



UNITED STATES MILITARY ACADEMY
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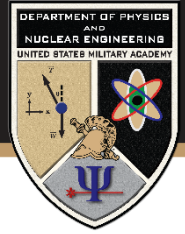
Establishing and Developing a Scientific Writing Framework for Students in Introductory Physics

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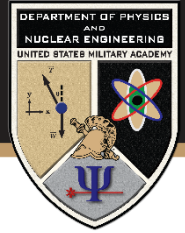


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Agenda



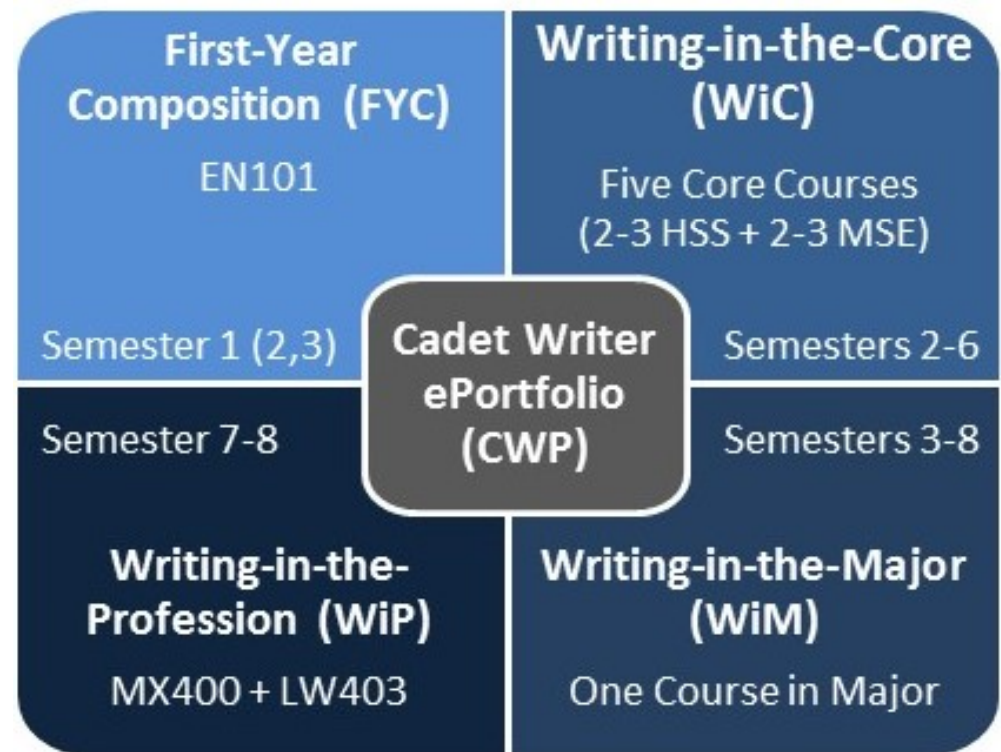
- Background & Motivation
- Results
- Conclusion
 - Summary
- Question

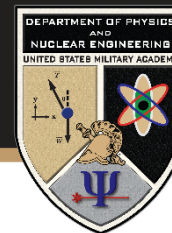


West Point Writing Program (WPWP)

Background

- -United States Military Academy conducted a thorough review of the core curriculum, with changes taking effect in 2015.
- -Two writing-intensive courses (One semester of English and one semester of History) were removed.
- -In order to offset the loss of these writing experiences, USMA created the West Point Writing Program to formulate the developmental process of writing across the entire four year experience



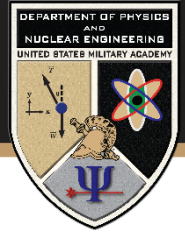


Execution

- WPWP developed a pedagogical model for writing the ~~WPWP~~
- “Writing in the Core” includes a “Signature Writing Event” (SWE) in the third science course.
- We are responsible for PH206, one of the third science options.
 - Writing requirements are integrated into the laboratory experience
 - Low stakes writing
 - One or two components of a larger effort
 - End of the semester high stakes SWE.

