

Storytelling Approaches for Elevating Student Voices in Research and Dissemination

Dorothy Decontee Gocol, Florida International University

Dorothy Decontee Gocol is a first-year PhD student at the School of Universal Computing, Construction, and Engineering Education (SUCCEED) at Florida International University. She is also a Graduate Assistant at SUCCEED, and a Global Ambassador for the Society of Women Engineers (SWE) FY24.

Dr. Helen Urpi Wagner-Coello, Florida International University

Helen Urpi Wagner Coello is a Postdoctoral Associate and Project Manager for the Voices for Organizing Change in Educational Systems (VOCES) program at the STEM Transformation Institute at Florida International University. She earned her PhD in Biology at Florida International University, focused on using citizen science as a gateway for mosquito monitoring in Miami-Dade County households. This citizen science initiative gained recognition in the 2022 CDC – Southeastern Centre of Excellence in Vector Borne Diseases newsletter. She is deeply committed to advocating for accessible education and fostering community connections. Her work with VOCES aligns with her broader mission of driving positive change in education, ensuring that every individual has the opportunity to thrive in STEM fields.

Dr. Monica E. Cardella, Florida International University

Monica E. Cardella is the Director of the School of Universal Computing, Construction, and Engineering Education (SUCCEED) at Florida International University. She is also a Professor of Engineering and Computing Education in SUCCEED and FIU's STEM Transformation Institute

Storytelling Approaches for Elevating Student Voices in Research and Dissemination

Introduction

This Work-in-Progress (WIP) paper advances storytelling as an approach that supports reflection, learning and community building [1] while also allowing for undergraduate students to craft their own stories as a version of narrative research, a form of qualitative research. While qualitative engineering education research typically involves collecting interview data and then conducting qualitative coding, in the past decade, engineering education researchers have been using narrative approaches in the analysis of personal stories [5], [6], with particular concern for an approach that is more holistic [7]. In some cases, researchers have endeavored to understand students' experiences by constructing narratives based on interview data and then analyzing these narratives ("narrative analysis"), while in other cases interview participants have shared stories with the researcher, and the researcher then keeps these stories intact during analysis ("analysis of narratives") [7]. In this paper, we emphasize the approach of allowing our research participants to author their own narratives (or "stories" of their experiences) that are then kept intact during analysis and dissemination. As researchers, we work to provide support for students to be able to tell their stories – but leave the telling of the stories to the undergraduates themselves. Within this context, storytelling emerges as a strategy to promote student insights in engineering education, offering a unique platform to engage and empower students.

In addition to being sources of data for qualitative research, the stories students build become theories- the frameworks for how to know and be in the world [3], [4]. By vividly depicting current ideas, beliefs, personal experiences, and life lessons through narratives, storytelling evokes strong emotions and imparts significant insights while translating private experiences into publicly negotiated forms [11]. As such, storytelling has been recognized as a tool for enabling learning as well as a tool for sharing experiences within a community of practice [1]. In our work we extend this by partnering with undergraduates to share their stories more broadly. Storytelling enables the storyteller to adjust the narrative according to the situation, putting them in charge of what they want to say and how they want to say it.

Beyond the professional community and body of knowledge in engineering education, students' experiences, and their reflections on their experiences can potentially transform educational institutions [1], [12]. For example, in Adams and colleagues' workshops, storytelling provided emerging engineering educators with the access to a community of practice, knowledge, and opportunities to co-construct community and faculty practices [1]. Unfortunately, this resource remains largely untapped. Although change initiatives emphasize the significance of engaging various stakeholders, most approaches to change are conducted for and then imposed upon students, rather than supporting co-creation and student-led leadership [13]. This WIP paper takes a proactive approach to amplify the role of students in telling their own stories as part of the research on an institutional change project that is focusing on elevating student voices. As such, we use storytelling as an approach that allows undergraduate students to craft their own stories that then become central to conversations about the types of changes that should be initiated within the institution, central to the research on students' experiences with co-leading

change work, and central to dissemination efforts aimed at encouraging other institutions to engage students as partners [17] in institutional change work.

