



Leadership Development in Change: A Panel to Explore Experiences, Skills, and Learning in Change Management for New Engineering Educators.

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Leadership Development in Change: A Panel to Explore Experiences, Skills, and Learning in Change Management for New Engineering Educators (Panel Discussion)

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Introduction

Graduate programs largely focus on knowledge, skills, and abilities related to the primary field of study. For example, one graduate program in civil engineering lists a set of student outcomes, including “evaluate the effectiveness of a designed experiment...verify and justify the solution to a complex civil engineering problem...develop and evaluate new, advanced technical knowledge...synthesize and explain the relevance and application of new, advanced technical knowledge...” and so on [1]. This list is admirable in its strong connection to the field of study and the intended purposes of graduate studies, and is one that likely represents key desired outcomes of any graduate program. However, we suggest that this list does not capture many of the knowledge, skills, and abilities (KSAs) required for success in academic settings (e.g., identified in typical advice to faculty publications [2]). The lived roles of engineering educators includes work well beyond the scope of the typical graduate student training.

Consider these excerpts from job postings in the Chronicle of Higher Education (all listed under engineering, January 2015):

“The responsibilities of the [Engineering Capstone Design] Facilitator include: identifying and recruiting appropriate design projects (summer support available), supporting the project sponsors and technical mentors, monitoring student group budget management, coordinating engineering design course content, and identifying and facilitating opportunities and forums for publication/presentation of student project success.”

The candidate must have the “ability to coordinate the engineering operations management graduate program.”

The candidate should have “Experience in curriculum development and student academic advising. Experience in program assessment and execution of a continuous improvement plan.”

We seek “a scholar with new and unique ideas and the ability to successfully execute such ideas; a leader with critically imaginative vision that sees leadership as a community effort to redesign and utilize resources for the maximization of the interests and programs outcomes.”

The candidates who will succeed in positions with these requirements will have skills that extend well beyond disciplinary-based knowledge, skills, and abilities. These advertisements are calling for leadership skills or the skills of a change agent. The challenge to new engineering educators

is to acquire such skills, and more so to acquire the understanding, early in their graduate training, that non-disciplinary skills will be required for success in academic careers. Others recognize this situation. In recent work exploring the career trajectories of engineering Ph.D. holders, Cox and her colleagues [3] discovered the complex nature of academic professional positions, with the majority of their sample holding joint appointments of some kind, and others having significant leadership positions. Similarly, Austin (in her 2001 presidential address to the Association for the Study of Higher Education) asserted that preparing future faculty members must account for “role, responsibilities, and challenges that we can only suspect”, since the future of the academic career will surely be changing [4]. Kelsch and Hawthorne (2014) explored the understanding of junior faculty in areas beyond research and teaching (e.g., “citizenship” or leadership/governance roles), and found a “deep sense of unpreparedness with which new faculty approach key issues in higher education” [5]. Given this wider background, it is not surprising then that engineering educators can find themselves in positions considerably different than anticipated and in which their research and teaching skills are not specifically applicable (e.g., recent job postings for STEM teacher initiatives with dual appointments or in first-year engineering programs that include “innovation” or “leading course redesigns” or being “a dynamic leader” in the requested attributes). Engineering educators who wish to position themselves for success should intentionally seek opportunities to learn, practice, and refine KSAs in these areas. In particular, engineering educators should embrace change skills and change management approaches to amplify success in academic settings.

In this paper and its accompanying panel session, we describe common challenges experienced by engineering educators regarding their work as participants and leaders of change projects, identify skills needed to support change from skills needed to be a successful instructor, and describe key resources to support change leadership development.

Background

This work is part of a larger project that seeks to understand how to scale engineering education innovations. A key premise of that larger project is that most change efforts experience significant challenges because they focus on courses and curricula [6] rather than higher level strategies that serve to facilitate institutional change, like influencing faculty motivation, improving communication, establishing high-functioning teams, and creating mutually-beneficial partnerships [7]. If faculty were well-versed in these skills, change in academia would not be as challenging as it is. For new faculty specifically hired as change agents, this overall problem is even more significant.

