

Story-Driven Learning: A Pedagogical Approach for Promoting Students' Self-Awareness and Empathy for Others

Dr. Kali Lynn Morgan, Georgia Institute of Technology

Kali is a Postdoctoral Fellow in the Wallace H. Coulter Department of Biomedical Engineering at Georgia Institute of Technology. She holds a master's degree in Student Personnel in Higher Education from the University of Florida and a PhD in Curriculum and Instruction- Higher Education emphasis from the University of South Florida. Her research explores equity in STEM education, student development and learning.

Dr. Cristi L. Bell-Huff, Georgia Institute of Technology

Cristi L. Bell-Huff, PhD is a Lecturer and Director of Faculty and Student learning in the Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory University. She is involved in teaching and educational innovation and research. In addition to her PhD in Chemical Engineering, she also has an MA in Educational Studies. She has industrial experience in pharmaceutical product and process development as well as teaching experience at the secondary and post-secondary levels.

Ms. Janece Shaffer, StoryReady LLC

Janece Shaffer, award-winning playwright and founder of StoryReady, has teamed up with Georgia Tech's Dr. Joseph Le Doux to create a signature storytelling curriculum that is now required for all biomedical engineering students. Shaffer is also currently leading a year-long, story-based leadership program for more than 100 engineering educators at the most respected higher ed institutions in the country. Her storytelling curriculum is filled with surprise and discovery and may be presented online, in-person, one-on-one or with groups. Shaffer invites her clients to engage in a dynamic way that sets the stage for bold sharing, deep learning and strategic, big-picture thinking. Georgia Pacific, Delta Air Lines, Georgia Power and The Home Depot are among her many clients.

Prof. Joseph M. LeDoux, Georgia Institute of Technology

Joe Le Doux is the Executive Director for Learning and Training in the Department of Biomedical Engineering at Georgia Tech and Emory University. Dr. Le Doux's research interests in engineering education focus on problem-solving, problem-based learning, the problem solving studio approach, the socio-cognitive aspects of the flipped and blended learning environments, and story-driven learning.

Story-driven Learning: Using Personal Narratives to Explore Identity and Self-Concept Clarity

Abstract

How do we help students make meaning of their experiences inside and outside the engineering classroom? Also, how can we help students develop the skills they need to communicate their meaning-making and its value to others? The purpose of this paper is to describe a newly required course, *The Art of Telling Your Story*, for undergraduates in biomedical engineering at one highly selective STEM-focused university. In this course, students develop and share powerful stories of events that transformed them in some meaningful way. The course instructor and students engage in joint dialogues around these stories that build self-concept and that help them to see themselves as being entrepreneurially minded. Preliminary findings suggest that students: 1) thoroughly enjoy the course, but more importantly, 2) explore their unique identities, and 3) improve their self-concept clarity. In this paper, we describe the structure of the course and its unique environment that promotes psychological safety among students so that they may fully engage in, and therefore benefit from, the course. We then explore the processes and outcomes of the self-concept clarity students develop through their engagement in the course.

Introduction

The value of a college education as a whole is augmented when liberal outcomes are infused into technical fields like engineering. One such liberal outcome identified in AACU's Liberal Education & America's Promise initiative in the early 2000s was "personal and social responsibility" [1]. Defining this outcome as students' preparation for engaging with a cause larger than themselves, Colby and Sullivan held that identity formation is necessary for achievement of this outcome. Indeed, many scholars have argued for identity development to be a fundamental outcome of modern higher education [2]. Schattle asserted that understanding oneself is necessary for understanding others [3], a key part of students' understanding of having personal and social responsibility as citizens of this world. Moreover, recent research building upon Chickering and Reisser's well-known work, *Education and Identity* [4], suggests that identity exploration of students' multiple and intersecting identities is a developmentally appropriate task for college students [5].

