

Enacting Narrative Inquiry Methodology in Undergraduate Engineering Education : A Research Team Approach

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Introduction

In this *full-length method* paper, we present our application of a narrative research method (ology)—the ‘science’ of our methods and their connections to the theoretically-informed reasonings used to legitimize our research approach—for living and telling stories of experience and, from those stories, making personally, professionally, and socially-relevant meaning. The purpose of this work is to show how we are (a) conceptualizing a narrative inquiry method based on the philosophical, theoretical, and ethical tenets of *narrative inquiry (methodology)* put forth by D. J. Clandinin and colleagues [1]-[2] in the field of teacher education, and (b) adapting and applying this method to make meaning from stories of experience shared with us by student veterans and service members (SVSM) in undergraduate engineering education.

This work is significant for a few reasons. First, we *continue the narrative theory/methods conversation in EER*, which began at the 2025 American Society of Engineering Education (ASEE) annual conference [3]-[4], by illustrating a growing presence of narrative in engineering education research (EER). Next, we *extend the conversation* by detailing (our developing understandings of) the theoretical underpinnings of narrative inquiry methodology, distinguishing it from and connecting it to narrative methods (i.e., Narrative Analysis and Analysis of Narratives [5]) that are (more) frequently called out in EER [6]. Last, we *enact the conversation* by providing an example of the method, drawing on data and preliminary analyses from an ongoing study with participants from an underserved student population in engineering.

Continuing the conversation: The evolution of narrative research in engineering education

There is unmistakable evidence of growing interest in using narrative in EER. (In prior work, we posited that engineering education is currently in a “narrative turn” [4]). Dr. Karan Watson’s plenary at the 2010 ASEE annual conference [7], which described how stories promote cultural and institutional change, may be likened to a watershed moment for narrative researchers in engineering education. In 2011, Case and Light [8] highlighted narrative as one of seven social science research methodologies “emerging” in EER; these scholars [8] advocated for increasing use of emergent research approaches, including narrative, to address persistent engineering education challenges: (a) establishing widespread adoption of evidence-based engineering teaching practices; (b) ensuring equitable engineering access and participation and improving outcomes for all learners; and (c) discerning the competencies engineers need in the 21st century.

Since 2011, there has been an uptick in narrative studies conducted in EER contexts. Of many notable examples, the narrative analysis works of Kellam [9]-[10], Pawley [11], and Webster and Mertova [12]; a continuing stream of narrative EER dissertations since 2016 (see e.g., [13]-[21]), and the narrative arts-based research of Sanders and colleagues [22] stand out. In 2023, just over ten years after Case and Light’s paper appeared, the first systematic review of narrative inquiry in engineering education was published [6]. Review authors [6] reported that use of narrative in EER is increasing (since 2017), highly contextualized by experience or participant type (i.e., single course, year of study, co-curricular activity, marginalized student groups), and often lacks methodological detail to support justifications of qualitative research quality. In 2025, the ASEE Educational Research Methods (ERM) Division sponsored a panel session on narrative research in engineering education [3]; the well-attended session culminated in (loose) plans to organize a community of practice to support narrative research within the EER community.

Extending the conversation: Narrative inquiry as the study of experience

Efforts to conduct narrative research in engineering education, an evolving field with roots in post/positivism, objectivist ontology, and quantitative research approaches and methods, suffer

from the noticeable lack of easily accessible, pre-theorized, methodological scripts that provide the ‘argumentative grammar’ needed to define, mesh, and align facets of a narrative research design. This void adversely affects us, as nascent narrative researchers in engineering education, because we (logically? naturally?) look for narrative research exemplars in “the literature” to help us understand the process. Within the narrative research literature spanning social science and literary disciplines, it is easy to lose our way searching for exemplars, heuristics, and rules of how to “do” narrative research. Therefore, in this section we extend the narrative conversation in EER by detailing the commitments and processes that undergird narrative inquiry (methodology), keeping in mind that narrative inquiry and the practice of narrative research continues to evolve in the social sciences [23]-[24] and, thus, in EER.

Definition and purpose. *The purpose of narrative inquiry (methodology) is to make meaning of individual human experience.* Clandinin and Caine [25 p.542] define narrative inquiry saying,

Narrative inquiry is first and foremost a way of understanding experience. It is also a research methodology. It is, then, both a view of the phenomena of people's experiences and a methodology for narratively inquiring into experience and thus allows for the intimate study of individuals' experiences over time and in context.

