Building Your Change-agent Toolkit: The Power of Story

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Building Your Change Agent Tool-Kit: The Power of Story

Because stories are important.

People think that stories are shaped by people. In fact, it's the other way around.

Stories exist independently of their players. If you know that, the knowledge is power.

Stories, great flapping ribbons of shaped space-time, have been blowing and uncoiling around the universe since the beginning of time. And they have evolved. The weakest have died and the strongest have survived and they have grown fat on the retelling…stories, twisting and blowing through the darkness. [1]

Stories have been an important part of how humans remember their past and hope for a bright future since long before we created written language. Telling our lived stories and listening to others' stories are part of how we make sense of our lives and build our communities. It is no wonder that stories hold us in such thrall and have power in our relationships and organizations. Both listening to and telling stories are important skills for engineering educators and change agents at any career stage. Listening to the stories others tell provides an important glimpse into the values, beliefs, and assumptions made by those in an organization, and help us make sense of how our own stories fit into a given community. For example, a faculty member new to a department or a dean new to a college may be seeking allies to support an innovative curricular change; careful parsing of the stories told by others in the department or college may indicate who will be supportive and who is likely to only give lip service. Over time, changing the stories told, as well as telling new stories, shifts the assumptions of a group and how concepts turn into meaning.

Stories can be fiction, and sometimes are fictionalized for the purpose of making individuals more open to hearing a truth. Stories can also be fact, a way of packaging our experiences into a narrative we can share. Likewise, an individual can tell a story about themselves that provides a counter-narrative to the story believed by someone else. The stories we tell can add new pathways to the conversation, without trying to tell folks that their way is 'wrong'. For example, stories like Asimov's Robot tales allowed readers to think about racism in a context removed from the stereotypes, strife and polemics of the time. It is important to note that this paper is about stories, not anecdotes. Stories are about how we frame our world, how we explain and understand our world, society, and organizations. A single anecdote is not sufficient. People who have never been exposed to why someone might do something differently, though, need to be exposed to at least one story.

Before we can redirect the stories in our organizations as part of making change happen, we have to learn how to identify, and build meaning from, the stories we hear. That is the purpose of this paper: to open the story of stories. By building a language and narrative of the stories we often hear in engineering education, we are laying the groundwork for the next stage, and the next paper, of this work, where we will explore interventions to change the stories and, as a consequence, change the meaning individuals make of their organizations for the better.

Story as a Way to Understand Meaning

> *Stories etch grooves deep enough for people to follow in the same way that water follows certain paths down a mountainside. And every time fresh actors tread the path of the story, the groove runs deeper.* [1]

For decades, researchers have realized that the stories we tell are important artifacts of what we value and how we find meaning. Schrank's study of artificial intelligence included a deep dive into how the stories we tell relate to human memory and understanding [2]. Further, he notes that both the act of telling a story and the process of listening to someone else's story shape the memories we have of our experiences. Pennebaker's extensive work with guided writing, a technique where individuals write about an experience with no expectation of sharing their story [3], has shown that understanding and reframing one's own story of a traumatic experience increases both mental [4] and physiological [5] health.

It is not surprising, then, that telling of stories is part of the research tool kit across disciplines. Stories of both nurses and patients help nursing science build better practices through understanding the "nuance and detail of previous experiences" [6]. Whether one is doing quantitative or qualitative research, the telling of stories contextualizes the work [7]. Understanding and evaluating statistics is predicated upon interacting with the story in which the mathematics are applied [8]. Similarly, the telling of stories is not new to engineering education research or to faculty development. A narrative-biographical or narrative inquiry approach has been used to understand the experiences of, and qualify the development of, primary school teachers [e.g., 9] through university level engineering faculty [e.g. 10 and 11]. Student learning and development has also received the benefit of storytelling approaches [e.g., 12]. Story, in many ways, fundamentally drives qualitative research. In all of these cases, stories provide the ability of researchers to view the past, present, and goals for the future of individuals, each of whom experience their development in their own way [13]. Fortunately for researchers looking to get a broad set of perspectives in their data collection, tools like SenseMaker allow the collection of narrative fragments, or micronarratives, to understand complex problems [14]. Modern forms of communication, such as memes and tweets, can also be studied as micronarratives. A sufficient number of micronarratives allows us to move qualitative research into a quantitative space in ways we have not be able to before.

