Effects of Discourse and Experience on Student Choice of Biology STEM Majors in Higher Education

SPENCER SMALL GRANT PROPOSAL

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DECEMBER 3, 2020

Choice of STEM Majors

- How do students select majors in college?
- Which influences were most important?
- What happens if they make the *wrong* choice?
- What determines *wrong* or *right*?
- Who must be satisfied?

Driving Force

https://pbs.twimg.com/media/CmnwawoWYAI3KRn?format=jpg&name=medium

- STEM is integral to most aspects of everyday life
- Growing STEM-related industries require increasing numbers of qualified STEM graduates
- Emphasis on encouraging student interest enrollment in STEM fields

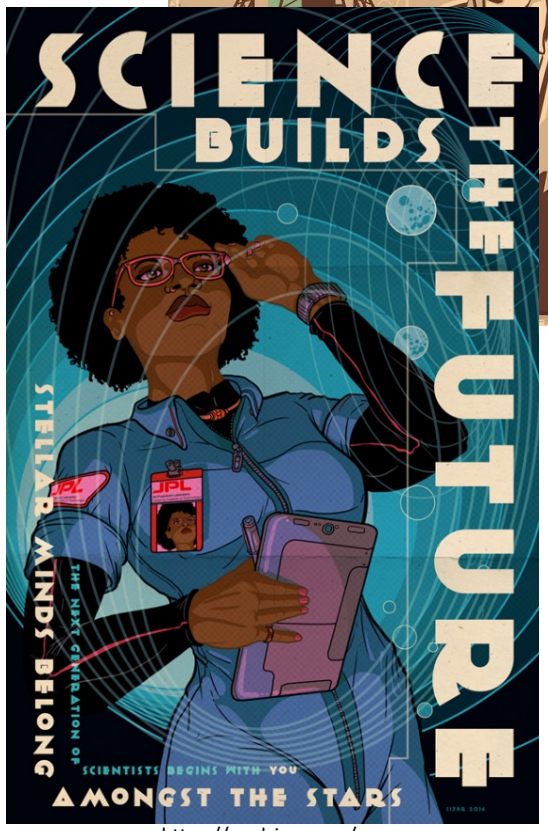
Outreach and Engagement

https://uwosh.edu/stem/wp-content/uploads/sites/24/2015/03/STEMOUTREACHbanner_1.jpg

https://www.pbs.org/video/stem-outreach-aien1q/

- Promotes STEM through engaging and enjoyable activities
- Pervasive through all levels of pre-college education
- Generally effective at increasing student interest and enrollment in STEM
- Identification with STEM is key

https://thumbs.dreamstime.com/b/retro-style-science-propaganda-poster-vintage-placard-young-scientist-space-rocket-spacecraft-drawings-colors-grunge-texture-169706106.jpg



https://paulsizer.com/wp-content/uploads/2017/02/sizer_posters_science4_11x17.jpg

Outreach and Engagement

- Works to help students identify a role for themselves in STEM
- Supports providing information and experiences supporting engagement
- Constitutes a discourse with students, relating the potential of a future in STEM

Discourse

- An exchange of information meant to initiate change
- May include oral, written, and experiential exchanges
- Context is important to meaning
- Diverse audiences may require contextual cues

https://www.valdosta.edu/student/diversity/images/sdi-students-in-a-row.jpg

Interest ≠ Persistence

https://media.edutopia.org/styles/responsive_1100px_original/s3/masters/d7_images/cover_media/terada-169hero-mathanxiety-shutterstock_0.jpg

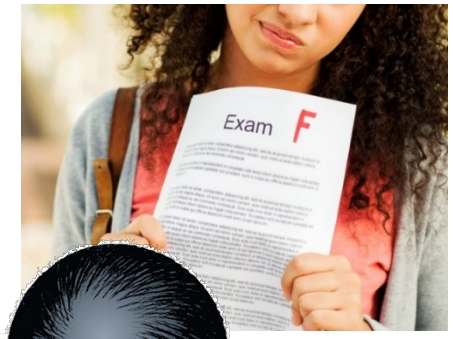
https://www.smart529.com/content/dam/smart529/en/images/elementarySchool-498651297.jpg

https://www.123rf.com/photo_147696449_coronavirus-covid-19-infected-blood-vial-in-hand-of-female-doctor-with-surgical-mask-and-glows-coron.html

- Feeling underinformed about STEM
- High attrition rates from college STEM programs
- Misunderstanding of student decision-making
- Disparity between *need for* and *needs of* STEM students

Consequences of Choice

https://www.cabrini.edu/globalassets/images-blog/2020-2021/anousha-qureshi/college-majors-.jpg



https://i0.wp.com/www.helpwithassignment.com/wp-content/uploads/2019/08/bad-grades-in-college.jpg

https://world.edu/wp-content/uploads/2016/10/studentloandebt.jpg

- To-Do: Persist, change majors, or drop out?
- Negative impacts on learning and performance
- Prolonged enrollments and increased financial burdens
- Loss of opportunities

Goals of Study

- Examine influence of discourse and experience on STEM choice
- Improve understanding of this influence on immediate and long-term STEM major decision making
- Inform future efforts for persistent STEM recruitment

Research Questions

- How did pre-college STEM-related experiences impact student decisions to pursue a university biology degree?
- What impact did pre-college STEM-related discourse have on student decisions to pursue a university biology degree?