The primary experience of graduate training is introduction to and acquiring competence in disciplinary research. Note, however, that the phrases above speak not to disciplinary research expertise (even if one holds a Ph.D. in Engineering Education) but to additional skills or areas of expertise: advising, mentoring, curriculum development, imaginative vision, program assessment, etc. None of these skills are likely addressed in a typical engineering Ph.D. curriculum. Even college teaching certification programs don’t address these areas (e.g., Michigan State University’s excellent program for engineering Ph.D. students involves developing competency in learning environments, teaching strategies, assessment, technology, and professional development [8]). For these reasons, we argue that new engineering educators who envision themselves as change agents should work to adopt the disposition and skills of a change agent.

In this paper (prepared in support of a panel session), we summarize the experience of four educators who are currently working to enact change on their campus. Their stories reveal important lessons about how emerging change agents can position and develop their skills to maximize success in unfamiliar and perhaps tenuous situations.

Method

We interviewed these educators with approval of the Indiana State University Institutional Review Board (#RHS0217). We've changed critical aspects of their identities to protect their anonymity, although we use their words as closely as possible to their original interview responses to maintain the key themes of this work. The subjects of this paper are not the members of the panel. Our work with change agents over three years via the Making Academic Change Happen Workshop confirms that the four individuals described herein illustrate most of the key premises of the change agent disposition.

We selected our subjects based on their participation in the Making Academic Change Happen Workshop. The Making Academic Change Happen Workshop [10] is a three-day faculty development workshop focused on promoting skills development in areas beyond a traditional academic or leadership experience. Topics range across personality assessment, communication, risk assessment and mitigation, and identity or diversity, to building and implementing partnerships, identifying sources of support and resistance, and creating action plans. Every session includes time for learning, practice, and feedback from facilitators and participants. The workshop is designed to help individuals move along a path toward becoming journeyman change agents, through organized sessions, building community, targeted follow-up, and other support. Although the four subjects of this report were all participants in this workshop, they have also engaged in other organized and casual development experiences. One pursued management training in the military, another participated in graduate student-focused general development experiences, another engaged in reading a variety of management-focused publications. Their experiences in this regard will be shared as a resource guide during the panel session.

We used open-ended interview questions to probe the experiences of the educators. We asked questions like:

Can you describe how you went about learning the different skills you've needed to be successful as the leader of this project?

What strategies did you use to understand the unmet needs of students?

What type of resources did you seek to assist you in managing this project?

Tell me about how engineering educators can position themselves for success as leaders.

Our interviews were recorded and transcribed by a confidential transcription service. For our analysis, we adopted the broad guidelines of the Kern Entrepreneurial Engineering Network to guide our analysis. This framework holds three key components of entrepreneurial mindset – curiosity, connections, and creating value. These three elements fit nicely into the analysis of change strategies offered by Henderson, et al. [6]. In Henderson's research, change work is accomplished largely in isolation (e.g., in the absence of connections) and unsuccessful change relies on top-down forces (e.g., administrative directives) or simple dissemination without support for adoption (e.g., try something and then make it available to others). In contrast, successful

change efforts incorporate significant contextual information (e.g., acquired through curiosity and connections) and a careful assessment of needs and possible directions (e.g., creating the valuable change for that situation). Further, the connection of change agents and their skills and needs to the entrepreneurship literature is more readily apparent if one considers academic innovations as start-up operations. Many of the same skills needed to support start-up activities in the business world are those needed for change agents in academia – for example, advocacy for a project, creating a network, developing vision, and passion [9, 10]. Although this business-oriented language may be unfamiliar, there are few other guiding constructs in change management that are accessible to a non-expert. For more detailed change models and language emanating from organizational psychology and higher education administration, see [7], [11], [12], and [13].