Telling stories is just as important to meaningful dissemination of research results as it is to collecting and analyzing data. Malin used two fictional characters to help readers understand quantum mechanics [15]. Several engineering and business programs in the United States use a business novel [16] to teach the theory of constraints. Telling stories is considered an acceptable mechanism for both creating and disseminating knowledge [17].

Story as a Tool for Change

> *This is called the theory of narrative causality and means that a story, once started,* takes a shape. *It picks up all the vibrations of all the other workings of that story that have ever been.*
>
> *This is why history keeps on repeating all the time.* [1]

Fiction writers have long known that story is an important tool for changing people, organizations, and society. In *The Diamond Age*, for example, the heroine learns from her stories how to navigate her experiences and get ideas of what she could do in various scenarios [18]. A machine learning tool lets her explore scenarios until she figures out her key lesson. Part of the popularity of choice-based video games and choose your own adventure books is that once you play or read them, you can enjoy a new story by selecting different options the second time. Stories allow individuals to 'borrow' the experiences of others as they discover the implications of new ideas or move through the stages of organizational socialization [19]. This is not restricted to formal organizations, stories in social movements are how we understand the impact of the movement on the "mainstream" [20].

It is important to note that these stories are not powerful because they are new, but because they have been discovered by someone who can see their relevance. Stories can be discovered through reflecting on one's own experience, through encountering others who share an experience, and through formal and informal means of hearing about others. Some of the stories we hear are stretched truth or obviously fiction, yet the power of a good story is still there. Similarly, there is power in echoing the refrain of story, claiming a connection to the stories others are telling. And power is sometimes encoded in the structures of stories used within a community. Phrases like "Once upon a time" and "They lived happily ever after" are very familiar in American and English literature. Repeating things three times to emphasize a lesson or point out key aspects of a story is used in some communities. Familiar characters live beyond individual stories to teach (e.g., Br'er Rabbit and Br'er Fox, Goofus and Gallant from *Highlights for Children* magazine*)*, satirize (e.g., Punch & Judy or Stephen Colbert in *The Colbert Report)*, connect times (e.g., Laura Ingalls Wilder) or inspire (e.g., Wonder Woman, Harry Potter, and King Arthur). The stories we tell in the engineering education community often involve good and evil administrators, faculty achievers and deadbeats (or burnouts), and shining star and disengaged, failing students. Our stories often follow repeated patterns that connect others to the struggles and triumphs of the people in our community. This connection to the story not only links the individual to the larger story, it also brings in and connects others whose only link to the larger story is their connection to this individual. This ripple effect of being connected to stories creates a herd immunity for individuals who have a story to tell, but are not in a position to share. It is okay for them to not tell their personal story because they are covered by the community's story.

We can use stories of all sizes, including the micronarratives mentioned above, to see what is currently valued and believed. We can also use them to imagine what *could* be better, our own version of the machine learning device the heroine in *The Diamond Age* uses to find a better way through challenging situations. In any system, there is a predominant story that is reinforced through the artifacts and behaviors. There is an archetype story, told many times in many ways, about engineering learning improvement as a response to poor educational experiences lived by

the now-faculty reformers. In this case, the archetype story welcomes those who have little experience with non-traditional practices and then uses additional stories to spur these faculty to try different learning environments. This is a story with power. However, if the response of an individual who connects to this archetype story is not "but I'm going to do it differently," that story actually loses its power. Not everyone relates to the archetype story. Some who are imaging a different experience in engineering learning have had really good learning experiences somewhere else. They have learned engineering while, for example, the chairs are in a circle, and bring their own past stories to the fore. Conversely, we have stories that we tell ourselves that are untrue. "I am great at learning. This is how I was taught, so this is how I should teach." To create change in this scenario, we need to change the story about what an individual can be. We need to change the story of engineering education to what it can be.