Connelly and Clandinin [1 p.2] assert that, within narrative inquiry, “...narrative is both phenomenon and method.” They explain how the words “narrative inquiry” share a reciprocal double meaning; “Narrative names the structured quality of experience to be studied [phenomenon], and it names the patterns of inquiry [method] for its study” [1 p.2]. Thus, it is equally correct to say narrative inquiry uses narrative to inquire (i.e., narrative as methodology) as it is to say through narrative inquiry we inquire into narrative (i.e., narrative as the phenomenon of experience). To support this duality while maintaining distinction, Connelly and Clandinin [1] use the term “story” when referring to the phenomenon (experience) under study (i.e., stories of experience) and “narrative” when referring to the research inquiry (methodology) and researcher writings (i.e., narrative inquiry, researcher narratives) [1 p.2].

Philosophical and theoretical underpinnings. Clandinin and colleagues use John Dewey’s [26] theory of experience, wherein experience encompasses *situation*, *continuity*, and *interaction*, to underpin narrative inquiry (methodology) philosophically and theoretically [25]. Ontologically, reality is considered relational and socially constructed. Researchers conduct narrative inquiry in metaphorical “3-dimensional narrative-inquiry space”; stories of experience are collected, constructed, and examined in terms of their place (*situation*), time (*continuity*), and personal/social milieus (*interaction*) [27]. Clandinin and Caine [25] describe how other distinct theories or even disciplinary ideas can be used to *support Deweyian theory* in undergirding narrative inquiry. Specific examples that may resonate in engineering education include Jerome Bruner’s [28] theory of a narrative cognition from psychology and Robert Cole’s [29] writings about narrative as life and as teaching practice in medicine. In engineering education, we might juxtapose Bruner’s narrative cognition with the kind of logical, scientific, or “paradigmatic” [5] thinking that dominates “engineering thinking” and “problem solving.” Alternatively, we could consider ways narrative is essential to engineering practice and the education of engineering practice, such as during (sustainable) design (divergent thinking, what ifs), troubleshooting (what happens when I do this?), and failure analysis (how did that happen?).

We must take care connecting narratives to theory. Researchers in education [e.g., 2] have critiqued narrative research, generally, for lacking theoretical linkages and equated a lack of

theory with a lack of scholarly rigor. Kim [30] argues that narrative inquiry is “...established as a rigorous methodology” through its explicit meso (i.e., methodological) level linkage to Dewey’s theory of experience [30]. Reminding us that doing narrative inquiry requires privileging stories above all else, Kim [30] warns of the dangers of interrupting or trimming stories, still in progress, to fit (other) theories applied to understand them at the macro (i.e., philosophical, phenomenological) or meso levels. In narrative inquiry, deeper theoretical linkages are made at the micro level to support meaning making of stories that have been free to run their course [30].