Subjects

Anthony is an assistant professor holding a joint appointment between his discipline (in which he earned a B.S. and M.S.) and education at an R1 institution. Anthony's disciplinary background and personal educational experience led him to understand his calling as engineering education-focused work. His time is spent supporting curriculum development in the two academic units he serves, administering discipline-based education research, and working with grant programs and assessment. Anthony is the only person at his institution that holds a dual appointment.

Alexis is a graduate student in a disciplinary field, completing her degree at a graduate only institution. Alexis intends to pursue a teaching-focused career as a result of her undergraduate experience in the discipline. Alexis pursued a significant project within her program, focusing on improving the summer research experience for visiting undergraduates and simultaneously increasing the opportunities for graduate students to acquire teaching experience. Her project occurred outside her normal bench-science research work.

Erica is a graduate student in a disciplinary education program at an R1 institution. Erica's intent is to pursue a teaching-focused career, specializing in disciplinary-based education research for her professional development. The area of her focus is in an advanced area of her discipline (e.g., not the first-year experience), although she will not have a Ph.D. in this area. During her M.S. degree (which was disciplinary, rather than education focused), she undertook a substantial revision to the way in which disciplinary writing conventions were taught and assessed in an upper-level undergraduate course.

Julian is a full professor in an engineering department at teaching-focused college (in the area in which he earned his B.S., M.S., and Ph.D.). Julian's primary efforts involve teaching undergraduate courses, participating in major departmental efforts and innovations, and contributing to larger institutional efforts. His major work in recent years is the creation of an accelerated M.S. experience, for which multiple staff and various institutional resources were required.

Results

Curiosity

Curiosity emerged a defining feature of the change agent experience. Exploring reality, performing investigations of situations and questions, and attempting to learn about their institution and

role were all ways that our change agents accomplished their roles in change facilitation. Much of their focus was understanding why things are the way they are. A defining experience for Anthony (dual appointment) was during his master's work, and illustrates this mindset:

[My Ph.D. advisor said] "You should know how to do this. This shouldn't be a problem. This is the way it worked for me. This is the way it'll work for you." To me, I'm sitting there going, "There's got to be a better way. There's got to be a better way to do this". [So in my current position] basically I've been running around trying to go, "What's the low hanging fruit?"

And from later in his interview...

To me the big part that I look at is, "If I'm not asking those questions, am I actually doing the job that I want to be doing?" The answer to that a lot of times is, "If I don't ask those, I'm not doing the job that I want to do."

This general approach to the job of the change agent was echoed in our other interviews. Expressing a genuine interest in situations and people was met with a positive response.

Our change agents had their specific interests, of course, but maintained an open mind toward other situations they experienced. These situations included faculty meetings, classroom observations, hearing student discussions, serving as a TA, having lunch with people, and so on. Negative experiences were especially informative. According to Erica,

Students hate this [upper-level science] class, so that made me very interested in find out, what is it about this class? It is very hard. It's complex. There's a lot of stuff going on in it. What is really at the crux at making it such a difficult class? What is the point of having this class?...What's going to provide the best student experiences for the highest student learning outcomes?

Observing colleagues interacting led Anthony to think about interpersonal challenges:

I sat there and I was like, "Why are we having these issues?" For me, wanting to investigate [the situation] was trying to figure out ways that you can better mitigate faculty relationships especially when there's been hardship or feelings hurt or however you want to describe something that creates tension in those environments.

And seeing his students struggle, then serving as a reviewer for NSF, led Julian to some questions that later guided several years of his experience (soon to culminate in a textbook):

[For something that a student could] work out by hand in 13 minutes and [this particular student] spent hours trying to get the computer to do it, and he doesn't...need...that powerful tool and he should be starting by hand. That terrified me...I took the experience of wanting to know how to do back of the envelope

[calculations, as a graduate student]...it just sloshed around in my head. I got invited a year later to be on an NSF panel in the CCLI program. As I reviewed proposals I thought, well this idea I have of finding out from practitioners how are they doing [back of the envelop calculations] and teaching it to students...I could write a proposal.

These various experiences illustrate how being open to observation, alternate interpretation, and exploring situations can reveal areas for future work.