PEDAGOGICAL MODEL

1. Cadets are asked to use **low or no stakes writing** to engage with primary material in the course. (E.g. brief summaries or reflections, problem statements, discussion questions, reading responses, journaling, learning logs, case briefs, rhetorical or stylistic exercises, etc.)
2. Faculty explain a major writing assignment in part by **distributing and discussing in class guidelines and multiple examples** for the products Cadets author. (Examples may be accomplished or ineffective, drawn from scholarly or professional writing in the field or from student or faculty writing at USMA or elsewhere.)
3. Cadets are asked to complete **planning or prewriting activities** inside or outside of class in relation to a major writing assignment. (E.g. annotating, brainstorming, freewriting, blogging, clustering, dramatizing, concept-mapping, outlining, etc.)
4. Cadets are asked to **iteratively draft one or more key components** of a major writing assignment inside or outside of class. (E.g. theses, hypotheses, introductions, methods or results sections, literature reviews, conclusions, abstracts, charts, tables, figures, or other discrete elements.)
5. Faculty provide Cadets with **feedback on ungraded drafts or pieces of drafts that Cadets may use to revise** before submitting a major writing assignment. (Feedback may be oral or written; it should be tailored to the Cadet and delivered in a timely fashion.)
6. Cadets are asked to conduct **collaborative, team-based conferences or workshops with each other inside or outside of class that centrally involve writing**. (Cadets can be organized in small groups of any number to work with each other toward outcomes clearly specified in guidance from instructors.)
7. Cadets are asked to **reflect** on the strengths and weaknesses of their writing process and products in organized, formal ways. Reflections may be graded or ungraded. Consider having Cadets craft **reflective cover letters** to accompany major written graded events or providing other opportunities for them to examine their writing critically. *Note: as a Program requirement, all Signature Writing Events will have a reflective component NLT AY19. Thus, all WPWP courses will eventually include this approach.*



WPWP LAB Rubric

- [A]** • 5/5 – Nearly perfect paper. A few minor issues but overall perfection for writing within the Physics Field

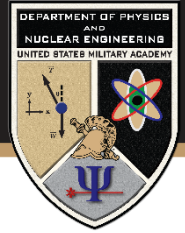
- [B]** • 4/5 – Several technical issues arise.
 - Incorrect use of passive vs. active voice
 - Slips into first person writing: “I did this... I did that...”
 - Subject verb dis-agreement: “The meters reads....” Instead of “The meters read...”
 - Incorrect complex grammar: “...the oranges and bananas were yellow and orange respectively”
 - Casual writing: “OMG, then the multimeter exploded in front my bro’s face”
 - Incorrect grammar

- [D]** • 3/5 – The technical issues mentioned above are more numerous, but the document still effectively communicates the general idea. Directions not followed: No sentence/paragraph structure. No required supporting documents like figures, tables, or equations.



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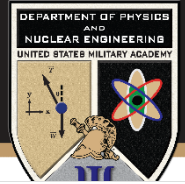
Background & Motivation



