WIP: Does Instructor's Facilitation Matter for the Entrepreneurial Mindset in Story-driven Learning Classrooms?

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***Abstract*— This research WIP paper explores how differences in instructors' facilitation affect the development of engineering students' entrepreneurial mindset within the context of story-driven learning classrooms. We collected data from four sections of the undergraduate course, "*The Art of Telling Your Story*" at a large public university in the United States. We collected and analyzed (a) self-report surveys of teaching characteristics administered to four instructors, (b) four instructors' facilitation approaches evidenced by their classroom discourses, and (c) students' entrepreneurial mindset assessed by their narrative-based semester-long writing assignments. Preliminary findings indicate that: (a) instructors facilitated student learning through either instructor-student interaction or student-student interaction, or a combination of these; (b) facilitation approaches predominantly involved instructor-student interactions over student-student interactions; and (c) these facilitation approaches positively influenced the development of students' entrepreneurial mindset.**

Keywords*— *Facilitation, Story-Driven Learning, Entrepreneurial Mindset, Engineering Education

I. Introduction

Recognizing the shift from instructor-centered to student-centered instruction, educational researchers and practitioners have emphasized the role of instructor as a facilitator in classrooms, rather than merely delivering content knowledge. Fittingly, story-driven learning, as an emerging student-centered pedagogical approach in engineering education, requires instructors to scaffold and facilitate students in crafting, sharing, and reframing the meaning of their life stories [1], [2]. In a story-driven learning classroom, students' learning can be maximized through the dialogic interaction with instructors (e.g., facilitation) and with other students (e.g., knowledge co-construction through dialogic interaction). Specifically, students reminisce about their personal life events in response to narrative prompts, share their own potentially vulnerable stories with other students, explore multiple perspectives on a particular life event by learning from and relating to other students' stories, and reframe the meaning of their stories through instructors' prompts, guidance, and facilitation. Such dialogic interaction between instructor-students, as well as among students themselves, can be viewed as students' engagement in joint-reminiscing processes [3]. These dialogic interactions facilitate the construction of meaning in students' personal narratives by integrating their own understanding with their experiences in a social context (i.e., classrooms). Despite the need for instructors to heavily facilitate student learning in story-driven learning classrooms, there is a paucity of guidance in the literature on how to do so effectively [4]. This lack of information poses challenges for instructors who wish to adopt and implement story-driven learning in their classrooms, and it may hinder the achievement of desired learning outcomes. To address this gap, we investigate whether and how different types of instructor facilitation approaches affect the achievement of learning objectives within the context of story-driven learning classrooms.

II. Methods

A. Study Context

The sites of our study were four sections of the same *undergraduate* course entitled "The Art of Telling Your Story", offered within a biomedical engineering department at a large public university in the southeastern United States. This one-credit-hour online, synchronous course is required for engineering students in the department of biomedical engineering, and requires them to attend two-hour sessions

weekly throughout the semester. The primary learning outcome for this course was cultivating students' entrepreneurial mindset. Each class session followed a structured format: students initially engaged with a weekly theme, such as dealing with failure. They were then tasked with brainstorming an initial life story related to the theme, an activity often guided by instructor facilitation. This initial in-class activity set the stage for their homework assignment: to develop and write a complete story, expanding on their initial idea, such as crafting a story around a personal failure experience. We collected data from four sections of "The Art of Telling Your Story" course during the Spring 2024, and obtained consent from instructors and students for this study.

B. Data Sources

In our study, we collected and analyzed three primary sources of data: (a) self-report surveys of teaching characteristics administered to four instructors, (b) audiovisual recordings and observations from four classrooms, and (c) a collection of students' writing assignments throughout the semester. Instructor self-report surveys of teaching characteristics were assessed at the beginning of the semester. In terms of audiovisual recordings and observations from four classrooms, the first author visited each classroom over the semester, and gathered recording data from selected class sessions over four weeks. Additionally, students' writing assignments from throughout the semester were collected.