Curiosity as a rigorous approach was described by one change agent. It was introduced to her as a research method by her advisor:

[According to my advisor] the first thing is go to the literature and find out exactly what's there. We tend to break it down into multiple different areas. What's out there for writing in general? What's out there for writing in an upper level lab? What's out there for writing specifically to try to get students ready to write journal articles? What's out there for presentation skills for students?

By practicing this approach, Erica is using organized curiosity to advance her understanding of her field and the pedagogical methods she adopts.

Connections

The experiences of the change agents reveal multiple ways in which connections are a critical aspect of professionalism. The important connections ranged from connections to people, connections to ideas, connections to the institution (often via the academic leadership), connections to content, and more. Anthony mentioned beginning his connection-making not with colleagues with similar disciplinary focuses, but with his hiring committee, the other new faculty (to make an experience-based cohort), members of education-focused committees on his large campus, and disciplinary experts outside his field. And he hasn't limited his focus to just his own connections (e.g., Anthony mentioned specific individuals as important connections, especially the Associate Dean in one of his two programs). His approach is open but deliberate:

Really I'm trying to meet people with that and make connections, make connections beyond just me as well...If I can help create networks through that channel, for me it helps because then I have an idea of what's going on in terms of STEM education but I also can build a bigger capacity of people who are interested in and doing work for STEM education...I keep trying to find new people to meet and talk to people and have conversations and figure out who I can work with, who I can get involved with. Right now I'm being very calculating in terms of who I work with for the fact of I'm a new faculty member and I would prefer some battles that are a little bit easier.

Working to create meaningful connections and the right connections for a particular project was important work for Alexis as well. In her effort, one person was the director of each program influenced by her project (e.g., undergraduate summer research program and graduate student administration), and so was especially important:

There's someone in the administration who is the head of that program and so she was our main go-to person for approval or any questions that we might have. She was certainly an important resource...I think there's more support when you have two people than just one. Better ideas [result] because you can bounce things off of one another. [In recruiting other participants, we could have sent a mass email] but we wanted to get people who are most interested. We decided that we'll have to take a more targeted approach so we came up with a list between ourselves or maybe discussing with some of the faculty. We came up with a list of students. Because our program is small enough. We know each other. Then we just emailed those people specifically. Then, some responded, some did not. From there others were added based on just hearsay. They found out we were doing it and they were interested so that's how we got this group of people who would be teaching with us.

To Alexis, with the eyes of a relative novice, allies were to be found in the institution's leadership. She later elaborated, saying,

I would say more specifically I think that administration is more supportive than the PIs that we're actually working for in the lab probably. Sometimes [PIs or faculty] are more stuck to how things have traditionally been. But I think people who are the leaders on the campus who are in the administration, that's their job is to improve the university and so I think they in general are more open to change.

While many might disagree with Alexis's basic premise, the spirit in which she sought the connection to the leadership in her institution is one that can yield positive results. The experiences of Anthony and Alexis suggest that creating a connection with leadership would serve change agents well.

Connections beyond people emerged in two of our interviews. Julian described making a connection to the facilities leadership during the construction of a key campus structure, for which the administration agreed to support using additional funding to make the structure usable for student testing in the future (although the project did not come to fruition for ancillary reasons). Such an organizational connection was echoed by Anthony in describing a seminar he started for faculty to get together for discussion. Julian described a final organizational connection – the ability within his program to mesh the scheduling of courses among four faculty:

We've come to the point where we now have I'll call it a balanced teaching load. Balanced in such that each of us teaches one of the required junior courses, there are four of them that are...related. We each get one. Each of us gets a freshman or sophomore [topical] course so we are seeing the students early in their career. We are seeing them in that junior required sequence...Then we each have what we'll call a service course and that might be senior through freshman [level].

Change agents seem to look for opportunities to create connections in various ways – through curriculum, programming, management strategies, non-academic departments on campus, various professional societies, different approaches to research and professionalism. In short, change agents are constantly seeking connections.