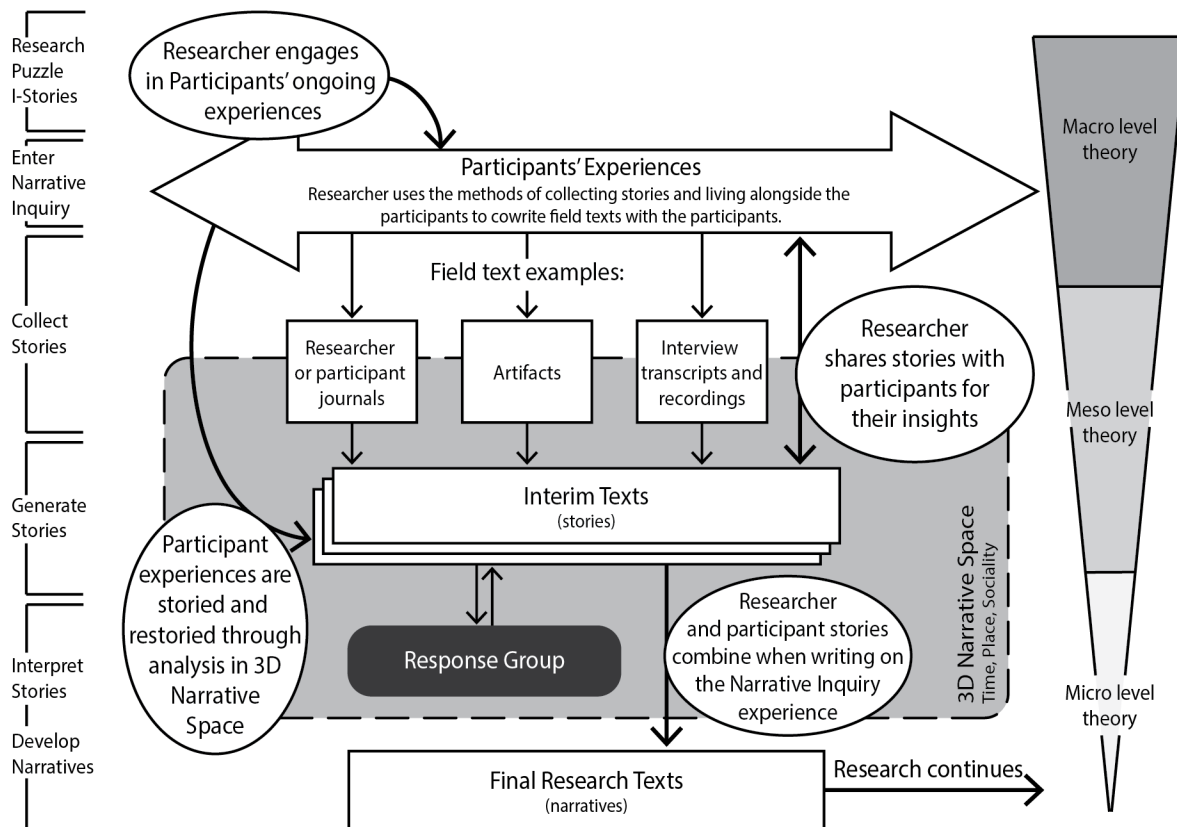


Fig.1. Overview of the narrative inquiry (methodology) process

Process. In the subsections that follow, we describe the elements of narrative inquiry methodology, including researcher requirements and how the elements fit together and support each other. Fig.1 provides a visual overview of the narrative inquiry process.’

Reflexivity and research puzzles. Narrative inquiry is a reflexive and reflective process [25]. Prior to engaging with participants, researchers first complete their own reflective inventory, remembering and collecting their own stories of experience with the phenomenon. Known as writing ‘I-stories,’ this process of reflection supports the researcher in framing a narrative inquiry “research puzzle” that encompasses the researcher’s curiosities and wondering about the phenomenon. Research puzzles are more like conundrums in that they are less structured and targeted than research questions; targeted research questions are often the result of a narrative inquiry, rather than a starting point. The process of researcher reflection on their ongoing experiences with the phenomenon, before, during and after the inquiry, is essential to the level of researcher reflexivity required.

Entering the narrative inquiry. Researchers begin a narrative inquiry in two ways: listening to participants tell their stories of experience via “interviews, conversations, or interviews as conversations,” and/or by “living with” participants “in the field,” through visual media or observations, as they live their stories of experience [25, p. 543]. Researchers negotiate research purposes, puzzles, relationships, and outputs (i.e., written texts) with participants, as well as ways they can support participants before, during, and after the inquiry.

Data and data collection methods. Data, or *field texts*, are generated directly from conversations, interviews, observations, and/or artifacts participants share with the researcher. Field texts are co-constructed by participant and researcher in 3D narrative space—over multiple interactions and reflections (*time*), inward and outward between participant’s thoughts and emotions and their actions and behaviors (*sociality*), and in locations where experiences occur (*place*) [25].

Data analysis methods. Data analysis is a process of narrative analysis [5] that involves moving from field texts to *interim texts* prepared by researchers and shared and negotiated with participants, and finally to *research texts* that reflect the experiences of both participant and researcher, consider all potential audiences, and communicate the “so what?” of the inquiry. Interim texts are also composed in 3D narrative inquiry space by researchers who often consult with response groups. Response group members are entrusted to support the researcher in recognizing the inquiry’s impacts on participants and broader implications for society [25].

Findings and representation. Narrative findings are presented through final research texts that can take on textual, visual, and/or audible forms of representation. Along with conveying the social significance—the “so what?”—of the inquiry, research texts communicate the personal and practical significance of the inquiry that manifests through researcher and participant “growth” and comes from thinking narratively about experience. Final research texts also consider and address the ways that social, institutional, and/or cultural narratives influence participant and researcher stories of experience within the inquiry context [25].

Enacting the conversation: An EER narrative inquiry example

In this section, we enact the EER narrative conversation, drawing on data and preliminary analyses from an ongoing study with student veterans and servicemembers (SVSM), an underserved population in engineering education [31].

Study purpose and overview. The purpose of our narrative inquiry is to understand the experiences of SVSM in undergraduate engineering degree programs offered at civilian academic institutions in the western United States. Specifically, we want to learn how SVSM participate, persist, and produce professional identities in engineering over time.

Philosophical and theoretical underpinnings. We stick close to narrative as experience underpinnings, the Deweyian view that experience encompasses *situation*, *continuity*, and *interaction*, and the ontological view that reality is relational and socially constructed. To make broader meaning as we compose research texts (micro level), we will use critical theories [see 32], such as Veteran Critical Theory [33] and Community Cultural Wealth [34], and social and professional identity theories [35]-[39] to scaffold findings (research texts) and implications.

Elements. In the following subsections, we describe how elements of the narrative inquiry process (Figure 1) manifest in our ongoing EER study.

