Building Your Change Agent Tool-Kit: Channeling the Power of Story

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We live in a social and organizational infrastructure made up of stories. These stories can be handed down from generations past, created spontaneously by events, and fashioned in our own heads. Regardless of their origin, stories illustrate meaning in our organizations and interactions. Learning to read the stories around us helps us to uncover the underlying beliefs and assumptions holding back the positive organizational change needed to implement and sustain innovations in engineering education. Anyone who has ever been held back from making or sustaining an engineering education innovation because 'we've never done it that way before' or 'it will never get ABET accredited' or another narrative has experienced stories used to block progress. This paper builds on The Power of Story [1], where readers learned to identify stories in their organizations through the use of interview data from our research study of engineering education innovation origin stories. This paper extends the process by further using stories to recognize and take advantage of opportunities for change, highlighting commonalities based on stories using qualitative research on the origin story of an innovative engineering program.

Why Stories

Stories have long held power in human society. Stories are used as a way to construct, understand and communicate meaning around events and experiences [2, 3, and others]. The act of telling a story is an effective way to disseminate a particular construct of meaning. The act of responding to a story, or re-telling a version with personal commentary, further develop the communal understanding of the story's events. As meaning is constructed, responses are developed. The role of a storyteller or author is often one of illustrating possible outcomes of responses, creatively demonstrating positive or cautionary stories. These stories can then be used as calls for action and tools for change. When the story itself is relevant to the listener, the power is evident.

Within engineering education, we see stories that are familiar, both positive and negative: stories that prepare new faculty for the tenure and promotion process; stories that support or suppress innovation; stories that include or exclude students from different groups. These stories can make community connections stronger and illustrate our communal values and beliefs, as well as illustrate strategies for survival and success.

Archetypical stories [1] that we tell in our engineering education community include stories of the *status quo* – it has always been this way and should always stay this way, stories of *rigor* – what gatekeeping looks like and how we might justify not changing curricular practices to benefit a broader range of learners, and stories of *faculty pathways* – where tenure and promotion are often presented as the ultimate goal, rather than a means to academic freedom and potential innovation. These stories are familiar to many, but they can be used to support positive change at all levels of engineering education rather than suppress it.

A trick to using the power of story to drive positive change is to leverage existing stories and shift the narrative, highlighting cases where there were different responses with positive results, or highlighting existing values in the field of engineering, such as innovation and dynamicism, that can be used to support change in engineering education.

From Stories to Action

Stories are part of the unique language created by any organization, the short-hand we use to express meaning and accept assumptions without having to describe the details. For example, the phrase "T and P" has specific meaning to individuals who work in academic organizations and specific meaning and assumptions tied up in the concept of "T and P" are unique to each institution. These explicit assumptions built into the stories we tell design our day to day practice as members of a workplace community [4].

In order to shift from simply finding the stories around us to changing the stories, and the organization along with them, we need to be intentional and systemic. Intentional attention to stories means that we are aware of the stories we are telling and the non-specific stories that arise from other's perception of us, such as 'word of mouth'. These are the stories and perceptions we are least likely to approach strategically and yet are the more likely to impact the behaviors of both those in our workplace community and those with whom we interact [5]. Systematic storytelling begins by acknowledging that stories are fragmented, collective, situated, and have a performance nature. From there, we can strategically manage the way we quilt the fragments together to manage the multiple and oft conflicting stories that interact in our day to day experience [6].

We can use our intentional and systemic storymaking to make arguments for, and move the behavior of individuals toward, the positive changes we want to see in engineering education. Lounsbury and Glynn [7], for example, define cultural entrepreneurship as "storytelling that mediates between extant stocks of entrepreneurial resources and subsequent capital acquisition and wealth creation". In terms more useful to academic departments, well-positioned stories connect the ideas and our abilities to innovate with our ability to acquire the resources we need to enact our proposed improvement as well as helping to make the positive change we want to actually happen. Further, using stories to make this connection also creates an organizational legitimacy for the new practice, identity, or other innovation.