Background

Voices for Organizing Change in Educational System (VOCES) is a student-centric, participatory approach to institutional change that spans STEM (Science, Technology, Engineering, and Mathematics) departments at Florida International University (FIU). The goal of VOCES is to guide students through a process of identifying opportunities for student-led change by encouraging students to identify areas that need improvement and then conduct research and develop plans for improvements. This involves defining specific and measurable goals that align with students' perspectives. The project underscores collaboration, fostering co-creation, and student-led leadership, diverging from other top-down methods by elevating students' voices and promoting student agency by positioning students as leaders, rather than recipients, of institutional change projects.

Against this backdrop, this paper asks: how might storytelling methods, that shift the role of students from research participant to research collaborator, provide insight into students' experiences?

Storytelling stands at the junction of engagement, accessibility, diversity, impact, interactivity, and transparency, because the process of developing narratives is led by the research participants themselves, with mentoring and support from the research team [14]. Storytelling can facilitate a constructivist approach for teaching and learning [1]. It can be a tool, as it provides a vehicle for combining digital media with innovative teaching and learning practices. Adams and her colleagues [1] concluded that the integration of potential multimedia resources, such as interactive activities, videos, and virtual environments, can enhance open ended learning environments for students, which can lead to learners' ability to self-regulate, and the potential of technology to enrich storytelling experiences in educational contexts. From a teaching standpoint, educators have used storytelling and autobiographical writing to promote a deeper understanding of personal learning processes and goals, multicultural awareness, and healthy self-concepts [15]. The motivation for many of these efforts builds on research that provides evidence for how stories are effective for reaching learners with educational messages, connecting new knowledge with lived experiences, and assimilating it within existing narratives of meaning.[8] stated that transformative agency can be built from designing a learning environment that cultivates persistent openness. To reach this state, the need to focus on more personal narratives to advise open-ended learning must be prioritized in engineering education. Collecting STEM student narratives is essential to get an understanding of their STEM experience. By collecting stories, we illuminate the systemic barriers and opportunities present within our specific educational landscape. Collecting stories allows for researchers and educators to move towards creating a student-centered learning environment [16]. Just as the undergraduates are positioned as leaders in their institutional change projects, they are positioned as creators of their own narratives for the research that is related to this project. This method differs from other research where researchers develop the story *for participants*, granting participants ownership when crafting their own stories as a version of narrative research.

Methodology

The VOCES utilizes a qualitative research approach, employing storytelling as a method to learn from students' experiences and to increase the recognition and understanding of students' perspectives. Storytelling as a qualitative method was employed to capture the nuanced experiences of students. This aims to inform the transformation initiatives and contribute to the elevation of students as partners in STEM Education work. In this Work-in-Progress paper, we primarily focus on our approach to supporting students in developing stories that become the dataset for our research. At this stage in the project, we are just beginning analysis of these stories.

Ten students, all enrolled in various STEM departments at the host institution of VOCES, participated in the storytelling initiative. To facilitate the process, two workshops were organized. During Workshop 1, the project's aims and objectives were discussed, and participants engaged in a reflective exercise (See Appendix A and Appendix F). Three days before Workshop 1, students received prompts for the storytelling, answering questions that guided them in reflecting on their undergraduate experiences, that then supported them in considering what kind of story they wanted to tell, and in the eventual development of their narratives (See Appendix C). Following Workshop 1, participants were prompted to continue to think about the story they wanted to draft during Workshop 2 (see Appendix D).

Workshop 2 focused on the components and structures of a compelling story, exploring what constitutes a narrative's effectiveness (see Appendix B). Participants were given time to develop their stories, and then receive feedback on their draft stories from both peers and leaders associated with [Project]. Additionally, they were asked to consider how they intended to share their stories—whether through video recordings or anonymously. Participants took their stories home to further develop them after Workshop 2 (see Appendix E). They were asked to share their finalized stories within a week, including details on how they intended to share their narratives. Participants were compensated for the time that they spent developing their stories.

Discussion

The heart of this study lies in the stories shared by the ten undergraduate STEM students who participated in the workshops. These stories provide a unique lens through which we gain insights into the diverse experiences and perspectives of students within the institutional context of VOCES. The goal of the storytelling was to allow students to share their experiences, in order to help educators gain an understanding of students' perspectives, challenges, and aspirations, and how these insights can be used to promote change within and beyond our institution. This section delves into one story, exploring preliminary themes, patterns, and implications that emerged.