Theoretical Framework

- Post-Structuralism (Foucault)
  - Embraces
    - The multiplicity in meaning and subjectivity of interpretation
    - Recognizes power disparities arise during social interactions
- Critical Discourse Analysis (Fairclough)
  - Examines how information is
    - Assembled by an author and presented to a recipient
    - And the context which influenced its creation

Theoretical Framework

- Study examines
  - Self-described experiences influencing choice of college STEM major
  - Influences on students' ability to identify with their selected STEM field
- Relates
  - How experiences and supporting discourse were encountered, received, and impacted STEM perceptions

Methods - Qualitative

- Phenomenology
  - Shares characteristics with Constructivism
  - Examines the essence of experiences through participant description
  - Draws meaning from the uniqueness of personal lived experiences

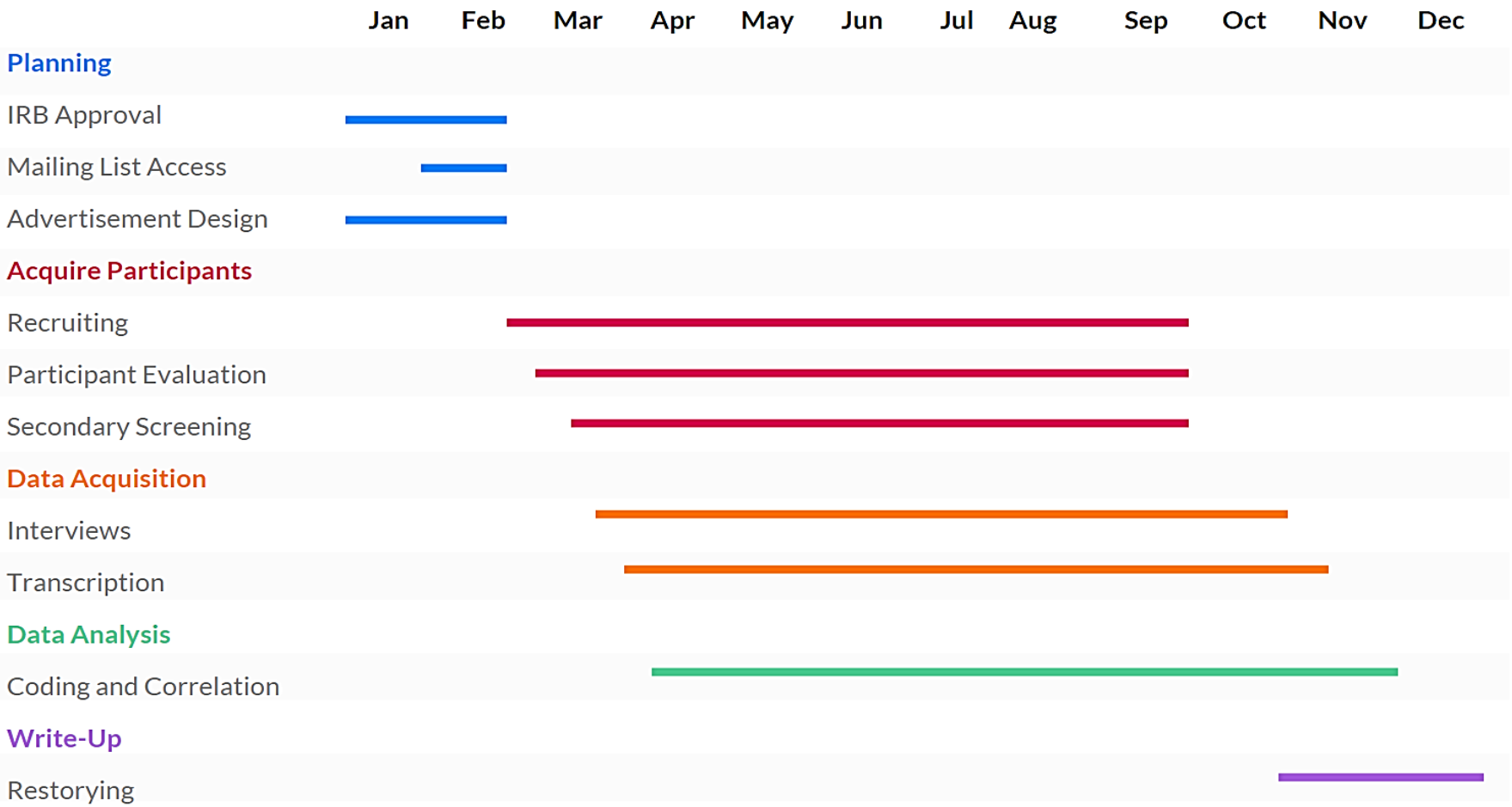
Methods – Study Groups

- Context
  - University students who are or were previously discontented within their chosen STEM majors
- Biology or Transfer Groups
  - Current biology majors or previous biology students who have changed to a non-STEM major

Methods – Data

- Semi-Structured Interviews
  - Guided by research questions
- Thematic Narrative Analysis
  - Focus on the thematic meanings of what is told
  - Illustrates significance of lived experiences
  - Concurrent with data collection

Timeline - 2021



Gantt depiction: Concurrent data collection and analysis result in overlapping activity windows.

Budget

- Salaries (1 fiscal year)
  - Principal Investigator $18,538 (12 months, 0.5 FTE)
- Benefits
  - Tuition & Fees $9,992 (two semesters)
- Travel $1,500 (conference fees, transport, lodging)
- Equipment and Software $1,000 (HQ audio recorder/mic, analysis software)
- Project Expenses
  - Supplies $500 (office supplies, notebooks, digital storage)
  - Transcription $3,600 (approximately 20 x 2 hour at $1.50 per minute)
  - Participant Gift Cards $500 (approximately 20 at $20 to $25)
  - Miscellaneous $500 (reference materials, copies, PPE materials)
- **Total Projected Costs** **$35,230**