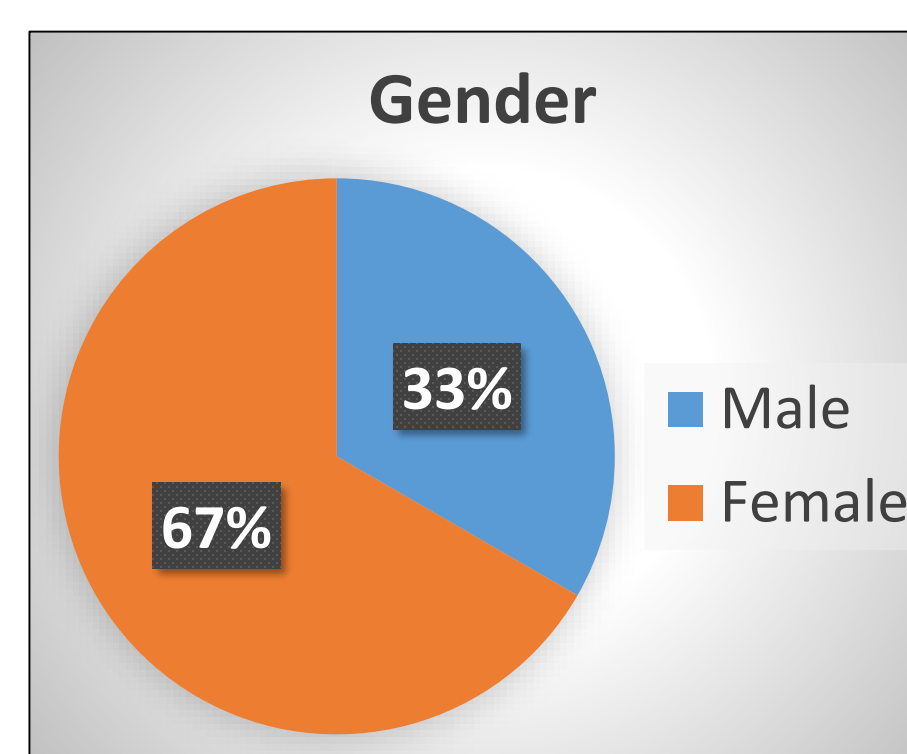
Traditional Classroom

- Paper and Pencil Warm-Up
- Lecture
- Text Book Homework
- Laboratory Exercises
- Performance Assessments
- Quizzes
- Paper/Pencil AP Prep

Blended Classroom

- Interactive Warm-up
- Interactive Background Content
- Shorter Lectures
- Mastering Chemistry Homework
- Laboratory Exercise
- Quizzes
- Blended AP Prep

Demographics



Qualitative Analysis

- **Student Feedback:**
 - Appreciated flexibility
 - Continue to increase course rigor
 - Incorporate more AP passages on assessment
 - Mixed perspectives on MasteringChemistry™
- **Likert Findings:**
 - Shift in mindset to include finding value in varied resources
 - Continued to strongly value traditional content delivery methods

Treatment

- Introduce technology rich and blended resources *systematically* throughout the **treatment period**
- Plickers technology-rich warm-up with AP exam questions
- Mastering Chemistry interactive online homework (hints, enhanced feedback, and adaptive follow-up)
- Blended resources (found videos, teacher created videos, virtual labs, virtual flashcards, pHet simulations, diagrams, etc) for background content
- Kahoot reviews
- Implement student feedback and resources

Data Collection

- **Sub-Question 1 Data (Engagement):**
 - Pre- and post-treatment surveys
 - Homework completion rates
 - Adaptive follow-up attempts
 - Monitor evolution of question from superficial, what do I do next, to deeper inquiry based questions
 - Monitor in-class participation
 - Plus (+) / Delta (Δ) focus group
- **Sub-Question 2 Data (Performance):**
 - Pre-test vs. Post-test results
 - Number of individuals needing to retake post-test
 - Midterm exam results
 - Practice AP exam results as predictor for AP score

Conclusions

- **Analysis of the Blended Learning Environment**
 - Confirmed research: Results of blending not always statistically significant
 - Fosters environment for deeper thinking and questioning
 - Improved students' engagement, self-regulation, and intrinsic motivation
 - Students more open to blended environment after treatment period
 - Slow, systematic changes essential to successfully blending a class
- **Value of the Blended Learning Environment**
 - Enhances traditional learning environment
 - Flexibility (pace, delivery method, student practice, review methods, AP prep)
 - Increased student engagement during entire course
 - Better in-class assessment performance
 - Increased individual, or small group, teacher contact time
 - Student's taking more ownership of learning path