Colleges and universities do, and should continue to, provide a myriad of learning opportunities designed to foster such development [2]. Historically, the responsibility of providing such holistic developmental opportunities primarily fell to professionals working in student affairs [6]; however, faculty and academic staff are recently, increasingly sharing with student development professionals the responsibility of educating students holistically and in ways that further students' identity development [2]. We argue that engineering education should approach students' identity formation intentionally by integrating a novel pedagogy we call *story-driven learning* (SDL) into the undergraduate curriculum. In this pedagogy, we engage students with crafting and sharing their evolving life stories and imagining their future selves. The intended learning outcome is to help them build a sense of identity and purpose to their lives, and to further their personal and social responsibility.

In this work-in-progress, we first review the literature informing the practice of SDL and the development of a newly required course featuring SDL in our undergraduate engineering curriculum. We then present and discuss a preliminary study whose findings suggest that this approach promotes identity development and, more specifically, self-concept clarity.

Background

Theoretical Foundations of Story-Driven Learning

We center storytelling in our pedagogy because McAdams argued that stories are a “powerful” way people develop their identity [7]. What people believe about themselves plays a central role in what they think, feel, and do [8], [9]. The self consists of two parts: the “I” and the “me”. A person’s identity, as well as the processes that underlie it, is their “I,” whereas their self-concept is the “me” that their “I” creates. Schwartz and co-authors analogize these concepts to painting: identity is the painter and self-concept is a picture that is painted on the canvas by a painter [8]. A person’s self-concept clarity, then, is the extent to which their self-concept “portrait” is a coherent and clear representation of the elements that compose their identity.

According to McAdams, a person’s identity, the “I,” is composed of life stories that are “coauthored by the person and the cultural context within which that person’s life is embedded and given meaning” [10]. He posited that the ability to author one’s life story requires cognitive skills that may not be fully developed until emerging adulthood. In the first few years of life, the “I” is merely an “actor” who creates their “me” by playing roles and portraying specific traits. In later childhood and adolescence, the “I” exerts more agency in how it creates “me” by establishing and pursuing specific goals. Usually, not until emerging adulthood is reached does the “I” directly author their life stories to demonstrate who they are and how they got there.

These life stories depicting one’s identity originate from what are known as autobiographical memory, that is, the complete repository of memories of specific events that an individual has encoded, stored, organized, and retrieved since as early as the end of their second year of life [10], [11]. People use only a subset of their autobiographical memory to construct their life stories. The subset they use are primarily composed of “personal event memories,” the detailed memories that take place at a specific time and place that, when recalled, produce images and emotions that make it feel almost as if the event is being experienced again [12]. Green and Brock refer to stories with these characteristics as being transportive [13].

The personal event memories that have the biggest influence on defining a person’s self are those that convey lessons or moral principles, mark the beginning of something significant in their life (such as an interest, relationship, or life goal), or highlight a pattern or theme that runs throughout their lives [10], [12]. A significant portion of these kinds of events happen between the ages of 15 and 25, when individuals are “actively formulating integrative life stories to address the psychosocial challenges they face. Consequently, they may be more likely to encode personal events occurring during these years as relevant to their psychosocial goal of formulating identity” [10].

Interestingly, life stories are malleable. For example, they are strongly influenced by the people they are told to, and the cultural context in which they are created. One important socialization influence comes from parents. Parents, in a process Wang calls “joint reminiscing,” discuss past events with their children, modeling for them what events should be remembered, how they should be remembered, and why they should be remembered [14]. Parents instill in their children habits and methods for remembering that help propagate important aspects of their culture. Indeed, the “I” often internalizes values and beliefs from important others, including not only parents but also friends and mentors [15], [18]. As Thorne puts it, “families and friends collude in self-making” [16], [10].

Life stories can also be influenced by more intentional interventions. Studies have shown that people who write their life stories can experience an increase in self-esteem [17], improved mental health and well-being [18], [19], and a greater sense of agency and control over their lives [20]. For example, in one recent randomized controlled study, ninth grade students in the control group were asked to write about a specific time they failed and a specific time they succeeded. Students in the treatment group were also prompted to provide at least one way the failure changed them for the better, and to list steps they took to make their success a reality. The students in the treatment group reported higher levels of grade persistence and attained higher levels of academic performance in the quarter immediately following the study [21]. This study suggests that guided framing of personal narratives can actually shift the ways people think about important events in their lives in ways that can influence future life outcomes.