In this first story, the student describes challenges and overcoming obstacles to pursue their dreams. The student chooses to focus on their experience as a first-generation experience student and their experience navigating STEM coursework. This story highlights the ways that students can experience anxiety when they feel that they don't have support, but also demonstrates how this led the student to identify ways other students could be supported, including through the inclusion of undergraduate "LAs" (learning assistants) in STEM classrooms.

Story 1:

As a first-generation student, with no prior knowledge on what to expect from going after a higher education, my experience in Florida International University has varied from extreme points to other. Coming into FIU, there have been things in my experience that have stood out to me enough to make me reflect and wonder how things could've occurred if I knew then what I know. A general experience that sticks out to me was back when I took calculus during the covid online semesters. To this day, every time I think about that class I grow a pit of anxiety in my stomach – especially when I realize that one of the reasons why I felt so anxious over the course was because I felt like I had little support in the course, especially considering that the one learning assistant we had, I didn't even know what his role was and what he was supposed to do. This course was what prepared me for struggles in the classes I would take eventually in the future – especially when I had to balance courses like chemistry and physics at the same time and I had to learn the ways to effectively study for these classes. Some of these general struggles I can't help but feel that if I somehow had some sort of "older sibling" (not really a sibling but a mentor) to help me prepare for what to expect from these experiences, I could've avoided some of the unnecessary anxiety I got from navigating through these things on my own. Because of these personal struggles, I decided to dedicate my VOCES research to the idea of development of an "older" sibling through the roles of LAs in STEM classrooms. Having access to be able to provide support for students in LA model, where learning assistants are easily accessible for students and have been in their shoes to provide genuine support that students can take after.

In this story, the student's experiences with feeling unsupported and then realizing forms of mentoring support that could be beneficial for STEM students exemplifies the importance of having a supportive community within STEM educational institutions. The student reflects on their experience with a challenging calculus course, demonstrating the importance of having accessible resources for academic success. They express feelings of anxiety and isolation due to lack of support. Inspired by their personal experiences, they make the decision to dedicate their research to improving support systems for students. This student's narrative gives us access to the significance of accessible resources and mentorship in facilitating academic success and inclusivity within STEM classrooms, and demonstrates how undergraduates have insight into both areas for improvement in undergraduate STEM and approaches for working towards change.

By maintaining the voices of students through their personal stories, storytelling can serve as a powerful tool in education. Even though storytelling has not been widely used as an organizational change strategy in education [9], practitioners have effectively used it in team building and decision-making strategies [9].

Summary

This emerging form of research is ideally positioned to allow researchers to gain research insight into students' (or other research participants') experiences while continuing to promote student voices and eventually, promote agency. Agency requires that learners feel empowered to take action within the learning environment [10]. Additionally, storytelling excels in

engaging individuals by helping us gain a more profound understanding of complex STEM student experiences. The use of storytelling as a qualitative method capturing nuanced experiences has the potential to offer institutions a glimpse into the realities of student perspectives on their education and student insight into opportunities for positive change. Through future analysis we can use student stories to inform initiatives aiming at promoting student success and well-being in higher education.

Acknowledgements

This material is based upon work supported by the National Science Foundation under Grant No. 2225201. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. We would like to acknowledge the other members of the VOCES team who contributed to the design and implementation of the VOCES project: Yesim Darici (PI), Rocio Benabentos, Laird Kramer, Janki Bhimani, Leanne Wells, Stephen Secules, Jaroslava Miksovska, and Umut Caglar. We also acknowledge and appreciation the contributions of the undergraduates who participated in the VOCES project and the storytelling workshops.