Teaching Characteristics. We assessed three aspects of teaching characteristics in four instructors. First, pedagogical content knowledge (i.e., instructor's knowledge about pedagogy in story-driven learning to increase entrepreneurial mindset) was assessed using two sub-scales adapted from [5]. A sample item included: *I know how to select effective teaching approaches to guide student thinking and learning in the BMED 4000 class*. Second, we assessed instructors' teaching philosophy to determine whether they leaned more towards constructivist teaching vis-à-vis traditional teaching, using subscales from [6]. Sample items included: *learning means students have ample opportunities to explore, discuss and express their ideas* and *the lecture method for teaching is best because it covers more information/knowledge*. Third, we further assessed instructors' teaching self-efficacy within the context of story-driven learning classrooms, adapting subscales from [7]. Two sub-dimensions for teaching self-efficacy included efficacy for instructional practices (e.g., *to what extent can you craft facilitative questions for your students to frame the meaning of personal stories*?) and efficacy for student engagement (e.g., *how much can you do to motivate students who show low interest in class*?). All questionnaires were completed by the four instructors who taught the class during Spring 2024 on a five-point Likert scale, ranging from 1 (strongly disagree/not at all) to 5 (strongly agree/very). The instructors reported a high degree of pedagogical content knowledge and teaching self-efficacy for this course, and they leaned more towards constructivist teaching approaches. Table 1 includes descriptive statistics of teaching characteristics.

TABLE I. DESCRIPTIVE STATISTICS OF TEACHING CHARACTERISTICS (AVEARGE SCORES)

	# item	Max Score	Instructor				Average
			A	B	C	D	
Pedagogical Content Knowledge	2	5	3.5	4.5	4	4	4
Teaching Philosophy							
Constructivist teaching	6	5	4.5	4.6	4.7	5	4.7
Traditional teaching	6	5	1.3	1.8	1.5	1.5	1.5
Teaching self-efficacy							
Efficacy for instructional strategies	4	5	3.5	4	4	4.5	4
Efficacy for student engagement	5	5	3.6	4	5	4	4.2

Facilitation Approaches. We analyzed the audiovisual classroom recordings and classroom observations data, gathered during the Spring 2024 to identify instructors' facilitation approaches. We coded the utterances of four instructors to capture their facilitation approaches, using a previously developed coding scheme of pedagogical practices in story-driven learning [8], [9]. Two sub-dimensions for instructors' facilitation approaches are: direct facilitation to students (i.e., instructor-student interaction) and promotion of students to interact with other students (i.e., student-student interaction). Table 2 presents descriptions of examples for specific facilitation approaches (i.e., five categories of instructor-student interaction, five categories reflecting student-student interaction).

TABLE II. *INSTRUCTORS' FACILITATION APPROACHES IN STORY-DRIVEN LEARNING CLASSROOMS*

	Description	Examples
Sub-dimension: Instructor-student interaction		
1	Instructors summarize stories that students posted to Canvas (as homework) or shared during class, providing interpretation, evaluation, or comments	I really appreciated your descriptions of this townhouse you visited and it felt so alive. I felt like we were walking in the townhouse with you.
2	Instructors provide students with constructive feedback (e.g., on story structure and imagery)	The thing is that I want to see the solution a little bit more. If we can see the other side of it, if we could see it working, that would be cool to you. That'd be kind of a cool resolution to have at the end, very strong.
3	Instructors ask students for their opinions on a particular concept	What is your definition of perfectionism?

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4	Instructors ask clarification questions – whether surface-level or deep-level (e.g., elaboration concerning a story that students shared with the whole class), including self-reflection prompts (e.g., what did you feel when you were in this situation?)	Surface-level: Is there a specific flavor? Deep-level: Where does that come from? Do you think this is something you were taught by your parents or is this something you've learned growing up.
5	Instructors make connections between a story currently being told and stories shared previously in the class, or to their own personal experiences (e.g., this helps students make connections, see themes, and helps build trust with the instructor)	So this class is building on last week's class in terms of its connection to self-defining memories. And so, this allows us to use our self-defining memories to help us achieve our most important life goals.
Sub-dimension: Student-student interaction		
6	Instructors encourage/ask students to provide (any types of) feedback on other students' stories, including verbal feedback and written feedback (Zoom chat or on a Jamboard)	I will note that when people are sharing their stor[ies] in class, it would be great if, as listeners, we could be putting our thoughts, feedback, comments, and reactions in the chat so we can be actively engaging with them.
7	Instructors read students' feedback/comments in a chat box/Jamboard or verbal feedback and then ask for clarification if needed	I'm really curious to hear more from someone who, many of you who chose a family member as their favorite leader and sort of what drew them to that person.
8	Instructors ask what students liked and learned from the stories shared by other students	Student A, what do you think the story says about student E? What did you like about student E's story?
9	Instructors ask students to share how they resonated/related to a particular student's stories (e.g., Does anybody resonate with this story? what relates to you?)	Which one did you feel more connected to?I'd like to hear from a few people what really resonated with them or what they liked about it.
10	Instructors encourage students to reframe their own or other students' stories	[After student A shares a story] I think if you can think of a weakness, that kind of a double edged sword, which means that it can also be a strength in some sense.