Holistically, the idea is that people author their sense of self by selecting and making meaning of self-defining memories that are situated in a specific time and place, evoke an emotion, are detailed and mark an important event, goal accomplished, or turning point [10, 12, 13]. These memories form the basis of life stories that a person creates to help integrate and bring meaning and purpose to their life. The construction of these integrative stories begins in earnest in emerging adults, that is, traditionally aged college students, who are developing the complete set of cognitive tools [22, 23], they need to carry out this work. This work can help bring a sense of clarity and coherence about their lives, which can lead to a greater sense of well-being, agency, and self-direction. What people tend to remember, and the meaning they ascribe to these memories, is influenced by the people they share their stories with: their parents, friends, and teachers. Based on this research literature, we thus incorporated story-driven learning into our undergraduate curriculum.

Another central tenet in, and intended outcome of, our curriculum is the development of an entrepreneurial mindset, as described by the Kern Entrepreneurial Engineering Network (KEEN). The ultimate goal of infusing entrepreneurially minded learning (EML) into our undergraduate engineering curriculum is to not only develop our students' engineering skill set, but to also habitualize the use of that skill set to create value for themselves, others, and society as a whole. The entrepreneurial mindset consists of this constant intention to create value, and also values curiosity and making connections among seemingly unrelated information [24]. In short, we intend for our students to use their skill set to improve the human condition. KEEN analogizes these concepts to a tandem bicycle: to benefit society, one must have both the engineering skill set *and* the entrepreneurial mindset. *Of critical importance is the fact that having our students develop and own their entrepreneurial mindsets is synergistic with the goals of liberal education* [25]. Specifically, Colby and Sullivan describe "personal and social responsibility" as having five key commitments including, but not limited to, "contributing to a larger community" [1]. These contributions refer to multiple levels of society: local, national, and global. Regardless of the scale or level of impact, value creation helps students understand and demonstrate how they can improve the human condition [26].

Our Curriculum: Vertically Integrated Story-Driven Learning

Our department previously established a highly interactive, problem-driven curriculum that challenges students to collaboratively solve authentic real-world problems [27, 28]. We also infused SDL, which is informed by what we know about life stories and how they affect a person's identity and self-concept, throughout our curriculum. We did this by vertically integrating three parts of our curriculum: a new course designed for first year students, several of

our middle years major-required courses, and a new third-year course designed for students who expect to graduate within the next year [29]. The first-year course introduces students to principles of reflection as a building block of SDL, in addition to design thinking, and the biomedical engineering (BME) field. In the middle years' courses, students engage in signature learning experiences that foster their entrepreneurial mindset and encourage them to integrate what they are learning with some of their prior extra- and co-curricular experiences. In their third year, students complete a new, major-required course entitled *The Art of Telling Your Story* that acts as a type of capstone experience in this vertically integrated curriculum.

The purpose of this work-in-progress is to describe the *The Art of Telling Your Story* course and its impact on our students' self-concept clarity. We see this as a first step towards developing a course that will help students see themselves as engineers who create value for others, or, those who are entrepreneurially minded.

Our Signature SDL Course

Given the above body of research literature, we postulated that engineering students, most of whom are emerging adults and actively engaged in exploring their multiple identities, could benefit from an opportunity to remember, explore the meaning of, and tell the stories of key events in their lives to a supportive audience of peers and teachers. This was the inspiration behind our creating of the new third-year course called *The Art of Telling Your Story*. This one-credit course is *required* for all students who are majoring in biomedical engineering. We believe such a requirement was necessary, in part because many high impact practices (i.e., those educational experiences that have decades of empirical evidence to support their efficacy in promoting student development) often exist *outside* of the required curriculum for a major and thus are not accessible for students of underrepresented backgrounds [30]. We also believe this requirement sends the message that this kind of work is central to becoming an impactful engineer: one whose understanding of themselves promotes their sense of agency and self-direction to be someone who habitually and proactively uses their skills to improve the human condition.