References

- [1] R. Adams, C. Allendoerfer, T. Smith, D. Socha, D. Williams, and K. Yasuhara, "Storytelling In Engineering Education," in *Proceedings of the American Society for Engineering Education Annual Conference & Exposition, ASEE 2007, 2007*, Honolulu, HI, <https://doi.org/10.18260/1-2--2904>.
- [2] M. Sandelowski M. "Telling stories: narrative approaches in qualitative research," *Image--the journal of nursing scholarship*, Vol 23, No. 3, pp. 161-6, 1991.
- [3] J. A. Archibald, *Indigenous storywork: Educating the heart, mind, body, and spirit*. Vancouver, BC: UBCPress, 2008.
- [4] B.M.J. Brayboy, B. M. J., "Toward a tribal critical race theory in education," *The Urban Review*, Vol 37, No. 5, pp. 425–446, 2005.
- [5] S. Bird and N. Kellam N "Teaching Journeys of Engineering Faculty: Stories of Transition," in *Proceedings of the 2013 American Society for Engineering Education Annual Conference and Exhibition, ASEE 2013, 2013*, Atlanta, GA.
- [6] A. L. Pawley and C.M. Phillips, "From the mouths of students: two illustrations of narrative analysis to understand engineering education's ruling relations as gendered and raced," in *Proceedings of the 2014 American Society for Engineering Education Annual Conference and Exhibition, ASEE 2014, 2014*, Indianapolis, IN.
- [7] N. Kellam, K.S. Gerow and J. Walther, "Narrative analysis in engineering education research: Exploring ways of constructing narratives to have resonance with the reader and critical research implications," in *Proceedings of the American Society for Engineering Education Annual Conference and Exposition, ASEE 2015, 2015*, Seattle, WA.
- [8] S. Denning "Effective storytelling: strategic business narrative techniques." *Strategy & Leadership*, Vol 34, No. 1, pp. 42–48, 2006.
- [9] Y. Engeström, "From design experiments to formative interventions," *Theory & Psychology*, Vol. 21, No. 5, pp. 598–628, 2011.
- [10] C. Tzou, Meixi, E. Suárez, P. Bell, D. LaBonte, E. Starks, and M. Bang, "Storywork

in STEM-Art: Making, Materiality and Robotics within Everyday Acts of Indigenous Presence and Resurgence.” *Cognition and Instruction*, Vol. 37, No. 3, pp. 306-326, 2019.

- [11] Serrat, O. (2017). Storytelling. *Knowledge Solutions*, 839–842.
https://doi.org/10.1007/978-981-10-0983-9_91
- [12] Sochacka, N. W., Walther, J., Rich, J. R., & Brewer, M. A. (2021). A narrative analysis of stories told about engineering in the public discourse: Implications for equity and inclusion in engineering. *Studies in Engineering Education*, 2(2), 54-77.
- [13] Cook-Sather, A. (2022). *Co-creating equitable teaching and learning: Structuring student voice into higher education*. Harvard Education Press.
- [14] Kendall, J. E., & Kendall, K. E. (2012). “Storytelling as a qualitative method for IS research: Heralding the heroic and echoing the mythic.” *Australasian Journal of Information Systems*, 17(2).
- [15] Clark, M. C., & Rossiter, M. (2006). “Now the pieces are in place...”: learning through personal storytelling in the adult classroom. *New Horizons in Adult Education and Human Resource Development*, 20(3), 19-33.
- [16] Green, C., & Harrington, C. (2020). “Student-centered learning: In principle and in practice.” *Michigan Virtual University, Lansing, MI*, accessed July, 30, 2020.
- [17] Mercer-Mapstone, L., Dvorakova, L.S., Matthews, K.E., Abbot, S., Cheng, B., Felten, P., Knorr, K., Marquis, E., Shamma, R., & Swaim, K. (2017) “A Systematic Literature Review of Students as Partners in Higher Education.” *International Journal for Students as Partners* 1 (1)

APPENDIX A: Agenda for the First Workshop

- **Overview of storytelling workshops:** We reviewed the VOCES project and goals, introduced the goals of the workshop, and talked about how storytelling was a part of the VOCES. We clarified that the undergraduates would have the opportunity to share their own stories as they would like them to be told, and that the stories would be shared publicly (either as anonymous stories or stories attributed to the students, depending on the students' preferences).
- **Example of a story:** One of the facilitators shared one of their own stories from their undergraduate experience, and then briefly shared the reasons she decided to tell that story. In this process, we tried to emphasize that the undergraduates could choose to tell a story that focused on a single moment in a class, a story that was about their overall experience as a STEM student, a story about their experience as a member of the VOCES team, etc. We also emphasized that there could be different audiences – “maybe you want to tell a story to help parents understand college; maybe a story to help faculty shift their teaching; maybe a story to help the senior leadership better understand student experiences.”
- **Warm-up questions:** We shared a list of “warm-up questions” that were designed to help the undergraduates reflect on their experiences. We told them it was okay if they didn't answer every single question, but the goal was for the questions to help them to think about what story they might want to tell. They spent most of the rest of the time answering the questions.
- **Choosing a story to tell:** At the end we asked them to each share their idea for what story they wanted to tell (in one case, it was their experience being a first-generation college student; in another case, it was their experience as part of the VOCES in another it was their experience as a STEM student with the goal of inspiring high school students to study STEM).