When we systemically storymake with intention, we can, as Sunstein and Thaler [8] put it, "influence behavior while also respecting the freedom of choice". We see the use of stories to drive behavioral change in many fields. Pennebaker [9] has done extensive work on using guided writing – or telling one's own story to one's self – to help individuals who have experienced trauma find resolution. Wilson [10, 11] used stories from students who successfully navigated a difficult course to create a 30-minute intervention that significantly improved the scores of students struggling in that course. Schrank [12], in understanding artificial intelligence, found that stories are key to how we relate human memory and understanding.

Core recommendations and data

Grounded in the literature described above, we analyzed the interview transcripts from our two-phase origin study of systemic engineering education innovation. The first phase of this study was a deep dive into the origin of Iron Range Engineering, a successful and ABET accredited upper division engineering program that is project-based [e.g., 13, 14]. Interviews were conducted with individuals who were part of the decision-making chain who approved Iron Range Engineering, including the program founders, faculty from other departments, curriculum committee members, and administration. One of the unique features of the phase one study is the inclusion of faculty from other departments and curriculum committee members who actively opposed the formation of the Iron Range Engineering program, some who voted against it and are still suspicious. Phase two of the study added more voices from the phase one institutions, specifically to address credentialing concerns, as well as several new institutions. The new institutions included in this data analysis are a successful, innovative private college, a program at a public university that began innovative and was pulled into a more traditional course, and a program at a public university that is just beginning its journey.

Four themes emerged from the data regarding how stories were used to cause change and influence individuals to action: reframe, change the anchor, social influence / social norms, and co-opt the disbeliever. The following sub-sections describe each theme and provide examples from our research data.

Reframe

Stories are frequently used to reframe an experience, concern, or pathway forward. To do this, a new perspective on the story is introduced by adding a new point of view or changing the language used to describe the story. Reframing can be particularly useful when making change in engineering education that impacts diversity and inclusion.

A faculty member at the successful private institution described how their college's project-based approach re-framed the story of what engineering education could be:

> We want engineering to serve the public good, and [my college] was telling me that their approach would do that. So projects, for example, were not just an interesting idea but was saying this is how you get the people and human problems into the engineering. Instead of a problem set or something abstract that's focusing on a scientific principle, let's have a project where you have the science, the engineering, the math, going into a real world setting, and this is what I studied at grad school.

At another point in the interview, our team member used terminology in her question that this faculty member had not been previously using.

> Bridge, I should have used that word myself. See, I'm new at this job, so you just gave me a key term.

The faculty member then reframed their own story of how they make change.

In our first phase origin story, we found reframing used when the story that had long been told by faculty in other departments was limiting these faculty members' ability to see a new pathway to an engineering degree.

> Where you take this class and this class and this class and you choose electives from these offerings and we as mechanical engineering faculty can verify that you have received this content and therefore you should be an engineer. Versus the approach of saying, "At the end of this, you should be able to do these things with whatever aspects of engineering you've learned."

This was particularly evident in the discussions between the curriculum committee and the program founders. The curriculum committee continually asked traditional questions about specific content, while the program founders tied the content and delivery together as necessary for the innovative student experience.

> We were seeing the Curriculum Committee saying, "But what will you teach?" And the Iron Range Engineering faculty saying, "Here's how we will teach."

Not all of the reframing in our data set was supportive of systemic innovation in engineering education. A faculty member at the public institution whose innovative engineering education program was pulled back into a more traditional management structure described one of the ways the difference in frames used to tell the story of faculty tenure and promotion impacted the department culture:

> We had been hiring on the basis of this [innovative] vision. We had hired a couple of people. We had set up our unit bylaws so that teaching was an integral part of promotion and tenure, which was different than everybody else at [our university]. And so, we were very focused on delivering the best undergraduate education program we could and we went from that sort of very tightly-knit sort of esoteric-- and we called ourselves the hippies. From that sort of environment to a much more traditional-- the faculty that were merged into the program had much more traditional views of curriculum, much more traditional views of education, and there were more of them than there were of the original founders. And so that started to change the character of the program."

In this case, the story of an innovative engineering department who was setting its own governance structure to support student-centered goals was being reframed through a forced merger with a larger group of faculty who had not bought in to the new vision. Or, in the words of a faculty member who was part of the innovative program from the beginning:

> But, in other ways, that accelerated our trajectory back towards the mean.