Because we have heard so many stories, we are already culturally inclined to be influenced by them. We, as humans, tend to really like stories, and they are so ingrained into how we learn about the world, that the power of story is that when it is a good story, it can influence people who are otherwise not receptive to an idea. Our biases about stories make us receptive. If you are receptive, you may find that the story connects to inner story you hadn't thought about. If you are not receptive, a good story may make you receptive, especially if it strikes an emotional connection.

Not only does a good story connect the listener to experience, it also has legs, it travels on its own [21]. While a charismatic story teller may increase the speed of travel, the power of the story itself is significantly more vital for sustainable improvement in an organization or system [22]. This means that regardless of who is telling the story and even if the nuance of details has been lost in the retelling, a powerful story is still enough to carry the weight of change and sustainability. Further, there is something in the retelling of the stories that gives it the power of a movement.

> *Once there was a town, and whenever the town was in peril, the Rabbi would go to a special place in the woods, and light a special fire, and say a special prayer. And the town would be saved from disaster.*
>
> *And in the next generation, when the town was in peril, the Rabbi who was the student of the Rabbi would go to the special place in the woods and light the special fire, but he did not know the special prayer. But he said a prayer anyway. And the town would be saved from disaster.*
>
> *And in the next generation, when the town was in peril, the Rabbi who was the student of the Rabbi who was the student of the Rabbi would go to the special place in the woods. He did not know the special fire but he lit a fire anyway, and he did not know the special prayer but he said a prayer anyway. And the town would be saved from disaster.*
>
> *And in the next generation, when the town was in peril, the Rabbi who was the student of the Rabbi who was the student of the Rabbi who was the student of the Rabbi said:*

> *"I do not know the special place, and I do not know the special fire, and I do not know the special prayer."*
>
> *"But I know the story, and that will have to be enough."*
>
> *And it was. And the town was saved from disaster.*
>
> *And the moral is to remember to tell the story to each generation.* [23]

Combining these ideas, we can see the power of story for making change happen. Even though this is the way the story has always gone before, it need not continue down this path this time. Changing the predominant story means being true to the people we are. It means saying the emperor has no clothes in a voice that can be heard. It means saying that we are already on the right track when we are. It means listening to those who say #MeToo. It means supporting those who have no voice. It means being – or supporting – the charismatic leader who says it is ok to do it your way. We have the local, personal experiences of the impact of telling us the story can go differently from the way it has been. To make larger, national change, we need to know that the story can change. Sometimes it is one person redirecting the local story until the national story catches up, sometime it's a strong, charismatic leader who breaks onto the national scene and forces the story to take notice. Always, it is the listeners who take a story to heart and consider their own actions in response to the story. In telling a story, the listener can be as important as a catcher is to a baseball pitcher.

Story of Stories: Finding Changing Archetype Stories in Engineering Education

> *Stories don't care who takes part in them. All that matters is that the story gets told, that the story repeats. Or, if you prefer to think of it like this: stories are a parasitical life form, warping lives in the service only of the story itself.* [1]

As part of a larger project that includes documenting the origin story of large, systemic curricular innovations (redacted for peer review), our team has interviewed individuals both supportive and against these changes. In this project we collected and listened to the stories of numerous stakeholders involved in change in engineering education, then created micronarratives of their lived experiences to help us make sense of, perhaps disrupt, and re-tell the larger story of change in engineering education. In doing this work, we have identified a starting set of archetype stories which we believe to be broadly applicable, and useful for engineering educators wishing to use and leverage storytelling in their change efforts. We have grouped them into the stories of status quo, rigor, and faculty career pathways. The following subsections provide quotes from our data as well as an established story that can be used to reference these engineering education change stories. We have elected to use established stories outside of engineering education in order to preserve the ability of individuals to relate to the stories while decreasing the likelihood that the archetype story itself will cause negative reactions to the proposed change. It should be noted that our examples are constrained by the cultural norms in which we live, and another group of authors may select very different stories. Our examples do not work everywhere, and every change agent should consider how best to frame their ideas to the people in their organization.