We have identified five key aspects to *The Art of Telling Your Story* course:

1. Setting the stage
2. Story-telling principles
3. Productive prompts
4. Supportive feedback
5. Facilitated meaning-making

The first task is to set the stage, to create a supportive and caring environment, where the students feel comfortable and motivated to create and share their stories. Next, we introduce students to a set of fundamental storytelling principles. To do this, we first tell them an autobiographical, transportive story to model for them the fundamental storytelling principles. We then explicitly share these principles with the students, using the instructor's story as a concrete example of what those principles look like when operationalized by a skilled storyteller. We teach them how to tell their stories in ways that will be useful in thinking about themselves: by situating them in a specific time and place, by including rich and relevant details, and by sharing images and emotions that make it feel almost as if the event is actually being experienced by both the storyteller and the listeners. The storytelling principles not only align with

components of transportive stories as described by Green & Brock [13], but also center on “personal event memories” [12]. The next key aspect is the story prompts, which we design to elicit what Pillemer [12] called “personal event memories.” Specifically, we prompt students to tell stories centered on a key childhood memory, a peak experience, or a time they experienced failure. To meet our goals toward developing students’ entrepreneurial mindsets in our curriculum, our prompts must also elicit the production of stories that build students’ self-concept and that hold the potential to highlight their entrepreneurially minded behaviors.

The fourth key aspect of our SDL course is the focus of this study and involves Wang’s process of joint reminiscence [14]. Rather than the process involving reminiscing between a parent and child, in this context, the reminiscence occurs between an instructor and students. Wang affirmed the potential application of joint reminiscence to this postsecondary instructional setting, even though the instructor would not have been present with students for the experiences about which they were sharing (personal communication, J. M. Le Doux, April 2021).

To enact this concept, students not only craft their stories, but also share those stories with, and then receive feedback from, other students in the course. This sharing first takes place in a paired setting, and then in the context of each student sharing with the whole class and instructor; then, they each receive feedback from the group. In addition to feedback about the mechanics of the way the story was told, students give and receive feedback about elements of their identity that others saw emerge from the story. Critically, students are coached in advance to provide *supportive* feedback; specifically, what the student could do to improve their story, and summatively repeating positive aspects of the student’s identity in the story that were readily apparent to the audience back to the storytelling student. Feedback given in such a supportive manner aids in the creation of a space where students *want* to share their stories with their peers. In this way, we, as instructors, along with their peers help students identify patterns and themes in their stories that help them reaffirm or learn something significant about themselves.

The fifth component, facilitated meaning-making, occurs during and as a result of these peer and instructor feedback sessions: Discussion often results from comments provided as initial feedback. Since a goal of ours is specifically to help students see themselves as engineers who will use their skills to improve the human condition (i.e., using an entrepreneurial mindset), we intentionally underscore, whenever possible, details from their stories that affirmed or highlighted these significant aspects of themselves. We contend, however, that instructors and peers could highlight other dimensions of students’ multiple identities as well, thereby facilitating identity development of other domains and dimensions.

Furthermore, we anticipate this course could impact students in multiple different ways. As a first step, we chose to focus this study on examining the ways in which SDL in *The Art of Telling Your Story* affected our students’ identity and self-concept clarity. In addition to this description of our newly required course, the purpose of this work-in-progress is to describe the self-concept clarity gained by students participating in joint reminiscence throughout this course. Specifically, the research question guiding this study was: How do students describe the outcomes (i.e., self-concept clarity) and processes (i.e., joint reminiscence) of their learning in a novel, story-driven learning-based undergraduate engineering course?