Change the Anchor

Another theme in how the power of story is used to support or subvert innovation in engineering education is changing the anchor of the story. In this case, additional or contrasting information is provided that casts a new light on the focus of the story.

A faculty member at the successful innovative private college described changing the anchor for colleagues who misunderstood what a project-based approach means in terms of day-to-day interactions between students and faculty, particularly related to how lectures can be used to support a project.

> Truth be told, you can lecture as part of a project. The lecture can absolutely be a building block in a project, totally great. The project is saying the students are solving a problem. This is why engineering is such a great thing, problem solving. But the students are solving a problem and they are evaluating resources to help them solve it, as opposed to I am giving them a problem and the resources and testing them on how well they use it. So, if I say here's your project, oh, you want me to lecture it to you? Okay, I'm happy to lecture it to you, let's see what you do with that.

Noticing the ways people might be telling themselves stories that prevent change provides an opportunity to help them reframe things and actively change the anchor. Without seeing how stories might be hindering the process, it can be hard to use them to support the process.

The phase one interviews included several examples of changing the anchor of how credentials are operationalized, such as the credit hour and the meaning of the engineering degree.

> It's a credentialing battle, which is a university battle of who gets to say. It's an industry thing, but universities are in the line of credentialing. And so, if they can't credential, if it's not the universities that say who is an engineer, then who does? It's weird with connections to software engineering, because anybody who has a job title of software engineering gets to be a software engineer.

In the early days of the public university innovative engineering program, the faculty made an intentional choice to change the anchor of the university's story of who could be an engineer.

> And so, we decided we were going to try to be an engineering program where we would not basically limit who came in. We would see if we could become good enough that we could instruct all of them.

As the innovative program was pulled back into the traditional academic structure, one of the faculty noted the importance of changing the anchor of your change story up the organizational chain.

> You really need buy-in at the levels where people are hired and promoted. Because to really do it well, you need people to be doing stuff that's different than just a standard go out, get research dollars, publish, graduate PhD students.

The innovative program may have continued their original trajectory more clearly if this story had been told more clearly. It also highlights the fact that sometimes stories are easier to perceive in hindsight.

Social Influence / Social Normative

Leveraging social influence (a fancy name for peer pressure) and the social norms of the organization to support your change story can help move people to the action you desire. The

two primary mechanisms are to make the story you *don't want* seem like an outlier and to lead by example.

An early faculty member at the successful innovative private college described the balance between their new college leading the national dialogue of how faculty should be evaluated in a student-centered environment and maintaining their faculty members' ability to be mobile.

> Part of it was intentional saying at the beginning, they told us, [the 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.

In the start-up days of the innovative public university engineering education program, the faculty immersed themselves in other institutions who lived stories that matched the social norms the new program desired to emulate.

> Several of us had gone to Alverno and seen their assessment techniques and that was actually very inspirational in the sense that they're not at all selectively admitting. But, if you see what their graduates can do-- well, even what their students can do after a year or two, it's pretty amazing. I mean, it's just astounding. And so we thought, "Hey, we can do that."

Reflecting on this from the post-forced department merge perspective, that same faculty member noted that the social influence of their new department colleagues limited the program's ability to maintain the fundamental norms necessary for the Alverno approach.

> But the reason they're able to do that is their culture is to spend every Friday afternoon looking at classes, looking at what they're doing, assessing themselves, figuring out how to do it better. And this is the whole institution. If I were to propose that to my faculty, oh, they'd all smile and say, "Whatever." They wouldn't say, "no" directly, but tenured faculty don't have to.

Two faculty members at the public university noted the social influence of the students and how the social norms the students acclimate to are carried into every classroom. One talked about the importance of changing the students' story of what their course experiences may be and why a broader definition is useful.

> If you do something that students aren't used to, you have to work really hard to justify the fact that you're doing something that they're not used to.

Another faculty member in the same program spoke with regret about how the influences and norms the students bring from other faculty and classes can lead to misunderstandings of, and aspersions cast on, innovative pedagogical practice.

> So now when the freshmen unbidden call their project class arts and crafts, to me that's a bother and I think it reflects some of what then happens in the later semesters.

Both expanding the story and bringing in different story tellers (e.g., graduates who could see how their learning experiences supported the work they are doing in industry) can expand the power of the story to both explain an experience and motivate the effort associated with change.