Finding the Story of Status Quo

> *When the guru sat down to worship each evening, the ashram cat would get in the way and distract the worshippers. So he ordered that the cat be tied during evening worship.*
>
> *After the guru died, the cat continued to be tied during evening worship. And when the cat expired, another cat was brought to the ashram so that it could be duly tied during evening worship.*
>
> *Centuries later, learned treatises were written by the guru's scholarly disciples on the liturgical significance of tying up a cat while worship is performed.* [24]

This is the story of holding to the way things have been done before because it is what we know. The guru had a simple reason for restraining the cat. The disciples, however, did not know the context – they only saw the cat. Thus, they assumed that the context had not changed and some cat, any cat, was needed for appropriate worship. You may recognize "guru's cat" behavior when you hear comments like "we've never done it that way before" or "I've been doing this for 25 years and it's worked (kind of)…"It is found more often where people have read the headline but ignored the story and its emphasis on connections and why acts, events, structure, and thoughts happen [25].

What, then, does this story sound like *in situ*? It often sounds like putting a portion of past happenings on a pedestal without questioning the context or connections of the original decision. For example, this quote from a State University faculty member who was against the systemic curricular innovation in their college:

> "It didn't seem to have lectures, problem workings, homework. And it's just being involved with projects… I do not think that you can do design and do the kind of detailed design that you need to do in the industry without a more formal training. You get the depth. It's doing original work, creating things versus just supplying something that exists, pulling it together."

This faculty member has put time spent in lecture courses and traditional homework and exams on the pedestal they use to define engineering education. This is the way they have always "done" engineering education, thus this is the way it should always be.

> "And I've hired, like I said, hundreds of engineers in the industry before I came here 11 years ago. And I just never hired anybody quite like these graduates." (State University Faculty)

Further, this faculty member has experience with the old system creating the product they are expecting, thus if the system is changed, the faculty member is worried that the product will change in an unacceptable manner.

Finding the Story of Rigor

> *Now, the Star-Belly Sneetches-*
> *Had bellies with stars.*

The Plain-Belly Sneetches-Had none upon thars.
Those stars weren't so big. They were really so small.
You might think such a thing wouldn't matter at all.

But, because they had stars, all the Star-Belly Sneetches
Would brag, "We're the best kind of Sneetch on the beaches.
With their snoots in the air, they would sniff and they'd snort
"We'll have nothing to do with the Plain-Belly sort!"
And whenever they met some, when they were out walking,
They'd hike right on past them without even talking. [26]

While originally written to teach children about the folly of discrimination, the story of the Sneetches is also about the artifacts of rigor. The stars on the bellies of some Sneetches can represent a degree, knowledge base, acceptance into a social or professional network, or other symbol that informs others that one belongs because some standard has been met. Applied to engineering education, "The Sneetches" becomes the story of those who respond to systemic curricular improvement with "That can't possibly be what the institution can vet as a credential because it's not rigorous enough." Whether it is called rigor, standards, or fundamentals, this story is an archetype of what it means that learning processes and the engineers trained in these spaces have to be a certain way in order to be accepted, a way that locks out creativity, flexibility, adaptability, imagination, innovation, and play [27].

In our data of the narratives from various players in engineering education change stories, the need for changing the story of rigor emerged. Certain understandings of "rigor" act as barriers to change. For example, it is difficult to implement a program that uses mostly project based learning when the gatekeepers to change believe that "rigor" means lectures and exams:

> "My opinion [of the proposed program] was that it didn't have enough rigor. It wasn't rigorous enough. It didn't have any tests…it didn't seem to have lectures, problem workings, homework. It's just being involved with projects." (State University Faculty)

Change is also unlikely when gatekeepers equate rigor with a specific, rigid list of courses:

> "[There is] a clear distinction between that program and the program down here, where you take this class and this class and you choose electives from these offerings and we as mechanical engineering faculty can verify that you received this content and therefore you should be an engineer." (State University Faculty)

> "I think it [the new program] was something that a lot of people didn't think would be able to work. There was some concern that it wasn't going to get the students the information and the knowledge that they needed to go out and be useful, I guess, in practice. So that was, I think, a large hurdle, how do we measure it. It's the accreditation piece. How do we show that the students have met the outcomes that we want them to reach? And it's difficult in a traditional curriculum to show that they're getting what they need. It's all the more difficult when you have a little bit less, I guess, rigidity and the traditional box curriculum as to how things are measured and how the outcomes are met." (State University Faculty)

Tangled up in the stories of rigor that we heard were concepts like status, naming, labeling, reputation, and stories of future success (e.g., students getting jobs).