PH206

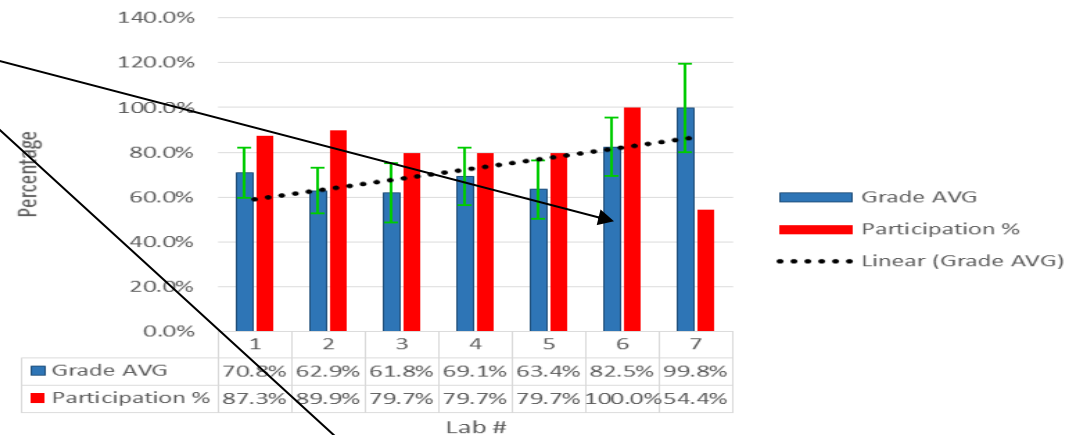
WPWP LAB Prac Rubric

- [F]** • 2/5 – Answers the prompt but does not use any writing format. Writing is attempted but is very poor English
- [F]** • 1/5 – Turns in document but fails to meet any standards and writing is mainly nonsensical
- [F]** • 0/5 – Does not do assignment. Don't follow up with CORs or forced submissions, this is low stakes

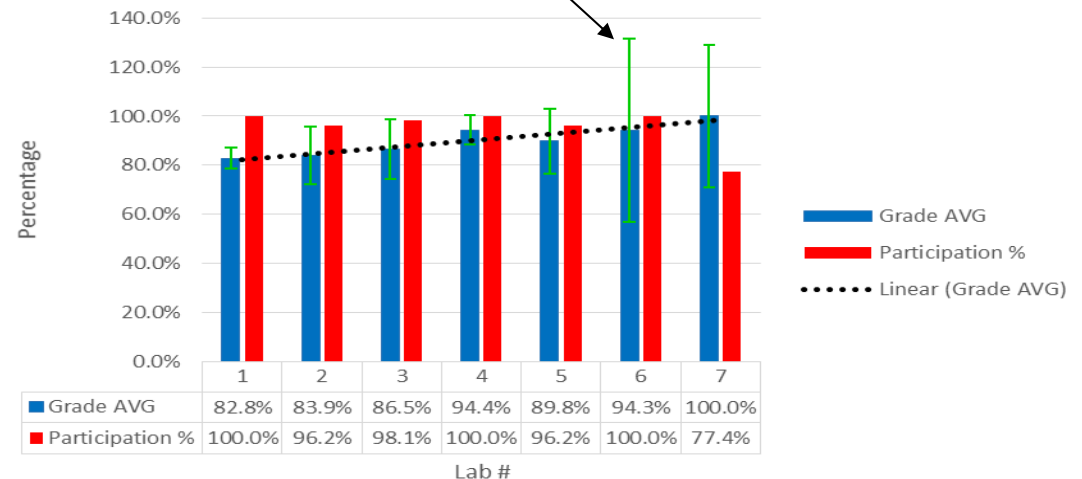


- LAB 6 is the high stakes signature writing event (SWE)
- Both the traditional and advanced courses in PH206 (Physics II) showed an improvement
- Grades increased in PH206 from 60% to 80%
- Traditional PH206 students start off considerably lower in average grades, but both groups improved.
- All students show some sort of improvement in style and presentation
- Most students appreciate this amendment rather than adding a separate English course to help grow their writing ability
- PH256 Diverged at the SWE
- PH206 did not converge or diverge throughout the course.