Co-Opt the Disbeliever

Our final core recommendation to use the power of story to make positive change in engineering education is to co-opt the disbeliever. In this strategy, you involve someone who does not support your innovation story in activities, usually small steps in the beginning, that over time will help them change their narrative. This technique can also be used to help a 'new believer' deepen their identity as an innovative engineering education practitioner. One of the impacts of this research is in our development of an onboarding process to bring new faculty at scale into one of the most innovative engineering programs in the world [15].

A faculty member at the innovative private college talked about the process by which their students come to be fully vested in their project-based curriculum.

> Project based learning is something that I've come to really believe in, and now when I teach a standalone history course, it's what I'm teaching this semester, it is project based. So it's very interesting. Doesn't have to be interdisciplinary. I just find I love seeing students roll up their sleeves and we use the word authenticity a lot or authentic, do something authentic.

One of the program founders in our phase one study talked about a long-time faculty member in another department who opposed the innovative new program. This person felt they should have more influence in the decision because of his involvement in the engineering education community.

> He just said, "I am published in engineering education and I know this and I know that. I don't like your program." I said, "Well, what don't you like about the program?" And now we have to use the language of specifics from now on because it's one thing to say, "I don't like it." Tell me what you don't like. And he would say this. I said, "Well, that's not what we're doing." "Well, that's what I heard." "Yeah, okay. Ask me what it is you need to know."

The program founder co-opted the opposition from this individual by using the nay-sayer's misapprehensions to publicly correct the story and nudge others to accept the innovative change.

The faculty at the public university talked about how their own disbelief was co-opted by participating in the program start-up process.

> So we went through a very lengthy process of developing branding and brand identity, which I had never done before. As an engineer, I thought engineers just know what engineering is and so, for me, it was a really interesting process and what it did was it really forged a common understanding of what we wanted to accomplish.

Similarly, when they had their first change-over in the dean's office, they co-opted the new dean's disbelief and turned them into a supporter.

> It's really hard to build a program that goes counter to sort of the institution's accepted vision of what should be going on. And we did that and, when we started the program, we had the university president all the way down to our dean were in agreement that this would be a good thing to try. And they understood the differences between what we were doing and what the university generally did. And they thought, "This would be a good way to try to build a capability that the university doesn't have." And our next dean started off with a pretty traditional view of how we should be running things. Our department chair that founded the program was very persuasive and helped him understand what we were doing and he bought into it.

It is possible to co-opt the non-believers to have them become advocates. In this case, the department chair co-opted the non-believing dean into an advocate and was able to continue the forward progression of the innovative program; the backwards progression began under the next dean, whose dis-belief was stronger than the co-opting forces. Figuring out where to use this influence and how is also valuable. Change agents should consider the relative value of having a department chair advocate to the dean rather than a non-tenured assistant professor, and then having the dean share stories with the president. These chains can get the process started so that change is supported at all levels.

Conclusion

We see some specific strategies for change agents emerging from our data, such as:

- Being aware of one's own perspective on the stories perpetuated in the organization and how that perspective compares and contrasts with the dominate perspective. This is important to one's ability to find opportunities to reframe the story and nudge the choice of frames used.
- Actively look for additional or contrasting information to dominate stories that impede or subvert innovation. While research data is useful and often necessary for this process, adding narrative to illustrate the research data helps personally connect the others in the organization to meaning or implications of the data.
- Regularly telling the stories of engineering education innovation and the benefits of the behaviors we want to see. In order to make the stories we don't want become the outliers, we need to regularly and loudly provide an alternate narrative.
- Live the story we want others to tell and/or follow. It is difficult to counter a prevailing narrative when we continue to support it with our actions and day-to-day decisions.
- Create low-stakes opportunities for the dis-believers to stick a toe in the waters of innovation and change.

The same use of stories to influence innovation and change in the behavior of others can also be used to push innovation away and revert innovative practice back to the norms of the non-innovative dominate organization. Using our four core recommendation (reframe, change the anchor, social influence / social norms, and co-opt the disbeliever) in a strategic, systemic, and

intentional campaign will make a significant difference in your ability to channel the power of story for positive change in engineering education or any other arena.

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