A final perspective of connections emerged in our interviews, one that emphasized that institutions are made of people, and knowing people generally yields a positive return on effort. Erica developed a professional relationship with a faculty member outside her research group and advisory committee that allowed her to pursue her pedagogy reform project. As she described it,

The instructor for the class was a new faculty member. In some ways, I think that helped because he was very willing to let me do some different things because I had helped with teaching the lab the prior year [before he arrived]. He was pretty willing to let me try some things because he knew that I was interested in education. Sometimes I think he felt like he was doing it as a favor to me, rather than he thought that it would work. At the same point, he let me do these things [I wanted to do].

The relationship facilitated Erica's ability to implement her project. As the most senior faculty member in our interview group, Julian's experience was consistent with Erica's, and he presented important advice for developing personal, professional relationships:

It sounds silly perhaps but one of the coolest things my wife told me was we'll make it a priority for you to go to lunch over at the dining hall routine. Get away from this desk and go there because the dialogues are so rich. Things of what have you been trying in class, where are you struggling, just getting to know who are the more senior members, who are the other junior members...Around that table is a really good no threat or low threat opportunity to just share struggles and ideas...It's through interactions on cross departmental committees, cross departmental projects and that lunch table that I become aware of things that people are doing. I was told when I arrived "Get out" so that when it comes [promotion, tenure, retention] time, there is a face that goes with your name. If everybody in the room says "I never met this person," that's probably problematic.

The voices of the change agents confirm that the personal aspect of professional relationships is critical. People remember both kind words and harsh words. Colleagues remember a sincere word of thanks or an honest inquiry into their thoughts.

Creating Value

In the sense that we use it here, “creating value” means contributing something meaningful to the institution, through any means, but particularly by identifying an unmet need and working to meet that need. With this relatively broad perspective, our change agents were continually involved in creating value. An important mechanism by which they started this process was in having a clear vision of their roles in the institution and then working within those roles to meet the needs of various constituencies. Anthony’s story exemplifies this pattern. In his words,

My role and the way I view my role is to try and help people better teach engineering and to stop propagating practices that create engineering as an exclusionary practice, where it tends to limit participation from minorities and diverse groups who could strongly benefit from participation...The big unique contribution to the institution [I make is that] nobody has the competence or the depth of understanding in terms of how to teach engineers. That's where my role fits in and where I fit in. I'm the one who is basically the flag bearer for “Here's how we're going to teach engineers and how we're going to teach engineers in [this state] because of my connections with the College of Education.”

With a strong sense of identity, our change agents worked from a position of personal strength and satisfaction to add their value to their institutions.

For our graduate student change agents, their mechanisms of creating value were on a smaller scale, but no less important. They used their experiences and expertise to contribute in small and meaningful ways. Erica’s work in upper-level science exemplifies this pattern:

I made some rubrics which was exciting at [my former institution] because before that the students didn't really have any rubrics. I'm even talking about for figures and tables. They didn't know how to make them in [the field-specific] format. That was one of the small things that I did – make a rubric for that, so that every single figure and table that you make, you have to follow these guidelines. This is the way that we communicate as scientists. Then they also had two full lab reports where I designed a rubric for them, gave them examples. I definitely increased it. I really took that initiative as I came [to my current institution]. I [am the TA] for the physical chemistry lab here as well. I made rubrics actually for all the labs here.

Like Erica, Alexis saw an area in which opportunity did not currently exist, and worked to fill that vacancy. While her personal experience was the impetus, as she described it, it was clear that the national conversation was moving in a direction consistent with the aims of her project:

It's not just me and it's not just [my project partner] who were wanting teaching opportunities. I mean, [the administration is] getting this all the time from students that they want more teaching opportunities. I think that could be a mechanism [for understanding change], just knowing that this need exists for students. It's their job actually to provide opportunities for students...I think they know that as a goal of the [major funding agency] there needs to be more push for students

to have opportunities to get experience in alternative careers, meaning not necessarily a Principle Investigator in a big lab which is the traditional career path. I do think that since there is this outside motivation from the [major funding agency] that people are more accepting and know that things need to be done to get more teaching experience for students.