Entrepreneurial Mindset. To assess students' entrepreneurial mindset, we shifted from traditional self-report measures (e.g., [10]) to a more narrative-based assessment of their semester-long writing assignments. Specifically, we assessed students' entrepreneurial mindset (EM) evidenced by their writing homework assignments, using thematic analysis of their narratives with a rubric developed by [11]. Expanding upon the three components of EM (i.e., curiosity, connections, creating value) [11], [12], another component indicative of an EM has been added: persisting through failure.

Curiosity refers to students' drive to explore and investigate a rapidly changing world. Connection is characterized by students' ability to integrate their knowledge with other information. Creating value refers to students identifying unexpected opportunities to create value and persistently meet the needs of a changing world. Persisting through failure refers to students' ability to learn from setbacks, maintain effort, and continue working towards goals despite obstacles.

Identifying these four components of EM within students' narratives allows us to obtain a more reliable and context-specific evaluation of their entrepreneurial mindset (Author et al., under review), addressing concerns over the accuracy and validity of self-report measures [13]. Table 3 includes students' sample responses.

TABLE III. RUBRIC TO ASSESS STUDENTS' ENTREPRENEURIAL MINDSET

Components	Sample Responses
Curiosity	"Something that I found surprising was how my hero described handling being a young woman in a position of influence. She told me about **the various ways she learned to navigate professional relationships and be taken seriously without being deemed 'bossy.' She made a lot of different jumps to various fields at the start of her career, and she transferred these skills as she continued forward.** I don't plan on having any significant changes in my field during my own career, but I will be going.."
Connections	"My parents' story aligns with mine in more ways than one. **It serves as a reminder of where I come from and the legacy of perseverance and resilience that runs through my veins**. It affects **the way I view my own challenges**, teaching me that heroism lies in the courage to continue, to give, and to love, despite the odds. Their response to challenges and failures was not from defeat, but it was a response of determination."
Creating Value	*"*This day was a vivid moment when I realized that giving back to my community was one of the more important things in life…**Since then, I have made it a priority to take time to do things for other. Whether that is as small as buying someone something they need, or something as big as spending a whole day at a food pantry, this is something that has become important to me**… I have continued these efforts in college, and it is my goal that the act of service stays as one of my top values for years to come.
Persisting through Failure	"In my journey with this sport, it taught me about hard work. Hard work does not guarantee success. That may sound depressing, **but it taught me to not put any pressure on yourself when you want to try your hardest at something. Try your best and see what happens.** If you lose, you lose. In a race only one person can be a winner. **Now, I am still relentless when I want to achieve a goal and when I am not pressuring myself to achieve a goal and focused on doing my best, I become more capable at doing my best, which will bring me as close to my goal as I could try for.** Being fearless when trying something new is a strength I have as I am not afraid to give it all I have and lose and know that I could not have done better."

III. RESULTS

In this research WIP paper, we were specifically analyzed one session (in-class topic: Failure experience) for four instructors. Three preliminary findings have emerged so far. First, instructors were observed directing facilitation either towards students (e.g., posing clarifying or self-reflective questions), promoting student-student interaction (e.g., instructor asking students to offer constructive feedback on their peers' stories), or using a combination of these approaches. Second, interestingly, instructors used facilitation strategies focused on instructor-student interactions more frequently (on

average 90%) than those that encouraged student-student interactions (on average 10). Third, instructors' facilitation approaches were beneficial in cultivating students' entrepreneurial mindset in story-driven learning classrooms, consistent with other learning contexts [14], [15].

IV. CONCLUSION

Upon completing our data analysis in Spring 2024, we expect to strengthen our initial findings and evaluate the efficacy of different facilitation approaches in enhancing students' entrepreneurial mindset. Additionally, we intend to explore the association between instructors' teaching characteristics and their implementation of facilitative approaches in story-driven learning classrooms. Furthermore, we plan to analyze the impact of these approaches by comparing the entrepreneurial mindsets of students who engaged more frequently with instructors to those who had less interaction over the semester. A significant contribution of this study will be the identification and dissemination of effective facilitative teaching practices, which can be integrated into professional development programs to enhance engineering educators' ability to foster students' entrepreneurial mindsets through story-driven learning.

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