

Collaborating between Writing and STEM: Teaching Disciplinary Genres, Researching Curricular Interventions, and Engaging Science Audiences

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Phase I: Need for Curricular Intervention

- Physics faculty observe that students lack writing skills, particularly with genres of writing in their field of study
- Writing taught sporadically in undergraduate curriculum
- Faculty training typically does not prepare to teach writing
- Curriculum must prepare students for variety of careers
- Report by Joint Task Force on Undergraduate Physics Programs → revise the curriculum with emphasis on communication

Curricular Collaboration: Physics and Writing Faculty

- Introduce concepts from Writing Studies to Physics faculty
- Demonstrate that students can be taught writing conventions of physics, and that faculty can do this teaching
- Collaborate on development and dissemination of physics-specific curricular materials
- Research how teaching physics genres enables students to conceptualize themselves as emerging scientists

Phase II: Physics and Writing Research

- **Interdisciplinary study** between Physics Department and University Writing Program, in parallel with curricular revision
- **Research question:** Does instruction in genre and understanding audience improve undergraduate writing in physics?

Identify key genres of physics writing

Collect student writing in these genres

Develop rubrics to code and evaluate writing

Perform quantitative and qualitative analysis

- **Longitudinal study:** collect student writing from courses spanning the sophomore, junior, and senior year
- **Comparative study:** collect student writing from before and after the introduction of explicit writing genre instruction

Phase III: STEM and Writing Faculty Collaboration

- Expanding from Physics to STEM with monthly seminar series between STEM and Writing Faculty
- Share research from Writing Studies and STEM
- Exchange pedagogical interventions related to writing
- Develop in- and external community of research and practice

Professional Organizations and Funding Agencies

- American Physical Society funds for curriculum development
- University funding to create data and build research team
- National Science Foundation grant applications to further develop research study in physics

Future Writing and STEM Collaborations

- Further expand the community by disseminating findings to STEM faculty and Writing Studies scholars
- Continuation and broadening of student writing assessments throughout the STEM curriculum
- Future grant applications by Writing and STEM faculty together

New Physics Learning Goals

Familiarity with physics genres

Proficiency in communicating ideas & research

Capacity to communicate with various audiences

Active participation in peer review

Analysis & reporting on articles & proposals

Applications for competitive opportunities & jobs

Curricular Interventions: Genres in Physics (Written materials for research study in boldface)

Abstract Physics Today Article
Oral summary without slides

Summary Research Article
Oral summary with slides

Abstract Research Project
Presentation with slides

Cover letter & Resume Careers & Applications
Elevator pitch

Abstract for research Proposal
Presentation for outreach

Presentation on research ethics and issues of equity

Lab research reports

Poster on lab project

Final report on research

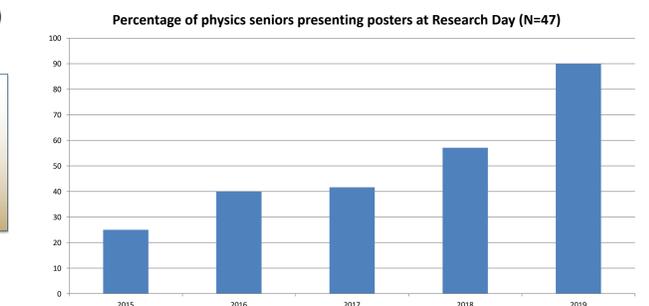
Symposium Presentation

Poster at Research Days

Current Research Status

- Collected student writing from all relevant courses
- Developed rubrics and training packets for coders
- Evaluated and rated all abstracts, posters and graphs from 2017 to 2019

Increased student engagement



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