Methods

Data Collection

For this exploratory, qualitative study, we received IRB approval to interview undergraduate biomedical engineering students who had completed the stories course during one of three, five-week long, mini-semesters occurring during Fall 2018-Spring 2019. We used convenience sampling to recruit interview participants; of the approximately 50 students that completed the course, 10 students agreed to participate. These students ranged from being in the second semester of their second year to graduating fifth year seniors and included one second bachelor's degree seeking student.

Each student interview, lasting 35-90 minutes, was conducted by the lead researcher in the second half of the spring 2019 semester, and was recorded and professionally transcribed. The topics of these interviews included students' experiences in the course, the roles their peers and the instructor played in their learning, as well as what the students learned about themselves and others.

To corroborate our student findings, we analyzed data from two 45-90 minute interviews with the instructor during spring and fall 2019. The instructor was a local, award-winning playwright who also has a business working with individuals and organizations on constructing their personal stories, as their stories are what differentiate themselves from one another. She collaborated with department leadership and faculty to apply her storytelling principles to what was a new setting for her: the undergraduate biomedical engineering classroom.

Each of these two interviews with the instructor was also conducted by the lead researcher, recorded, and professionally transcribed. The researcher inquired about the evolution of the course, the instructor's experiences, her specific strategies for attending to the classroom environment, work from and conversations with selected students, and her perceptions of the student outcomes.

Data Analysis

Preparing for thematic analysis [31], we deidentified our data for analyses and gave each participant a pseudonym. We familiarized ourselves with the data set, then we inductively coded the student and instructor interviews. From this process, we generated and reviewed the themes as the two major student outcomes of the course were empathy and self-concept clarity. As our project continued to progress and evolve, we clarified our understanding of how story-driven learning works. It is then when we realized that the way the course appears to work is through a process similar to Wang's joint reminiscence [14]. We subsequently revisited our dataset and applied a more theoretical approach to a second round of thematic analysis. In this work-in-progress, we share the integrated findings of both the inductive and theoretical thematic analysis. We removed verbal fillers from all participant quotes to facilitate clarity of their meaning.

Findings

As integrated here, the findings from our inductive and subsequent theoretical analyses suggest students developed their self-concept clarity in the course. Specifically, students learned who they believe they are, gained deeper insight into who they are, or, for those who were sure of

their identity, gained confidence in that self-concept. One third-year student, Allison, learned who she was. She stated:

I kind of learned when people would ask me -- I think back to the interviews I had last year for my job. And, my boss said to me, "Okay, but who are you?" Like, "How are you going to fit in with our team? Are you cunning? Are you nice? Are you -- like, what are you interested in?" And, I'd be like, "I don't know." I think I'm funny. But, I didn't know what to say. And, I think now I could answer that question more easily. I could put words who I am, what I mean to myself, and what I'm going to mean to you.

Though many students commented that communication was an important outcome of the course, Allison was describing more than just communication; she was expressing greater clarity in what, and how, she thought of herself.

Maria, a graduating senior, appeared to have a general sense of her self-concept and identity. She was an example of students who gained deeper insight into who they were. She described her learning in this way:

I definitely learned how my experiences lead me to be a certain way. And then, also, how my experiences tie into specific things about my personality.

Here, Maria expressed how she connected stories from childhood that hinted at some aspect of her personality that was still an important part of her identity at the time of the interview. In this way, Maria was likely calling upon those "personal event memories" that significantly impacted her identity and self-concept. The connection between her prior, childhood "me" and the "me" her current, college-aged "I" was portraying was newly insightful for her.

Another student, Zoe, expressed her strong self-concept: a woman whose strength was empathy. Yet, Zoe did not believe empathy was a valuable enough trait for her "I" to include in her portrayal of "me," particularly in highly competitive, engineering environments. The SDL course helped her change that perspective. She said the feedback from her peers and the instructor during the course "affirm[ed] they [her strengths] are valuable... it makes you feel a little bit better." She also emphasized that this new perspective of her self-concept was helpful for her in building her self-confidence, too.