Even in positions of relative low power, our graduate student change agents enacted projects that added value to the situations they were experiencing.

Academic institutions are increasingly subject to market forces. Changing tides in program popularity, challenges or successes in student recruitment, needs of the future job market are all pieces of the puzzle that change agents might consider in the value creation efforts. This pattern was especially notable for Julian. In his program (with heavy recruitment to industry and subsequent very high placement), the market forces were a key driver of his value creation efforts:

The corporate climate outside of campus... We've had enough of our alums come back who have obtained a master's degree from big name schools. Schools that would be even top 13 ranked graduate programs in [this discipline]. They come back and say they are very disappointed knowing that they wanted to get a degree to go practice not to go and get a Ph.D. They were very disappointed with the quality of their preparation to go practice because the courses were very much geared toward getting ready for Ph.D. work. They are taught by faculty who have zero practical experience, that's just the way over the last couple of decades the research schools have evolved... We see that that is not going to change in the foreseeable future and in fact it's probably likely to get worse. We anticipate that the market place will have a demand for engineers trained by people with practical experience in a program geared toward practicing. We knew that's what we wanted to do. The market place is ready for students who fit that bill.

Erica's perspective was consistent with Julian's – the needs of the marketplace were drivers of identifying needs of the students. For her communication project in science, Erica reformulated the worth of the laboratory experience:

I think we often go for...these knowledge pieces. I look as those [communication] skills as much more important, in all honesty. I think those are the skills that you have to consistently repeat throughout a students' academic experience. To me, it's just really important because I think we do a real disservice to our students if we don't give them those opportunities. No matter where they end up, they're going to have to know how to communicate to a specific audience. They need the skills of being able to identify who the audience is, what type of language they should use, how to break down complex, abstract scientific terms to that audience, and so that was just really important to me. They need to be able to communicate to a wide variety of groups.

For change agents, having a solid sense of the ultimate utility of the educational experience allowed them to explore ways to add value to that experience.

Our change agents held interesting perspectives about themselves and the standards they held themselves to. Uniformly, the change agents described creating value from a very personal position, not just viewing the outside situation. Two examples illustrate this point. Alexis said,

I felt very inspired by the faculty I see [at my undergraduate institution] and how they are succeeding there. It made me build confidence that I'm getting an education...so I think it must be a great education and I therefore have a responsibility to do something with it.

Julian expressed his personal investment in creating value in different terms but with the underlying emotion:

If we cannot create and deliver a world class program, we need to shut it down. Just having something on the books because our students want it is not enough. We are going to make this a program of distinction or we are not going to do it. Because if it's not a distinction then let them pay the tuition and go somewhere else; that's okay... We are not afraid to dream bigger and better and that's one of the things I love about this team.

Value creation was held to high internal standards by our change agents.

Challenges

The challenges experienced by our change agent interviewees were quite predictable. The varied strategies they used to remedy those strategies provide a clue into a least a few successful approaches.

Not surprisingly, the change agents we interviewed were unanimous that a significant challenge they faced was time limitation. With positions, responsibilities, and interests that intersected with many other people in their programs or institutions, these individuals had “limited capacity” (in Anthony’s words):

I can do some of the smaller scale stuff on my own, but there's only one of me who's pushing for that. I think that's where I run into the biggest challenges. I don't have a whole lot of capacity to help push things forward or what capacity does exist is very stretched in terms of resources.

Alexis reframed her time-based challenges into an understanding of her key priorities (in her position as a student) and the key priorities of her peers participating in the project. She conceptualized it thus:

[The biggest challenge is] time a little bit and when it comes to preparing. I think that it's normal to let things go and...we're all busy, right? We're in the lab every day doing research so [the project] takes a back seat. It's something you're very

interested in and you want to do, but at the end of the day, I mean, you have to do what you're there for.