APPENDIX B: Agenda for the Second Workshop:

- **Story components and structures:** the undergraduates participating in the workshop were asked to share their ideas about “what makes a good story.” We also discussed other tips for drafting stories, drawing on the ideas of “Stickiness” from *Made to Stick* (Simple, Unexpected, Concrete, Credible, Emotion, Structure) and the OCAR structure (Opening, Challenge, Action, Resolution) from *Writing Science*.
- **Draft your story:** The majority of the workshop was used as time for the undergraduates to create drafts of their stories. They were reminded to think about their audience -- who do you want to tell your story to? And reminded that they could choose to tell a story about their experience working on the institutional change project, another story about their undergraduate experience, or a story about experiences that led them to choose to study a STEM field for their major.
- **Peer feedback:** Students read their stories aloud, and gave each other feedback (in some cases, they asked each other questions, in other cases, they provided feedback, in all cases they offered appreciation and praise to each other).
- **Your plans for sharing your story:** We concluded by telling the undergraduates that they could choose if they would like to share their story more publicly by recording themselves telling the story or would prefer to have someone else read their story (for anonymity).
- **Wrap-Up/Conclusions:** We asked the undergraduates to finish working on the stories and share them with us when they were finished, and indicate if they would like to be recorded themselves telling the story or would prefer to have someone else read their story (for anonymity). We also asked them if they could provide feedback on the storytelling workshops (as part of their weekly reflection).

APPENDIX C: Reflective prompt question given before the first workshop:

- To help prepare for the workshop, we need you to **write a short paragraph (~250 words) about your experience at Florida International University, either your overall experience or one experience that stands out.**

APPENDIX D: Reflective prompt question given after the first workshop:

- What do you want to focus on for your storytelling pitch? How broad or narrow do you want to make it?

APPENDIX E: Reflective prompt question given after the Second workshop:

- Please include the story that you wrote. Please also include feedback on the storytelling workshop (be specific about what you liked, what motivated you, and what you would have liked to change to improve it).

APPENDIX F: Warm-Up Questions

Questions to help you reflect on your experiences as you begin to develop your stories:

1. What is your name, and what are some key things about yourself (think about: where did you grow up; what are some of your hobbies/interests/key characteristics)
2. What are you studying at FIU (what is your major)? What inspired you to pursue this field of study as a career?
3. Can you share some challenges you have faced at FIU so far?
4. What type of resources do you find most helpful in being successful at FIU?

Thinking Specifically About Your Course Experiences:

1. How do you manage your time to stay motivated to excel in your course work?
2. How do you approach building a relationship with your professors? Do you seek help or clarity when needed?
3. What teaching method or strategies is effective in your classes
4. How do you balance theoretical knowledge with practical application in your course work?
5. In what ways do you think professors can better support and engage with undergraduate students in your field?
6. Are there any changes or improvements you'd like to see in your field of studies at FIU?

Thinking About Your Experiences Either Related to Courses or Any Aspect of Your FIU Experiences

1. Can you recall a specific situation where you felt empowered to make a positive change or take a leadership role? What led to that feeling of empowerment?
2. In your opinion, what qualities or characteristics make someone an effective leader? How have you observed these qualities in action, either in your academic or extracurricular activities?
3. Have you ever faced challenges or barriers that made you doubt your ability to lead or make a difference? How did you overcome those obstacles?
4. What strategies or initiatives do you believe universities can implement to empower students and foster leadership skills?
5. In what ways can students proactively contribute to their campus communities or larger society to effect positive change and exercise agency?
6. What motivates you to take on leadership roles or advocate for change in areas that matter to you? How do you sustain that motivation over time?