Others, who appeared to have a clearer idea of their self-concept, still believed the course helped them. Amelia, a graduating, fifth-year senior, described her experience in the course:

I think we all still look for how to figure out who we are. I don't think anyone knows exactly who they are. But it was interesting being the only fifth year in the room, in the class, because I felt older and I could relate to all the problems a lot of the younger students had. And it was cool for me to think, 'oh, yeah, I went through that and I figured myself out this way.' So, I guess, for me-- And I'm still learning a lot about who I am right now this semester, and especially because I'm graduating-- life is going to change drastically so I'm interested to (see) how I'm going to react to it. But I really...in college, the last five years have really refined me as a person *and I just want to finally communicate that...like I feel pretty confident of who I am.* (italics added for emphasis)

For Amelia, the course allowed her to step out of herself and see how she had grown, that is, how she developed her identity, as she listened to younger students. The benefit of the course to her, then, was not only having furthered her understanding of her identity development, but feeling ready to share that with the world. Taken together, these data suggest the course was able to help students progress in their self-concept clarity and the projection of that clarity, regardless of the level of self-concept clarity with which they entered.

With these findings from the inductive coding process in mind, we then conducted the secondary thematic analysis; this time, we used a theoretical approach that centered the idea of joint reminiscence as the hypothesis of how students gained greater self-concept clarity. We found preliminary evidence supporting this idea.

One participant, Ralph, shared his struggle in transitioning to our university. He was still struggling with that transition when he took the storytelling course. He met individually with the instructor, Jackie, to get help with a cover letter he was writing for a job. He described the conversation like this:

I shared with her my struggles my first year and mainly just like how bad it was and how much I resisted to get better. But, she almost just kind of took the story I told and turned it around and said like, “No, like, here you persevered. Think about how much you've grown since you've gotten here.”

Jackie also talked about that meeting with Ralph during her first interview with the researcher. She recounted how she tried to spur that realization in him:

He pointed out that that is what kind of helped him finally have a light bulb come on, I think were his words, at Tech... Because we just kept reframing it, because you heard so much of the, “I fell apart, I am bad, I failed.” “No, you're here...You're resilient, you can keep going,” right?

This reframing of experiences, as Ralph and Jackie described, happened inside the classroom as well. Sonia, a second year student, described it like this:

[Jackie] set up everything for us. She would kind of guide our thinking process, right? We started from childhood, kind of formed a thread starting in the beginning. What kind of qualities did I have then until now?

Here, Sonia echoed Maria's new insights into connecting her personality with her experiences. Yet, Sonia specifically attributed this insight into herself to Jackie's actions in “guiding” their “thinking process.” In this way, Sonia and Maria's assertions illustrate how the joint reminiscence process [14] elicited the new insights about themselves.

This process of helping students reframe their experiences and gain confidence in themselves, however, may not have been deeply effective for all students. In this counterexample, Jackie reflected on one student with whom she struggled:

She couldn't own it, at all, that she was talented. That she was capable, she just couldn't do it. And that's where it was like. I thought about her all the time. I talked to my kid about her. I'm like, “what can I do?” ...*As a parent, you can't control what your kid is going to be. You just have to say what you say, and see what you see, and give positive feedback.* And you have no idea what sticks beyond that, maybe she walked out of there

and maybe she heard some of that...It was sad. She was super capable. That was the only kid that was like that. [italics added for emphasis]

At the time of the interview, Jackie was unaware of Wang's study [14], yet she still analogized parenting with facilitating students' development in the context of this course. Though Jackie did not believe this student internalized her self-concept, Jackie emphasized that the growth she saw in most students was indeed the clarity of and confidence in their self-concepts, just as the students themselves had stated. She elaborated:

How I think I see them change... I think self-awareness... becoming more aware and perhaps more confident in who they are. Being thoughtful about what it is that differentiates them from each other and owning that. I don't think it was something they really thought about. I don't know that they thought about their future concretely. *I don't think that they necessarily connected who they were when they were eight to who they are now, and that goes into the future.* [italics added for emphasis]

In this quote, Jackie reinforced Sonia and Maria's insights about connecting prior experiences to their present and future selves. In this way, Jackie's facilitation of joint reminiscence elucidated students' self-concepts. As such, our data provided preliminary evidence in support of our hypothesis.

