GIFTS: Using Storybooks and Storytelling to Prompt Discussion and Reflection of Growth Mindset

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This GIFTS paper describes an effort to engage first-year engineering students in thinking and analyzing their Personal Grit through a Reflective and Story-based approach. Almost every "orientation" course covers the basics of advising and essential student success strategies, starts fundamental community building, and works on a career plan. Student success is often tied to grit, which includes a growth mindset and an ability to learn from failure. Orientation courses are essential foundational experiences for first-year retention and success, but it is challenging to cultivate a classroom environment where students feel safe sharing ideas and struggles. This GIFTS paper will detail the research regarding the benefits of using storybooks with older students, the details (and individual modifications) of the activities done in the orientation courses and the scenarios for storytelling, plans for future assessment of the classroom exercise, and the conclusions drawn from the faculty reflections.

Justification of Picture Books

"Picture books are for everybody at any age, not books to be left behind as we grow older."
- Anthony Browne, Children's Laureate 2009-11

Reading a story to college students might seem silly, but there is an argument for doing so [4-5]. K-12 research has shown that reading aloud helps with many skills, including building community and assisting teachers in making academic, emotional, and social connections with their students [1]. Many educators have noted that story/picture books can be used not only to challenge various social norms but also to introduce complex ideas in a more comfortable environment [2-3]. There has been some preliminary data [8 and 9] regarding the use of storytelling in the classroom, the benefits [9], and the general enjoyment of it [6-8]. The papers [8-9] generally note that faculty telling stories is helpful and enjoyable for the students. The paper [10] discusses the history and the power of storytelling. In [11], they describe a story-driven learning environment to help with identity building.

Orientation Course Details

The Growth Mindset Picture Book lesson was implemented at two engineering and applied science colleges, both small and in a rural location, which have historically required students to enroll in an "orientation" section. However, Ohio Northern University (ONU) splits the students by major and has "engineering orientation," while West Virginia University Institute of Technology (WVU Tech) has more mixtures of students, including STEM-adjacent students enrolled in their orientation sections. Additionally, one university has only an hour timeslot, while the other has an 75 minutes. ONU is a private institution, and WVU Tech is public, but both serve a high first-generation population.

Regardless of location, the focus of the course is to assist students in successfully transitioning between high school and college, build community within the university, and introduce students

to essential skills to help them to have a successful college experience. Both universities planned to discuss growth mindset and grit during the course.

The activity was completed at both institutions by mid-semester (approximately week 7) of the fall semester. After all the instructors had completed the lecture, the faculty reflected on their initial reactions to the assignment, how they modified it to fit their classroom and teaching style and made recommendations for improvements in future iterations.

Growth Mindset Lesson Details

In an effort to foster a classroom environment where students felt comfortable talking about and reflecting on the challenging subject of grit, a new lecture format was introduced in the fall of 2023. The lecture began with the reading (or video) of a children's book on growth mindset selected by the instructor. A list (figure 1) of suggested books and videos was supplied to the instructors. Instructors were allowed to choose their favorite from the list. The book reading was followed up by a series of activities to discuss the growth mindset. It culminated in creating a short story to complete a pre-written, randomly provided scenario.

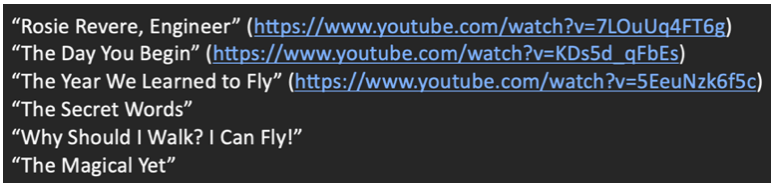

Figure 1. Partial List of Growth Mindset Picture Book Suggestions

Activity 1 (figure 2) was for the students to individually reflect on their experiences with struggles related to the story the instructor read and whether they had a growth mindset during these struggles.