> "[The faculty at this university] were worried about ABET accreditation, but I also think they were just inherently skeptical of the idea that you could really teach engineering in that way." (State University Administrator)
>
> "The fear here [at the university] was that they would go and get a job as a mechanical engineer in the cities and they would do a [bad] job and then it would reflect poorly on all of the graduates from [this university]. And that hasn't happened." (State University Faculty)

> "We looked at a lot of these big issues about like you said project based learning, how much of the curriculum should be in projects and how much should be traditional? How strange do we want to look to outsiders? So there were a lot of these questions, big picture questions. Do we even want to be accredited or will that chain us down?" (Private College Founder)

> "[The university faculty] saw [the program founder] as being from [a] community college telling them how to educate engineers at a university. We're a community college, they're a university. Oh, my gosh." (State University Innovative Program Founder)
>
> "We had department chairs that thought that the program had potential. But one of their biggest concerns was jeopardizing their own ABET accreditation. So all of our departments were ABET accredited. Still are. And they were quite concerned about that. That if this program was a failure it would reflect poorly upon, you know, their individual, whether it's mechanical or electrical or civil or whatever kind of engineering it would happen to be." (State University President)

> "It was primarily [university] faculty, and they just blasted the model and all their evidence for why it wouldn't be successful because that's not the way we've done it. Students need to do this…it was much more about what they'd always done. And I really don't think that they were ready for the change or understood what the change meant." (State University Innovative Program Administrator)

When alternate understandings of "rigor" come into play, change becomes more possible.

> "The thing about ABET is it's about outcomes and there are still people stuck back in the pre-2000 [mindset] when it was about inputs. You know, they've come in and asked, 'Well, how many labs do you have and how many faculty do you have?,' and yada, yada, yada. All the input stuff, not 'Did the student ever learn anything?' I mean, that was never asked. And then, EC-2000 came in and it flipped to just the opposite. 'Well, we look at do you have adequate labs and are they safe? And do you have faculty that are trained to teach what they're supposed to be teaching?' But the real issue is, are the students learning anything and how do you know?" (State University Innovative Program Founder)

> "We're not standing in front of a room,…we are not broadcasting engineering the way that it's done in a traditional program. Instead, the student-teacher interaction has become much closer, much more back-and-forth. … In our model of project-based learning, you

> can’t prepare for class, because it is not going to go the way you would’ve prepared. The students’ needs at that point and time, in a project-based learning environment, are different than what you might project them to be. And so when the two of you meet, or the group of students and the faculty member meet, that’s where the very rapid identification of needs exists. … We don’t give them our hand and walk down the path together, but we kind of stand behind them and walk down the path behind them, and do much less leading and much more guiding until the point where they are ready to walk out the door, where they shouldn’t even ask us the question anymore. They should have the learning skills, the self-regulated learning abilities and the technical acumen to know where to go to solve their problem. That’s our goal.” (State University Innovative Program Founder)

Finding the Story of Faculty Career Pathways

> *Then Strong Wind's sister knew that because the girl had spoken the truth at first her brother had made himself visible to her. And she said, "Truly, you have seen him." And she took her home and bathed her, and all the scars disappeared from her face and body; and her hair grew long and black again like the raven's wing; and she gave her fine clothes to wear and many rich ornaments. Then she bade her take the wife's seat in the tent.*
>
> *Soon Strong Wind entered and sat beside her, and called her his bride. The very next day she became his wife, and ever afterwards she helped him to do great deeds.*
>
> *The girl's two elder sisters were very cross and they wondered greatly at what had taken place. But Strong Wind, who knew of their cruelty, resolved to punish them. Using his great power, he changed them both into aspen trees and rooted them in the earth. And since that day the leaves of the aspen have always trembled, and they shiver in fear at the approach of Strong Wind, it matters not how softly he comes, for they are still mindful of his great power and anger because of their lies and their cruelty to their sister long ago.* [28]

