Student Mindsets: Exploring the Undergraduate Research Classroom

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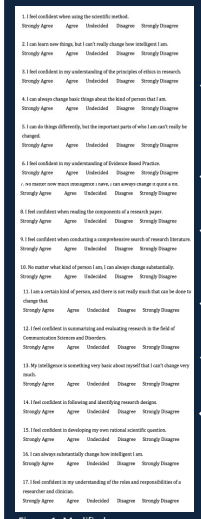
Background

- Undergraduates who engage in research experiences early in their programs have positive academic outcomes (Brownell & Swaner, 2009; Nagda et al., 1998).
- Undergraduate research experiences improve confidence and understanding in the research process (Kuh, 2009).
- Web-based surveys show that 83% of students perceived increased understanding of how to conduct a research project and an increased confidence in research skills (Russell, Hancock, McCullough, 2007).
- American Speech-Language-Hearing Association (ASHA) emphasizes importance of undergraduate research, applying the following standard for certification in speech language pathology: "The applicant must have demonstrated knowledge of processes used in research and of the integration of research principles into evidence based clinical practice."
- Preliminary analysis of research course reflections show evidence that some Communication Sciences and Disorders(CSD) students are intimidated by hard sciences and research.
  - Dweck and colleagues have written extensively about how implicit mindsets can constrain students' ability to learn about intimidating topics/concepts (Yeager & Dweck, 2012; Dweck, 2006).
  - The current investigation sought to examine the influence of mindsets on development of perspectives within a freshman-level research course in CSD.

Methods


1. I feel confident when using the scientific method.
Strongly Agree Agree Undecided Disagree Strongly Disagree

2. I can learn new things, but I can't really change how intelligent I am.
Strongly Agree Agree Undecided Disagree Strongly Disagree

3. I feel confident in my understanding of the principles of ethics in research.
Strongly Agree Agree Undecided Disagree Strongly Disagree

4. I can always change basic things about the kind of person that I am.
Strongly Agree Agree Undecided Disagree Strongly Disagree

5. I can do things differently, but the important parts of who I am can't really be changed.
Strongly Agree Agree Undecided Disagree Strongly Disagree

6. I feel confident in my understanding of Evidence Based Practice.
Strongly Agree Agree Undecided Disagree Strongly Disagree

7. No matter how much intelligence I have, I can always change a quite a bit.
Strongly Agree Agree Undecided Disagree Strongly Disagree

8. I feel confident when reading the components of a research paper.
Strongly Agree Agree Undecided Disagree Strongly Disagree

9. I feel confident when conducting a comprehensive search of research literature.
Strongly Agree Agree Undecided Disagree Strongly Disagree

10. No matter what kind of person I am, I can always change substantially.
Strongly Agree Agree Undecided Disagree Strongly Disagree

11. I am a certain kind of person, and there is not really much that can be done to change that.
Strongly Agree Agree Undecided Disagree Strongly Disagree

12. I feel confident in summarizing and evaluating research in the field of Communication Sciences and Disorders.
Strongly Agree Agree Undecided Disagree Strongly Disagree

13. My intelligence is something very basic about myself that I can't change very much.
Strongly Agree Agree Undecided Disagree Strongly Disagree

14. I feel confident in following and identifying research designs.
Strongly Agree Agree Undecided Disagree Strongly Disagree

15. I feel confident in developing my own rational scientific question.
Strongly Agree Agree Undecided Disagree Strongly Disagree

16. I can always substantially change how intelligent I am.
Strongly Agree Agree Undecided Disagree Strongly Disagree

17. I feel confident in my understanding of the roles and responsibilities of a researcher and clinician.
Strongly Agree Agree Undecided Disagree Strongly Disagree

Figure 1. Modified Personal Belief's survey (Flores, 2006)

- In Fall 2015, CSD 235: Undergraduate Research in Communication Sciences & Disorders was introduced as a specific, required course in the CSD comprehensive major.
- Under the instruction of Dr. Abby Hemmerich, 41 students with primarily sophomore standing attended the two credit course to participate in discussions and group research.
- At the outset and finish of the semester, students submitted reflections answering prompts focused on intimidating and exciting elements of research, goals for the class and future, and the relationship of clinicians and researchers.
- Students also completed a Likert-scale mindset survey with elements based on a Personal Beliefs Survey for intelligence, as well as the CSD 235 course outcomes as listed on the syllabus.
- Essays & course evaluations were analyzed using Graneheim and Lundman's (2004) qualitative content analysis.
- Aggregated data from the Personal Beliefs Survey (Flores, 2006) was analyzed quantitatively through descriptive statistics.