Reflexivity and research puzzle. In our study the primary researcher is the project’s Principal Investigator (PI). A military veteran, I transitioned out of the U.S. Army during the end-of-the -

Cold-War drawdowns of the mid 1990s under President Bill Clinton. Because I had earned a bachelor's degree in mechanical engineering (at a service academy) prior to starting active-duty service, I was able to enroll in a graduate mechanical engineering program at a civilian institution before I had signed out of my last duty station—and I never looked back.

Never, that is, until 2009, when I started a new career as an undergraduate engineering instructor. I taught foundational courses, such as Statics, Dynamics, Thermodynamics, and Mechanics of Materials, in a two-year, distance-delivered, undergraduate engineering transfer program at midsize university in the western United States. The classes were small, held in the evenings, and it was easy to develop relationships—caring but still professional—with the post-traditional, full time-working, adult learners who enrolled in the program. One student with whom I became close was an Air Force veteran, National Guard jet engine mechanic who wanted more than anything to become an Aerospace engineer and work for Elon Musk. He had me proofread the internship application he sent to SpaceX. “Just to get a foot in the door,” he’d told them he’d sweep their floors, if necessary, which reminded me of the time my graduate research advisor took me up on my offer to clean the lab microwave. In some circles, I’ve learned, there are certain things you shouldn’t volunteer to do.

I stayed in contact with that Air Force veteran, National Guard jet engine mechanic over several years. I watched as he strode into the Dean’s office when he his GI Bill benefits were delayed. I tutored him in thermodynamics problems, which ironically turned out to be his nemesis. I nearly cried when he told me he was going back on active duty with his National Guard unit—deploying to the War in Iraq—because the stress of the program was getting to him; he needed a break and he needed the money. I nearly cried again when he brought me back an American Flag that has flown at his airbase in Iraq. I asked him to be a participant in my dissertation research study and, through his generous participation, learned what life was like for him, before I met him. And I began to think what a helluva transition from active duty to civilian STEM career he was having and why, after almost two decades, I felt as if I was still in transition, too.

Entering the study. As PI, I recruit SVSM participants using approved IRB procedures. Veterans and service members, who often refrain from disclosing military identities in academic settings, comprise a category legally protected from workforce discrimination. An online screening survey, accessible through posted flyers or online media, establishes informed consent, captures personal and service-related demographics, and provides a mechanism for volunteers to share contact information. I contact volunteers via their preferred method (email or text) to complete informed consent and formally enter them into the study by scheduling the first interview.

Data and data collection methods. I entered into the inquiry by listening to (and audio recording) the stories participants tell about their time in the military, civilian transition, and experiences in undergraduate engineering education during our one-one conversational interviews. I build relational rapport by sharing my veteran status and my own stories as they are dislodged from my memory during our conversations. Sharing my experiences with the participant also helps me to continue to reflect and document reflections. I schedule subsequent interviews on a rolling basis and ask participants to write down stories of things that happen, good and bad, in between interviews that I will store securely with the recordings.

The continuing construction of field texts now becomes a research team process. Student researchers enter the inquiry, themselves coming to know one participant (at a time) by

immersing themselves in the participant audio recordings, verifying the interview transcript, and reading the participant's journal entries and other shared artifacts.

Data analysis methods. Audio recorded transcripts are verified and read by the student researcher. Gaining a sense of the participant, they begin to “excavate” [30] stories. To excavate participant stories from the written transcripts, journals and artifacts, the student researcher uses *memo-ing* and *chronology* practices to re/story data in 3D narrative space. Thus, the student researcher creates new field texts directly from participant stories contained in the data.

Memo-ing. The student researcher uses memo-ing to capture the place (*situation*) and sociality (*interaction*) of participant's stories – and to document personal notes on patterns related to the research puzzle and emerging stories. The Memo form we developed (Figure 2) provides space for student researchers to capture their firsthand experiences and reactions to data as they begin the re/storying process, while also keeping track of story origins within field texts to provide “evidence.” Many stories in research texts take shape during the memo-ing process.

Field text reference Memo

[Time stamp] A few words capturing the beginning of the excerpt... final words of excerpt.

The student researcher's memos on the participant's excerpt and overall experience.

Participant 1 Interview 2 Memo

[00:25:47] I'm barely in the military when I'm at school... I'm not keeping the standards and stuff

There are physical, interactional, and an identity-based separations between his military life and his (engineering) school life. He lives a totally different life when he's in [Home State] for Guard and when he is in [State] for school. They seem very separate for him.

Fig.2. Field text memo-ing example using place (*situation*) and sociality (*interaction*)

Chronology. As the student researcher memos, they construct a chronology (Figure 3) to preserve the time (*continuity*) aspects of the participant's experiences (as told) for re/storying and

Title

Age XX (approx. 20XX)

- Event
-

Participant 1 Chronology

Age 18 (approx. 2018)

- Graduates high school in [Home State]
- Joins [State] National Guard (6-year contract)
- Enrolls at [University] studying mechanical and aerospace engineering on the same day he joins the [State] Guard.