Happily ever after is the story most often told in doctoral programs when discussing a student’s future. Upon finishing the degree, the student will begin a tenure track position at a prestigious university, achieve tenure and rank, and make their name in research. There is this one path the student is expected to take and any deviations from the path are irreversible. This is the story of what we are told a faculty career looks like, one path where we find the prince (tenure) and live happily ever after. Even if that story isn’t true. Faculty are socialized to believe that if they aren’t where they are “supposed to be” right away then they will never get there, because there is only one flow. This affects who and how we hire, the expectations of faculty time, and supports an organizational norm that faculty, regardless of tenure-line eligibility, will never leave so how they are treated doesn’t matter. One of the authors was told by a graduate school professor “I don’t want to waste my time with any grad student who isn’t going to go on to a real [tenure-line research academic] career.” The reality is that multiple pathways not only represent the actual work lives of many doctoral graduates, multiple pathways are also important to an excellent and diverse future faculty [29].

When the traditional story of tenure and promotion is firmly in place, it can prevent change:

> "Worrying about tenure [and accreditation and students graduating], I think are largely social constructs. … So I think that those sort of constructs are ones that are present in existing institutions, and they don't get questioned in existing institutions. Like for example, I can't do that because I won't get tenure. Why is that the case? Why is it not the case that you need innovation? Why shouldn't you need to innovate in order to get tenure? … It's because of the way that we all behave. It's not because the faculty manual says, "Thou shalt be boring for the first six years that you are a faculty member here." It's because the tenure committee says, "Thou shalt be boring for the first six years." (Private College Founder)

However, individuals' interpretations of the story can vary even within an institution, opening up spaces for revised stories:

> "I know each one of my faculty have a different internal weighting on the importance of teaching versus their research. We're all responsible for doing teaching, research and service, but within each of those categories, everyone weights them a little differently in terms of what's priority. So if you have a priority research faculty member listening to somebody who's a priority teaching faculty member explaining about this great new teaching process or learning process they've got their students engaged in, it may be falling on deaf ears unless there's a hook in there or an idea that this is how it can really impact the research that you're doing. So how you communicate all of these things I think is key to whether or not curricular change like this actually ever takes hold." (Public University Dean of Engineering)

If the story gets rewritten, especially at the institutional level, new things then become possible. However, it is often a bumpy road to making real changes to the story. At one private college, they deliberately set out to change the tenure and faculty career pathway story by changing both the expectations (e.g. focus on innovation and teaching, rather than the typical research/teaching/service balance) and the label (i.e., renewal rather than tenure). However, they soon found that the ideal was not easy to achieve.

> "A big stumbling block was when a bunch of the early faculty had our contracts coming up for renewal, so people wanted to be promoted, we don't have tenure at [College] so that's a big thing. But in this case, you could almost think of it like a tenure review was coming to you. So many of us were coming to be ready for tenure, some want a promotion, some didn't, we all wanted to be renewed though, not be fired basically. So, that was when suddenly we realized that what we were doing all these years didn't line up with the values stated in the faculty manual, which had some traditional language in it saying you'll be evaluated on your teaching, your research and your service, of deficiency in one will not be, the exact line was something like, strength in one area does not compensate for deficiency in the other, something like that. Suddenly we're like wait a minute, I spent six years building the college, maybe we'll call that service let's say, in teaching. I'm doing lots of this stuff here and my goodness am I working on that constantly. But now I'm being told research is this bin that's of equal importance so the first you know what, my research has suffered because of this other stuff and this line

explicitly says that strength in one area doesn't help a weakness in the other." (Private College Faculty)

"If we decided we wanted to do things differently, actually, it mostly would just be about us deciding to do things differently. But at the same time, it's harder, both because changing culture is super hard, and because when you talk about them being social constructs, they exist in new institutions as much as they exist in old institutions. You need to fight really, really consciously against them." (Private College Founder)
"I think thinking about creating separate spaces is more powerful than thinking about trying to shift things within an existing culture. Within the existing culture, look, I know what tenure means. You can't change that, because I know what it means." (Private College Founder)

At one southern public university, they intentionally created an innovative program on their campus with a different vision of the faculty pathway (i.e., tenure and promotion guidelines). However, this only worked until the larger university system absorbed the program, and the traditional story was revived.