General Implications

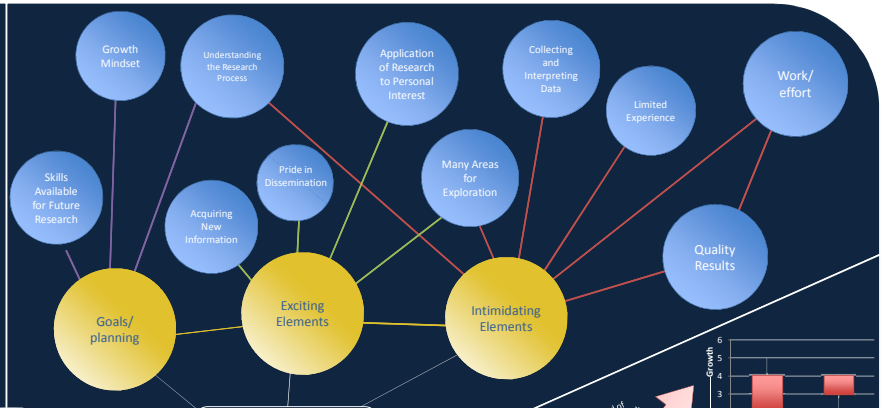
✓Initial and final student reflections show major themes that indicate student comfort-level and goal setting throughout the semester.

✓ Preliminary analyses of Pre-, Post- mindset surveys show that more students moved towards a "growth" mindset. Future statistical analyses will determine significance of this change.

✓ Pre-, Post-survey regarding course outcomes show student confidence level increased upon course completion.

✓Initial student reflections included common-sense responses, but final reflections moved towards alert-novice level, indicating deeper levels of introspection.

✓ Course evaluations exposed summative statements about progression in the research process.



Mindset/Course Outcomes Survey

Figure 2. Graph shows student mindsets at the outset and finish of the semester.

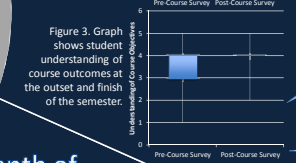
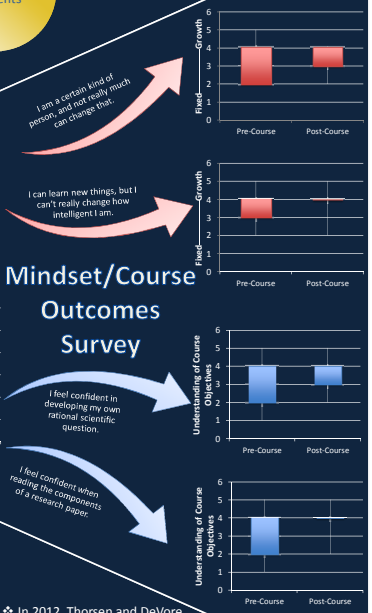


Figure 3. Graph shows student understanding of course outcomes at the outset and finish of the semester.



Depth of Reflections

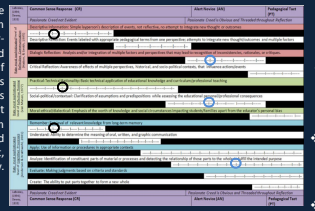


Figure 4. The Developmental Continuum of Reflection-on/for-Action(DCRo/fA) developed by Thorsen. The left side of the continuum categorizes common sense responses while the middle and right of the continuum categorize alert novice and pedagogical tact, respectively.

- In 2012, Thorsen and DeVore developed a rubric to aid in analyzing the reflexive dimensions of reflective work.
- This Developmental Continuum of Reflection-on/for-Action (DCRo/fA) Rubric shown in Figure 4 was used to analyze the reflective depth of students' initial and final reflections.
- In compiling the reflective research of previous studies, the DCRo/fA includes analysis of the reflective communication, reflective thinking, and cognitive processes present in reflective work.
- Analyzing a student's work reveals their level of reflexive sophistication, from lowest to highest, by ranking under the categories of common sense response (CR), alert novice (AN), or pedagogical tact (PT), respectively.
- In the current study, students typically reflected in a common sense response on their initial reflection and progressed to alert novice for their final reflection.

Initial Reflection

"My personal goals for this course include strengthening my writing skills, attaining new knowledge about research, gaining confidence in my skills in research, and learning not just how to research, but also how to best read or find other research that is already out there."

Final Reflection

"One of the most important skills that I think that I learned from this class was to be able to read and interpret research articles effectively and efficiently, and I will definitely be able to use this skill in future classes and in my future profession. As an SLP, I'll need to be a researcher, to find ways to be best treat my clients and their needs."

- After finish of the semester, students completed an online course evaluation.
- 36 of the 40 students completed the online survey.
- Coding of open-ended responses revealed five major themes, as shown in the diagram.

Figure 5. Example of results of the online course evaluation. Students responded in both Likert-scale and open-ended formats.

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