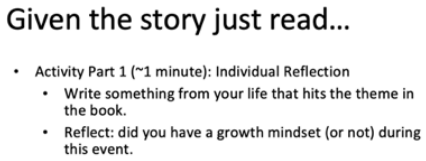

Figure 2. In-Class Prompt for Activity 1

In activity 2, the students got into groups, were provided a short scenario (figure 3), and determined a good strategy to approach the problem that fits a growth mindset. (Example scenario: Jakob noticed that his professor assigns regular math homework and requires the students to submit it. However, the grade is simply for trying and not doing the problems correctly. Therefore, Jakob decides that he is not going to waste time trying to do the homework correctly anymore). Activity 3 continues the group work by asking the students to finish the story with a happy ending, utilizing a growth mindset. Each activity was planned for 10-15 minutes.

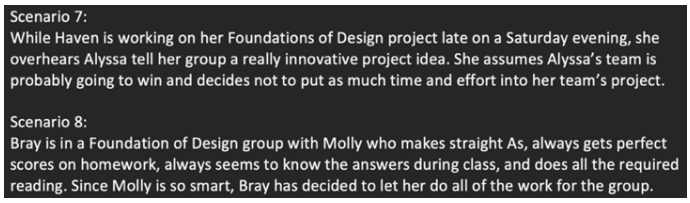

Figure 3. Sample Scenarios for Activity Part 2

Observations and Conclusions by the Faculty

One faculty at each university selected "Rosie Revere, Engineer" by Andrea Beaty. As stated earlier, at one university, the orientation section was divided by major and had only mechanical engineering students. The other faculty member had a mix of students (including STEM-adjacent majors). Another faculty selected "Why Should I Walk? I Can Fly!" by Ann Ingalls to read to primarily electrical engineering, computer engineering, and computer science students. The basic data is summarized in table 1.

Table 1. Summary of Information of the Three Section*s*

	Book	Major(s) in Section	Class Length
Instructor at ONU	"Rosie Revere, Engineer" by Andrea Beaty	Mechanical Engineers	75 minutes
Instructor at ONU	"Why Should I Walk? I Can Fly!" by Ann Ingalls	Electrical Engineers, Computer Engineers, and Computer Science	75 minutes
Instructor at WVU Tech	"Rosie Revere, Engineer" by Andrea Beaty	Chemical Engineers + STEM Adjacent Majors	50 minutes

All three faculty members believed their students enjoyed the novelty of being read a picture book, and the instructor at ONU with mechanical engineering students mentioned some of the students were familiar with the book "Rosie Revere, Engineer". The instructor at WVU Tech observed that the engineering students seemed more into "Rosie Revere, Engineer" and speculated that the students in STEM-adjacent majors were less interested because of the engineering focus. The instructor at ONU, who had students in three majors, selected a non-engineering book and did not observe the lack of interest.

All students participated in the follow-up activities as expected. Two faculty members had more extended class periods (an hour and 45 minutes vs an hour). Those with a longer class period could provide the students 15 minutes for each of the three activities with the additional material on imposter syndrome (with multiple faculty stories), mistakes, and learning from failure. The instructor with the shorter time period covered the other topics during a different week. While the instructor at WVU Tech observed disinterest among their students during the book reading, they were highly engaged during the follow-up activities.

This activity was completed around week 7. The authors believe developing a connection with the students is essential before this kind of activity. One instructor unfortunately had this activity after two weeks of absence and observed that about half were lukewarm to the story reading portion. The other two instructors did not have this experience. However, all three instructors

agreed that the students enjoyed the active parts of the activity. The most popular of the activities was coming up with their own stories. All three faculty believe this activity is worth continuing in future course iterations.

Future Research

The faculty plans to get an IRB at both institutions and survey the students. This would allow the instructors to better tailor the book selection to their section. Additionally, the authors could determine if their observations and speculations are correct. Given that the authors are not the only ones teaching these orientation courses, gathering data from other sections (with students in additional engineering and non-engineering majors) would be interesting. Other potential avenues of research include having the students watch a video of the storybook being read before the course meeting and allowing students to pick a storybook video to watch.

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