PH 206 Grade Comparison

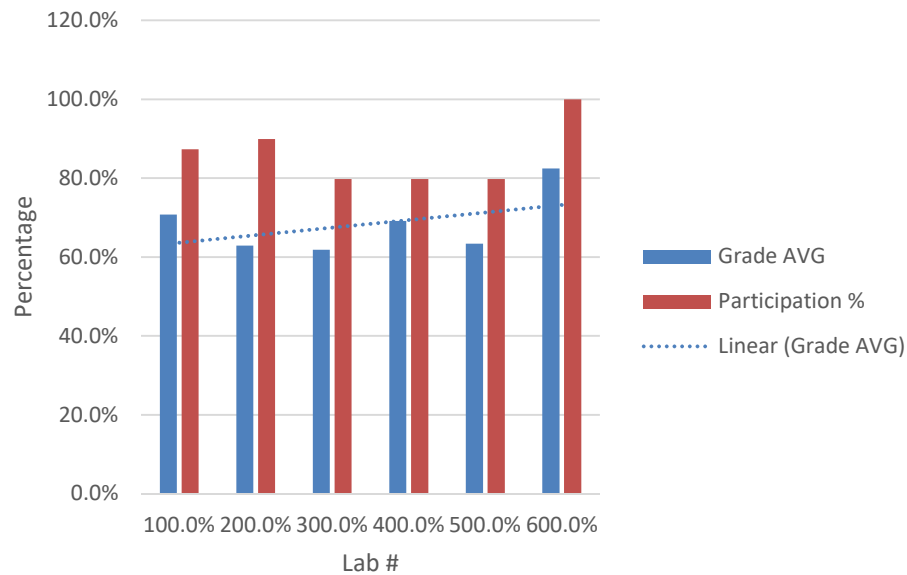


PH 256 Grade Comparison

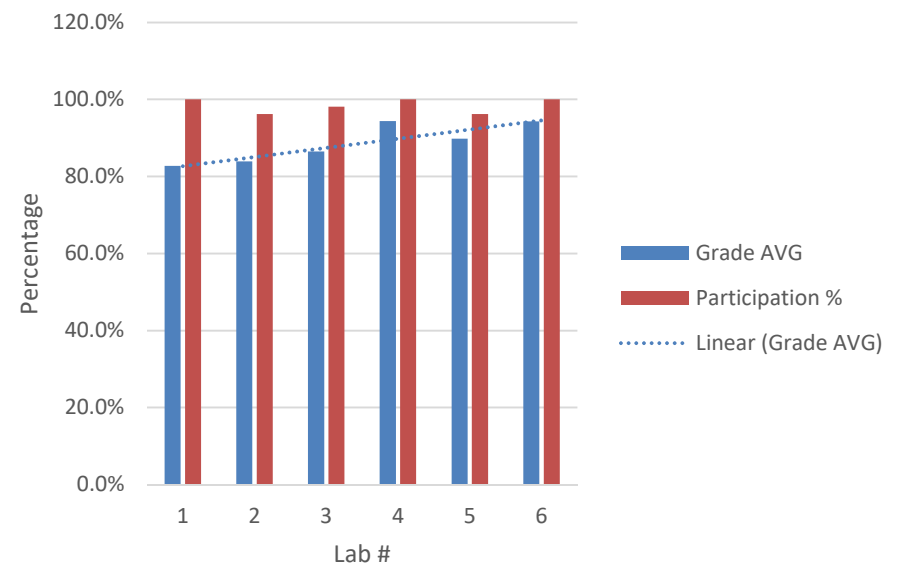




PH206 WPWP Grade Progression w/out Lab 7



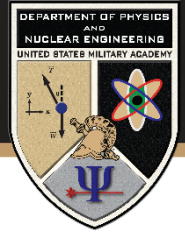
PH256 WPWP Grade Progression w/out Lab 7





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Summary & Future Work



Summary

- Scientific writing ability can be improved with low stakes events
- Regardless of starting point, most students can expect to improve their scientific writing in a semester
- Students appreciate the low stakes events and value the feedback

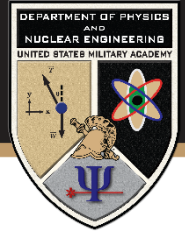
Future Work

- Increasing the amount of low stakes events
- Adjusting the required length of each assignment
- Joining the requirements of our assignments with the requirements in other STEM departments.



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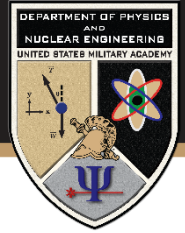
Questions?



- Questions?



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PH206

WPWP Signature Writing Event

SWE (50 pts)

- Two pages of writing with a handout (no coversheet)
 - No internet during
- It is Lab 7
- CDTs will keep a copy in their writing e-portfolio
- Prompt and criteria given ahead of SWE
- Remainder of situation and data provided during SWE
- Lab Pracs should build CDTs up to SWE
- Follow Cutsheet
- Authorized references
 - HRW (hard or downloaded)
 - SLAM
 - Labs
 - Physical Demo