"Honestly, we had prided ourselves on being different. We had sort of a mantra that was, it would be great if somebody could be tenured-- somebody at [college] who could be tenured in [college], couldn't get tenured here because they don't do enough innovative teaching, for example." (Southern Public University Faculty)

"It was a time of insecurity and from a personal perspective, for me and then there was two other faculty who were going up for tenure that year, and so we went up under [college] and it was a new set of guidelines and they said, "We don't care if you've had these old guidelines, we're going to"-- and in the credit of [college], they did allow-- I don't think they-- they didn't allow copy of our old tenured documents to go along, like our guidelines, but they did allow an extra paragraph to say that there's been a merger and these new guidelines did not reflect what these people were hired-- they allowed that in the letters to the external people and through the committee." (Southern Public University Tenured Faculty)

This southern public university continues to move away from the new story and back to the traditional story, which requires them to decide how to address faculty who began their pathways before the shift:

"I'm now on the Promotion and Tenure Committee. They still allow some indication, because people going up now still had-- the people who will find out if they receive tenure this May still had the majority of their pre-tenured time under a different set of guidelines. So the further out we get, the less that's going to matter." (Southern Public University Tenured Faculty)

"The fear, too, is part of joining [college], there are P and T [promotion and tenure] requirements. … I know that my package that I have currently…my package has kind of got some of those traditional components, but it's not very traditional. There's many

> boxes that I did not check off because that's not what was in my original P and T document." (Southern Public University Junior Faculty)

Overall, there was a line to be walked between perception and reality.

> "[College] wanted to look like the academy. We didn't want to look like some weird old kooks way out on the margin because we were hoping it'd change engineering education. So if we look so bizarre that no one could connect with and be like, well, they don't have tenure or they promote people differently, they don't have the same categories. So time and time again we sort of veered back towards tradition." (Private College Faculty)

The careful reader of these stories will likely note a key assumption embedded in the descriptions of faculty careers: tenure and promotion are viewed as an end, not a means. The result of this thinking is prevalent in the concept of the post-tenure slump [30, 31] as recently tenured faculty struggle to reset from focusing on that particular gateway to taking a broader view. Thus there exists a story within the story, an additional place of reflection and potential change. If one accepts a basic tenet that the development (or potential enlightenment) of the individual, be it faculty, student, administrator, or staff, lies at the foundation of education, then tenure and promotion are a by-product of a process, not the goal. We can imagine how the story of faculty career pathways might change if we shift to considering tenure and promotion as a by-product of a faculty career that is grounded in individual development and that of the whole, rather than elevating tenure and promotion to be an artificial purpose in and of itself. If we, as faculty, want to move to a happy ending, we need to think about where we gather the strength to be our own true selves, and how we can use the power of stories to influence the organizational infrastructure to reward and encourage a broader definition of success.

At the heart of this struggle for change lies an essential construct. Change (dynamic) and tradition (static) are a dualism and this inherent conflict has been embedded in stories since the beginning of time. Pirsig maintains that dynamic quality cannot be defined and that it can only be understood intellectually through the use of analogy [32]. A dynamic idea may be born of dynamic quality and if it gains acceptance, it will eventually join the ranks of tradition, something Pirsig calls static quality in a sort of ratcheting or latching process. By this method our traditional codes grow. Pirsig describes static quality as everything that can be defined. Laws, codified knowledge, common sense, institutions, etc. In other words, the bedrock of stability within society. One can neither have only static quality (stagnation) nor can one only have dynamic quality (wild changes without regard to stabilizing static codes). These dualisms are at odds (conservatism and liberalism is a current stark example). In practice, some static and some dynamic elements are required for a healthy, progressing human endeavor – in a ying and yang dance.