Fig. 3. Field text chronology example using time (*continuity*)

later narrative construction. We limit chronologies to include concrete events that happen in the participant's experiences to remain focused on event order and narrative meaning created by that order. To assist us in constructing a reliable chronology, we ask participants to construct their own *timeline of important life events* during an interview. Timelines serve as a starting point for the constructing full chronologies by adding in events described in interviews and journal entries.

Identification and organization of small stories. The synthesis table (Figure 4) depicts our process of storying events, excerpts, and meaning made from interview transcripts, journal entries, meaning making memos and chronology. As a student researcher works through the data verification, memo-ing and chronology stages, "small stories" [40] began to form and need to be captured and organized. For this purpose, we developed a synthesis table format (Figure 4) that enables small stories to develop while also capturing "evidence" (excerpts) from field texts.

Story of...	Meaning Making	Evidence in 3D Narrative Space	
		Events	Excerpts
X. Descriptive phrase that describes this story	X.a. Meaning made by researcher from field texts (data, memos, chronology) that relates to the story (X.) X.b. Other distinct, meaning made by the researcher from field texts and their experience with the participant that relates to the story.	a. Chronology entry documenting item X.a. b. Chronology entry documenting item X.b. a.b. Chronology entry documenting item X.a. and X.b.	a. Excerpt directly from field notes (interview transcripts, journal entries, etc.) that documents item X.a. in the participant's told experiences. a.b. Excerpt directly from field notes that documents both item X.a. and X.b. directly in the participant's told experiences.
1. Coming to the military.	1.a. Participant's decision to join military was influenced more by his community and associations rather than a family tradition. 1.b. Participant viewed military enlistment as a step in his career path toward aviation, rather than an identity or destination.	a. Met close friend (< age 18) with military parents a. Joined the [State] National Guard with a six-year contract (age 18) a.b. Transferred from [State] National Guard to the [Home State] National Guard three years into his contract (age 21)	a.b. Interview 1: Participant 1: [00:04:07] And then after talking to some people, they were like, 'You should enlist, and you'll have just no problem commissioning as an officer and flying' is basically like, I was doing it to fly. a. Interview 2: Participant 1: [00:46:13] Well so, my I guess my grandparents... it's not like direct above like I'm a military kid, but they were supportive.

Fig. 4. Synthesis table used to organize events, excerpts, and the meaning made by researchers

We interpret the table (left to right) as the small stories (e.g., 1. Coming to the military) comprising a list of lettered “meanings made” by the researcher from memos (e.g., 1.a. Participant’s decision to join the military... and 1.b. Participant viewed his military enlistment...), and evidence from 3D Narrative Space (i.e., chronology events and memo-ing excerpts that captures the participants’ experiences and support the meaning made by the researcher). Evidence is marked by letters corresponding to the “Meaning Making” item they support. Thus, “a. Met close friend whose parents are military (< age 18)” supports the item 1.a. in the Meaning Making column and “a.b. Transferred to the Alaska National Guard three years into his contract (age 21)” supports both items 1.a. and 1.b. in the Meaning Making column. Shaded rows (Figure 4) indicate predetermined story topics across all participants based on the research purpose and puzzle, while unshaded rows indicate stories unique to the participant emerging from the student researcher’s work.

Constructing big stories as interim texts. We found that the format of the synthesis table (Figure 4) was beneficial for excavating, organizing, and documenting small stories, but did not provide a step off point for writing researcher narratives. Writing “big” stories (*interim texts*), shown in Figure 5, allowed the student researcher to bring together the previous work done through memo-ing (Figure 2), chronological ordering (Figure 3), and meaning making (Figure 4). Big stories center on the participant’s experience and focus on the topic heading of the story. Big stories, written by the student researcher, are shared orally with the response group, PI, and all student researchers in the group) during scheduled team meetings wherein the group listens to the stories and propose questions about details that are unclear to drive further excavation, storying, and re-storying (i.e., revision). The student researcher records these questions, or “wonderings,” going back to the field texts to further explore the participant’s small stories.

Participant 1’s Military Experience Big Story

Participant 1 enlisted in the [State] Air National Guard the same weekend he enrolled in classes at [University]. He served in the [State] Guard for three years, doing monthly drills in [City], approximately [<100] miles south of [University]. After three years of taking monthly trips to [City], Participant 1 transferred to the [Home State] Air National Guard, thinking it was more in line with his future career goals of finding an engineering job in [Home State] after graduation since, with this transfer, he would do quarterly drills in [Home State]. His military service has been domestic field maintenance, though he was once slotted to be deployed to Afghanistan; he did not go for two reasons: (a) because by the time of his scheduled deployment, service members were being pulled from Afghanistan due to end of the conflict there, and (b) because of the Covid pandemic. He is slotted to deploy to Germany after graduation. Serving in the National Guard has been one of the “big things” going on in Participant 1’s life. He has experienced delays in receiving his due pay from the Guard. It would take another decade of service before any opportunities for a career in aviation would be presented. He felt as if, “with a degree [he] could be somewhere else.” He is currently looking for an engineering job in [Home State].