Conclusions & Our Future Work

In this paper, we described the theoretical basis for a story-driven learning course designed for third-year students in a vertically integrated biomedical engineering undergraduate degree program. We described key aspects of the course, in which we give students the opportunity to construct several stories about key moments, "personal event memories," in their lives [12]. In this course, we intentionally provide, and require, students to make space to connect the dots in their lives, especially within the undergraduate co-, extra- and curriculum, and toward the future. Our intention is that this course facilitates students' identity development in the support of the "personal and social responsibility" liberal education outcome [1].

Our data suggested that this course helped students develop clarity of their self-concept, about their identity, and spurred the need to share this self-concept and themselves with the world. The findings from the second, theoretical thematic analysis provided preliminary evidence that the way this self-concept elucidation occurred was through joint reminiscence, as posited by Wang. The difference in our case, as compared to Wang's study [14], is that the process happens in a classroom setting whereby the instructor acts as the parent, and the students as 'children,' and their peers also contribute to the parent-like feedback.

Our interview protocol did not center the experience of joint reminiscence, or critically inquire about the mechanics of the identity development in which students engaged. Our future research will therefore explore how joint reminiscence facilitates self-concept clarity, within the context of identity development, in engineering and other disciplinary college classrooms. Specifically, we will explore how this joint reminiscence facilitates students' conceptions of themselves as entrepreneurially minded engineers. We speculate that if students identify themselves as entrepreneurially minded engineers, they will be more likely to behave in ways intended to create value for society [32]. Finally, our future work funded by the Kern Family Foundation involves the expansion of story-driven learning across our College of Engineering.

References

1. A. Colby & W. M. Sullivan, "Strengthening the foundations of students' excellence, integrity, and social contribution," *Liberal Education*, vol. 95, no. 1., pp. 22-29, Winter 2009.
2. R. P. Keeling, Learning reconsidered: A campus-wide focus on the student experience, https://www.naspa.org/images/uploads/main/Learning_Reconsidered_Report.pdf, Jan. 2004.
3. H. Schattle, *The practices of global citizenship*, Lanham, MD: Rowman & Littlefield Publishers, 2008.
4. A. W. Chickering and L. Reisser, *Education and identity*, 2nd ed., San Francisco, CA: Jossey-Bass.
5. L. Patton, K. A. Renn, F. M. Guido, S. J. Quaye, D. S. Forney, & N. J. Evans, *Student Development in College*, 3rd ed., San Francisco, CA: Jossey-Bass, 2016.
6. M. S. Hevel, "Toward a History of Student Affairs: A Synthesis of Research, 1996-2015," *Journal of College Student Development*, vol. 57, no. 7, pp. 844-862, 2016.
7. D. P. McAdams, "The psychological self as actor, agent, and author," *Perspectives on Psychological Science*, vol. 8, no. 3, pp. 272-295, 2013.
8. S. J. Schwartz, A. Meca., & P. Mariya, "Who am I and why does it matter? Linking personal identity and self-concept clarity," in J. Lodi-Smith & K. G. DeMarree (eds.), *Self-concept clarity: Perspectives on assessment, research, and applications*, pp. 145-164, Cham, Switzerland: Springer International Publishing AG, 2017.
9. R. F. Baumeister, "The self," in D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology*, pp. 680-740, New York: McGraw-Hill, 1998.
10. D. P. McAdams, "The Psychology of Life Stories," *Review of General Psychology*, vol. 5, no. 2, pp. 100-122.
11. M. L. Howe & M. L. Courage, "The emergence and early development of autobiographical memory," *Psychological Review*, vol. 104, pp. 499-523, 1997.
12. D. B. Pillemer, *Momentous events, vivid memories*. Cambridge, MA: Harvard University Press, 1998.
13. M. C. Green & T. C. Brock, "The role of transportation in the persuasiveness of public narratives," *Journal of Personality and Social Psychology*, vol. 79, pp. 701-721, 2000.
14. Q. Wang, Q. Song, & J. B. K. Koh, "Culture, Memory, and Narrative Self-Making," *Imagination, Cognition, and Personality*, vol. 37, no. 2, pp. 199-223.
15. H. A. Bosma, & E. S. Kunnen, "Determinants and mechanism in ego identity development: A review and synthesis," *Developmental Review*, vol. 21, pp. 39-66, 2001.
16. A. Thorne, "Culture and cognitive development," *Current Directions in Psychological Science*, vol. 9, pp. 37-40, 2000.
17. K. L. Steiner, D. B. Pillemer, & D. K. Thomsen, "Writing about life story chapters increases self-esteem: Three experimental studies," *Journal of Personality*, vol. 87, pp. 962-980, 2019.
18. J. W. Pennebaker, "Writing about emotional experiences as a therapeutic process," *Psychological Science*, vol. 8, pp. 162-166, 1997.
19. K. C. McLean, & M. W. Pratt, "Life's little (and big) lessons: Identity statuses and meaning-making in the turning point narratives of emerging adults," *Developmental Psychology*, vol. 42, pp. 714-722, 2006.