Julian's solution to this challenge puts responsibility on the institution, but also on himself to advocate for his needs to decision-makers (e.g., department head and dean), describing it as follows:

[A goal should] be to be able to allow faculty time during their academic year. There is great support for financial opportunities in the summer to dive in and invest in these student development issues...if the institution stepped in and said "let's help you" there that would certainly liberate lots of folks in lots of areas to go and do....A second key ingredient was we'd finally gotten to enough people in the department when the [last] person came on board so there is enough flexibility... We said "Okay we've got the resources in terms of man hours"; it's just a matter of deciding to put it together.

Change agents will never lack opportunities to engage with and contribute to their communities. An ever-present challenge is time. Advocating for time, being highly selective in saying "yes" or "no," and working with their administrative colleagues to build in time were strategies described in various ways.

Perceptions were described as an important aspect of their roles as change agents, with perceptions being also a potential source of risk. For example, in her work to influence an upper-level science course, Erica found it was critical to establish first her content-focused credentials (coming from a disciplinary-based education research group):

I had covered [the instructor of record's upper-level science course] when he goes to conferences, so he'd seen me teaching. He's see me in class. I had already passed my cumulative exams, and I had taken a couple of [graduate-level science courses], so it really helped having the showcase in my content knowledge beforehand...I find it's one of the first things you have to do with [scientists in this area]: show that you do know your stuff, and also that you know how to teach it which makes sense. They're very concerned about the content knowledge.

Perceptions of the change agent are often connected to the prevailing perceptions of the faculty. Anthony's experience suggested that his work would involve challenging the perceptions his colleagues had, putting him in a regular position of some risk:

A lot of people get stuck in the rut of perceptions, of "Oh, we can't do that because of this, that, and the other thing that happened six years ago." I think there's a lot of self-created barriers between individuals. When conversations occur, and occur in a way that is fostering and facilitating of ideas, then I think it can help really to push change forward. That's what I've had success with here, is saying, "So you've always done it that way, why?"

Perceptions emerged with all four of our change agents in terms of testing their own perceptions and assumptions. A general theme was that perceptions can and should be carefully considered and examined to learn the underlying roots causes of any situation.

Change agents push. It is their nature and often their job. Change agents, especially those hired specifically to get something specific accomplished, are forward-thinking and fast-moving. That personality can cause internal or external conflict. Erica identified her biggest piece of advice to emerging change agents as,

Be patient. I'm not a patient person. I want everything done now, especially if I identify something, I want to fix it now. That doesn't often happen in academia. Sometimes you have to prove yourself to show that you do have the pedagogical knowledge as well as the content knowledge before people are willing trust you to do anything, as well as sometimes, especially if it's going to really rock the boat and make work for people. They really don't want to do that.

Similarly, Anthony understood the likelihood for conflict, but reframed it to be a positive aspect of his role as a change agent:

For me I don't feel a whole lot of pressure of, "I need to conform to the department to be successful" because of where my position sits [between two programs]. I think that that puts me in an advantageous spot to ask some of those questions that maybe will ruffle some feathers or make people think the deep thoughts, which, to me, I love. I love to be able to go in and rattle the cage a little bit and see where people go with it.

Alexis provided a critical piece of advice regarding promoting success as a change agent:

There was someone there who really thinks that her ideas are the best, wants to just take over. I think learning how to say the appropriate things to make sure that person feels like they've been heard but yet still keep the meeting moving forward. I'm not sure what that's called as a skill but I think that's the thing that I was learning how to do the most, the most useful skill. Because that became maybe one of the more challenging things is dealing with the people who are actually on the team sometimes...Trying to first listen to the person and not to just completely discard what they're saying.

Summary

Our discussions with change agents revealed the complex landscape of skills and approaches necessary for success. In the stories of these individuals, we learn the skills that are not taught in graduate training programs – how to create partnerships, perceiving areas of programmatic or personnel need, managing people, creating a collegial environment, and so on. Future change agents can enhance their success through careful attention to these additional skills [10]. Using the framework *curiosity, connections, and creating value* provides a set of touch points for emerging change agents to harness in their personal and professional development.

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