In terms of engineering education, "Rigor" often equates to bedrock stable static thought, 'Change" is believed to be fluff, while on the other dynamic hand, "Rigor" equates to strict adherence to static values and stagnate soul-deadening drills and "Change" is the way to reintroduce the magic of dynamic quality that elevates the soul of the learner. (Again, see [27] for further discussion of the role of rigor in engineering education.) Take the old story of "do you want your bridge to be engineered by only past tried and true methods only" – if so, we'd still have logs across rivers for bridges (albeit very large ones). Dynamic thought produced new materials and structures for our modern bridges in a union of art and science and technology. This story needs to be in engineering education; dynamicism, in wise doses, must be a part of the march of progress and improvement of static codes and knowledge. Ultimately, stories are the bridge to travel between the two worlds of static and dynamic quality; each of us author our own and engage in our own dance between them.

Be the Bicarbonate of History

> *It takes a special kind of person to fight back, and become the bicarbonate of history.* [1]

The stories we tell reflect the reality of what is going on in our departments, classrooms, and universities. Why the story is told is important to understanding the story and how to change it. One of the stories we tell ourselves is that other people care about the same things we care about, other people like those we work with, those we teach. Another story we tell in academia is that earning an 'A' means you have achieved high quality learning. It is likely that those of our colleagues who struggle with teaching and learning are also struggling with these stories and the ones told throughout this paper.

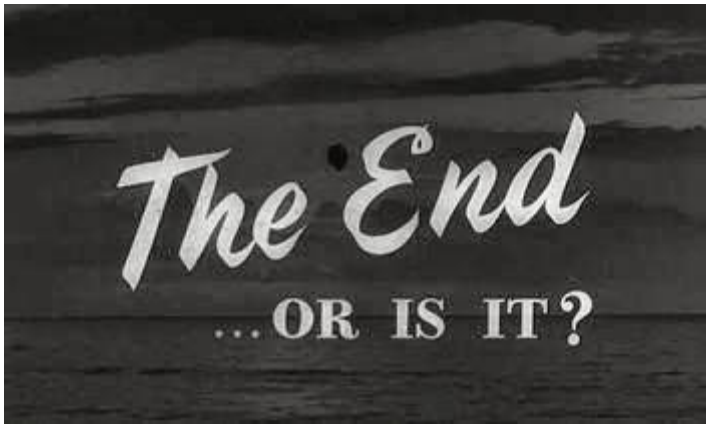
Similarly, we tell the story that there is one kind of happily ever after to which we should all strive. The goals of tenure and promotion are often egocentric. That's not enough for many people, it may even be counter to their value system. Further, this version of the happy ending sets up measurements that don't allow trust, cooperation, or failure. Yet, innovation requires failure. Any time we try something new, or we strive to create a better world, we risk failing. Therefore, if we punish failure we will never get innovation or improvement. Contrast this mindset to the apocryphal story told of former IBM CEO Tom Watson:

> *One of his subordinates had made a horrendous mistake that cost the company ten million dollars. He was called into Watson's office and said, "I suppose you want my resignation." Watson looked at him and said, "Are you kidding? We just spent ten million dollars educating you."* [33]

Trying again based on what we just learned means re-starting the story. It is a chance to move beyond the simple ending and seeing a new beginning. Academia is already primed for this story within a story, after all we call the ceremony where we celebrate our students' completion of their degrees a "commencement", or a beginning.

Every engineering education change agent can be the bicarbonate of history by learning to listen for the stories of our colleagues, departments, institutions, and in the national conversation. Listen for the stories people around you tell and discover the meaning in those stories.

Throughout the engineering education community there are many people making impacts, but there is not one powerful and famous person making an impact. The power of stories tells us that these collective actions will have a stronger and more lasting effect on engineering education and society as a whole *because* there is not one spotlight individual. What becomes important here is not that there is one charismatic leader, but that there are many happening at the same time. Listening for one another's stories is the first step toward change. The next step, and our continued work, is to change the conversations to move it forward, to connect the bits. The stories are critical to get the second, third, and fourth people on board with your ideas for improvement, to building that critical mass. The next paper in our "Building Your Change Agent Toolkit" series is strategies to nudge a critical mass of stories in the direction we, our engineering education community, want them to go.



(http://tvtropes.org/pmwiki/pmwiki.php/Main/TheEndOrIsIt)

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