20. J. M. Adler, "Living into the story: Agency and coherence in a longitudinal study of narrative identity development and mental health over the course of psychotherapy," *Journal of Personality and Social Psychology*, vol. 102, pp. 367-389, 2012.
21. B. K. Jones, M. Destin, & D. P. McAdams, "Telling better stories: Competence-building narrative themes increase adolescent persistence and academic achievement," *Journal of Experimental Social Psychology*, vol. 76, pp. 76-80, 2018.
22. T. Habermas & S. Bluck, "Getting a life: The emergence of the life story in adolescence," *Psychological Bulletin*, vol. 126, pp. 748-769, 2000.
23. P. G. Love & V. L. Guthrie, "Understanding and applying cognitive development theory," *New Directions for Student Services*, no. 88, Winter 1999.
24. Kern Entrepreneurial Engineering Network, "The Framework," <https://engineeringunleashed.com/framework#:~:text=%20The%20Framework%20includes%3A%20%201%20A%20starter,help%20you%20introduce%20mindset%20outcomes%20in...%20More%20>, n.d.
25. L. J. Higdon, Jr., "Liberal education and the entrepreneurial mindset: A twenty-first century approach," *Liberal Education*, vol. 91, no. 1, pp. 2-5, 2005.
26. C. Mitcham, "The true grand challenge for engineering: Self-knowledge," *Issues in Science & Technology*, vol. 31, no. 1, Fall 2014.
27. W. Newstetter, "Fostering integrative problem solving in biomedical engineering: The PBL Approach," *Annals of Biomedical Engineering*, vol. 34, pp. 217-225, 2006.
28. J. M. LeDoux & A. Waller, "The Problem-Solving Studio: An apprenticeship environment for aspiring engineers," *Advances in Engineering Education*, vol. 5, no. 3, Fall 2016.
29. C. Bell-Huff, T. Fernandez, K. Morgan, P. J. Benkeser, & J. M. Le Doux, "A vertically integrated portfolio process to foster entrepreneurial mindset within an undergraduate biomedical engineering curriculum," in Proceedings of the 2020 American Society for Engineering Education Annual Conference & Exposition, ASEE2020, Virtual.
30. A. Finley & T. McNair, *Assessing underserved students' engagement in high-impact practices*, Washington, D. C.: American Association of Colleges & Universities, 2009.
31. V. Braun & V. Clarke, "Using thematic analysis in psychology," *Qualitative Research in Psychology*, vol. 3, no. 2, pp. 77-101, 2006.
32. C. J. Bryan, G. M. Watson, T. Rogers, & C. S. Dweck, "Motivating voter turnout by invoking the self," *PNAS*, vol. 108, no. 31, pp. 12653-12656, Aug. 2011.