Response Group feedback: How did he come to THIS future goal? Discuss more about the back and forth between engineering and aviation. Capture the essence and change.

Fig. 5. “Big” story (interim text) composed from “small” stories constructed from field text memo-ing, chronology, and meaning making.

For example, in our response group discussions, members propose questions such as “I wonder why you (student researcher) chose to use [specific phrase] when discussing [event in the participant’s story]?” or “It seems like [participant] tends to use view [role] as a duty rather than an interest. I wonder if he ever says that in his interviews?” Response group discussions serve three purposes: (a) guide the student researcher in furthering excavating and re/storying participant’s stories, (b) ensure stories maintain the participant’s voice and attend to 3D Narrative space (time, place and sociality), and 3) support engaging story writing that can connect to broad audiences to improve transferability of findings. The cycle of excavating and storying field texts, re/storying and refining stories with a response group continues until the interim texts center the participant experiences and provide enough detail to inform narrative research texts that will be able to shed light on the research puzzle and the so-what of the inquiry.

Findings and representation. We begin to develop narrative representations of our findings by constructing narratives (research texts) using the small and big stories (field and interim texts).

Constructing narratives. Using the language of literary writing, we relate our position of writing small and big stories (field and interim texts) to a third person narration limited to a *single point of view*, that of the participant. Alternatively, narratives (research texts) are

Participant 1 Professional Identity Development Narrative

As Participant 1 continued through classes and his service, some connections to identities within engineering and the military began to grow: A military identity as “Air Guard” because it is “one of the big things that [he has] going on” and an engineering identity as he began to pursue vocational development specific to engineering. Perhaps influenced by the hands-on nature of his military service, Participant 1 didn’t claim an engineering identity until he had professional experience to justify it. Rather than identifying himself as a mechanical and aerospace engineer because of his experience studying in the major, Participant 1 described his engineering identity as a “mechanical and aerospace engineering student,” because that is what he studies, a “propulsion researcher” because that is what he has researched, and a “civil engineer” because in one of the internships, he worked in that field. In contrast, Participant 1 identifies himself as a “pilot,” “just cause [he is] proud of [earning his flight license while in college].” The differences in attitude toward his military service, engineering education, and aviation experiences suggest that Participant 1 chooses to develop surface level military identity because he has lower personal interest or investment in the military compared to engineering or aviation.

Fig. 6. Early narrative research text (third person omniscient) about professional identity development, which is a predetermined narrative topic related to the research puzzle.

written from a first or a third person *omniscient perspective*, since we as researchers integrate participants’ small and big stories and our own stories of experience (I-Stories) in writing narratives (research texts). Generally, no distinctly new events or stories of the participant’s experience show up in these narratives; small stories and big stories are used to construct narratives to ensure narratives are rooted in participants’ experiences. A key difference between stories and narratives is that small stories often represent idiosyncratic and unpredicted experiences of individual participants, while narratives are usually developed around predetermined topics that are closely tied to the research puzzle and invite “thinking with theory” [40] across narratives. In our study, we determined we would write narratives about participants’ experience of military-to-civilian transition, veteran and engineering identity development, and

SVSM community cultural wealth in engineering based on our research puzzle: how do SVSM participate (transition and integrate), persist (SVSM community cultural wealth), and produce professional identities in undergraduate engineering degree programs?

‘Thinking with theory’ across narratives. As the narrative inquiry proceeds with each participant, I continue one-on-one conversational interviews (storytelling sessions) until each participant no longer wishes to participate, graduates with an undergraduate engineering degree, or leaves their engineering program (either transfers out of engineering or leaves the institution). Resultantly, our team engages several participants in storytelling in parallel. Participant identities are anonymized, kept confidential and are not disclosed to other participants, members of the larger research team (response group), or in written texts. While storytelling interviews can occur with each participant until they exit the study, much of the analysis process (data preparation, memo-ing, chronology, identification/organization of small stories, and construction /revision of big stories with response group feedback) can occur as soon as data is available. To maintain project momentum, student researchers conduct analyses coincident with PI data collection.

Once participants’ early narratives are refined through multiple iterations of sharing with the response group, the response group/research team considers the narratives, within and across as in multi-case research, using “micro-level theory” [30]. We use theory to “...think *with* [our] data ... to accomplish a reading of data that is both *within and against interpretivism*” [41, p. 261]. Going against or beyond interpretivism means we use theory to avoid “...writing up transparent narratives that do little to critique the complexities of social life” [p.261] and that serve only to “...reproduce what we already think, know and experience” [p.69]. We “plug” one narrative “in” to another, or into theory, or theory into narrative, to create something new [41]. As PI, I take responsibility for writing first-person, final narrative research texts to be shared with public audiences. Our final research texts will scaffold findings with critical and identity theories and compare participant and researcher narratives to communicate the personal, practical, and social significance of the inquiry and creating knowledge for research and practice.

Implications of this work

Many engineering education researchers who are dedicated to pushing past the status quo are also drawn to the power of stories to catalyze and accelerate student-centered change. In this method paper, we accomplish three objectives developed to spur and safeguard the healthy growth of narrative research practice in engineering education. First, by highlighting a growing and evolving use of narrative as a research tool in the field over the past 15 years, we *continue the conversation* already energized around narrative research in engineering education. Next, we synthesize our understandings of narrative inquiry (methodology) as theorized and applied in the social science literature. In doing so, we *extend the narrative conversation* by documenting and sharing a methodological script that communicates our narrative inquiry process to the EER community. Finally, we *enact the conversation*, applying our methodological script in the context of an ongoing EER study. We provide an example of *one potential way* to apply narrative inquiry (methodology) to EER. In conclusion, we invite our EER community to consider, debate, adapt, or potentially apply bits or pieces of the ideas presented herein to develop deeper understandings of their own research puzzles.

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References

- [1] F. M. Connelly and D. J. Clandinin, "Stories of experience and narrative inquiry," *Educational Researcher*, vol. 19, no. 5, pp. 2-14, 1990.
- [2] D. J. Clandinin and F. M. Connelly, *Narrative Inquiry: Experience and Story in Qualitative Research*. San Francisco: Jossey-Bass, 2000.
- [3] C. Pantoja, A. Hira, N. Kellam and A. Minichiello, "Narrative research in engineering education," Panel discussion held at the *2025 ASEE Annual Conference & Exposition*, Montreal, Quebec, Canada, June 2025.
- [4] A. Minichiello, "The narrative turn in engineering education research: Theory and method," *Proceedings of the 2025 ASEE Annual Conference & Exposition*, Montreal, Quebec, Canada, June 2025.
- [5] D. E. Polkinghorne. "Narrative configuration in qualitative analysis," *Qualitative Studies in Education*, vol. 8, no. 1, pp. 5-23, 1995.
- [6] A. M. Jackson and C. A. Bodnar. "Narrative inquiry in engineering education: A systematic literature review," *Proceedings of the 2023 ASEE Annual Conference & Exposition*, Baltimore, Maryland, June 2023.
- [7] K. L. Watson. "ASEE Main Plenary: Can we accelerate the rate of change in engineering education?" Presented at the 2010 American Society for Engineering Education Annual Conference and Exposition, 2010.
- [8] J. M. Case and G. Light, "Emerging research methodologies in engineering education research," *Journal of Engineering Education*, vol. 100, pp. 186-210, 2011. <https://doi.org/10.1002/j.2168-9830.2011.tb00008.x>
- [9] N. 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," *Proceedings of the 2015 ASEE Annual Conference and Exposition*, Seattle: WA, June 2015.
- [10] J. Cruz and N. N. Kellam, "Restructuring structural narrative analysis using Campbell's monomyth to understand participant narratives," *Narrative Inquiry*, vol. 21, no. 1, 2017.
- [11] A. Pawley and C. Phillips. "'Learning from small numbers' of underrepresented students' stories: Discussing a method to learn about institutional structure through narrative," *Proceedings of the 2014 ASEE Annual Conference & Exposition*, Indianapolis: IN, June 2014.
- [12] L. Webster and P. Mertova, *Using Narrative Inquiry as a Research Method: An Introduction to Using Critical Event Narrative Analysis in Learning and Teaching Research*, Routledge, 2007.
- [13] A. L. Minichiello, "Toward alternative pathways: Nontraditional student success in a distance - delivered, undergraduate engineering transfer program." Order No. 10137687, Utah State University, United States, Utah, 2016.

- [14] C. H. Foster, "Hybrid spaces for traditional culture and engineering: A narrative exploration of Native American women as agents of change." Order No. 10107718, Arizona State University, United States, Arizona, 2016.
- [15] M. Scheidt, "Understanding undergraduate student veteran engineers' conceptualizations of success." Order No. 30503753, Purdue University, United States, Indiana, 2020.
- [16] M. Sheppard, "Discovering the unique assets of veterans in engineering: A strengths-based thematic analysis of veterans' narratives." Order No. 28155501, Arizona State University, United States, Arizona, 2020.
- [17] H. P. Brown, "Ready or not: A narrative study examining the preparation experiences of Black women engineers for the raced and gendered engineering workplace." Order No. 30505956, Purdue University, United States, Indiana, 2022.
- [18] C. A. Pantoja, "Women's engineering career stories: Perspectives on leaving." Order No. 30506193, Purdue University, United States, Indiana, 2022.
- [19] W. Gan, "A narrative inquiry of women international students in engineering programs in Australia." University of Technology Sydney (Australia), 2023.
- [20] C. M. Campbell, "A narrative study of women engineering students' career development through work-integrated learning." Order No. 30811843, University of Toronto (Canada), Canada, Ontario, CA, 2024.
- [21] A. Figard, "Disabled in academe: Interrogating ableism's role in the experiences of disabled students in undergraduate engineering degree programs." Order No. 31333236, Arizona State University, United States, Arizona, 2024.
- [22] J. Sanders, J. Mirabelli, E. Johnson, and K. Jensen, "Composite narratives with arts-based analysis of undergraduate engineering students' stress and social supports to identify structural barriers," *Studies in Engineering Education*, vol. 6, no.1, pp. 98 -128, 2025. <https://doi.org/10.21061/see.160>
- [23] S. E. Chase. "Narrative inquiry: Still a field in the making," In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research*, 4th ed., pp. 421-434, Sage Publications, Inc., 2011.
- [24] S. E. Chase. "Multiple lenses, approaches, voices," In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research*, 3rd ed., pp. 651-679, Sage Publications, Inc., 2005.
- [25] D. J. Clandinin and V. Caine, "Narrative inquiry." In Lisa M. Given (Ed.), *The Sage Encyclopedia of Qualitative Research Methods*, Thousand Oaks, CA: SAGE Publications, Inc., pp. 542-545, 2008. doi: <http://dx.doi.org/10.4135/9781412963909.n275>
- [26] J. Dewey, *Experience & Education*. New York: Simon & Schuster, 1938.
- [27] F. M. Connelly and D. J. Clandinin, "Narrative inquiry," in J. Green, G. Camili, and P. Elmore (Eds.) *Complementary Methods in Education Research*, Mahwah, NJ: Lawrence Erlbaum, pp. 375-385, 2006.

- [28] J. Bruner. *Actual Minds, Possible Worlds*. Cambridge, MA: Harvard University Press, 1986.
- [29] R. Coles, *The Call of Stories: Teaching and the Moral Imagination*. Houghton Mifflin Harcourt, 1989.
- [30] J. H. Kim. *Understanding Narrative Inquiry*. Sage Publications, Inc., 2016.
- [31] A. Minichiello, "The methodological promise of 'Narrative Inquiry' for exploring student veteran and service member experience as 'People in Relation,'" *Proceedings of the 2019 Annual ASEE Conference & Exposition*, Tampa, FL, June 2019.
- [32] A. Minichiello, "Thinking critically about critical research with military undergraduates in engineering education," *Proceedings of the 2022 ASEE Annual Conference & Exposition*, Minneapolis: MN, June 2022.
- [33] G. A. Phillips and Y. S. Lincoln, "Introducing veteran critical theory," *International Journal of Qualitative Studies in Education*, vol. 30, no. 7, pp. 656-668, 2017.
- [34] T. J. Yosso, "Whose culture has capital? A critical race theory discussion of community cultural wealth," *Race Ethnicity and Education*, vol. 8, no. 1, pp. 69-91, 2005.
- [35] H. Ibarra, "Provisional selves: Experimenting with image and identity in professional adaptation," *Administrative Science Quarterly*, vol. 44, no.4, pp. 764-791, 1999.
<https://doi.org/10.2307/26667055>
- [36] H. Ibarra, "Becoming yourself: Identity, networks, and the dynamics of role transition." 2003 Academy of Management Annual Meeting, Seattle, WA, 2004.
- [37] S. R. Jones, "Voices of identity and difference: A qualitative exploration of multiple dimensions of identity development in women college students," *Journal of College Student Development*, vol. 38, pp. 376-386, 1997.
- [38] S. R. Jones and M. K. McEwen, "A conceptual model of multiple dimensions of identity." *Journal of College Student Development*, vol. 41, pp. 405-414, 2000.
- [39] A. Minichiello, and M. Kirchner, "Theorizing military student transitions in U.S. higher education," *Proceedings of the American Education Research Association (AERA) Annual Meeting*, San Diego, CA (hybrid), April 2022.
- [40] A. Georgakopoulou, "Thinking big with small stories in narrative and identity analysis," *Narrative Inquiry*, vol. 16, no. 1, pp. 122-130, 2006.
- [41] A. Y. Jackson and L. A. Mazzei, "Plugging one text into another: Thinking with theory in qualitative research," *Qualitative Inquiry*, vol. 19, no. 4, pp. 261-271, 2013.