

COMPLETING THE LOOP OF INNOVATION: IMPLEMENTATION

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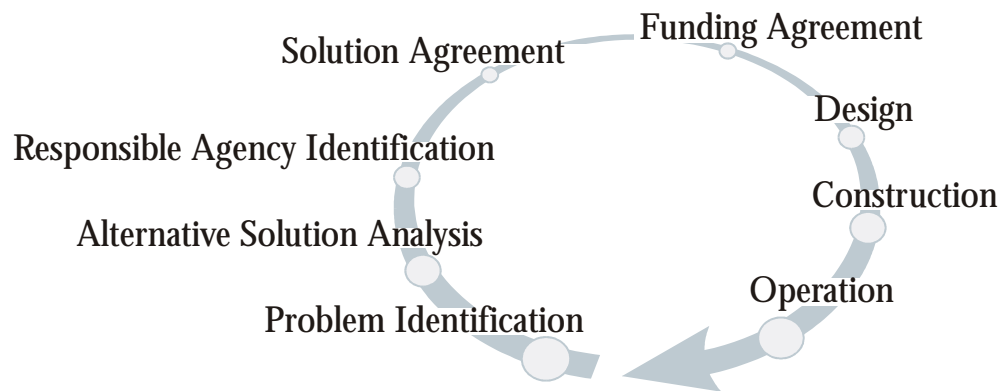
Introduction

This paper deals with the often overlooked, or minimized, aspect of innovation—implementation. It does no good to invest a lot of work in a solution to an intersection problem if the project fails due to the inability to implement the solution.

Most people generally only deal with what is on their radar screen now. That radar screen generally does not extend out very far. Many of us, particularly from the technically trained disciplines, struggle with concepts of communication that are required to successfully implement our concepts or ideas. “How can we get our ideas on someone else’s radar screen?” If we deal with a subject such as Intersection Safety, you would think that it would connote thoughts of “motherhood and apple pie,” with everyone falling into line with improvement suggestions, but usually because of the inability to communicate and understand other’s positions nothing could be further from the truth.

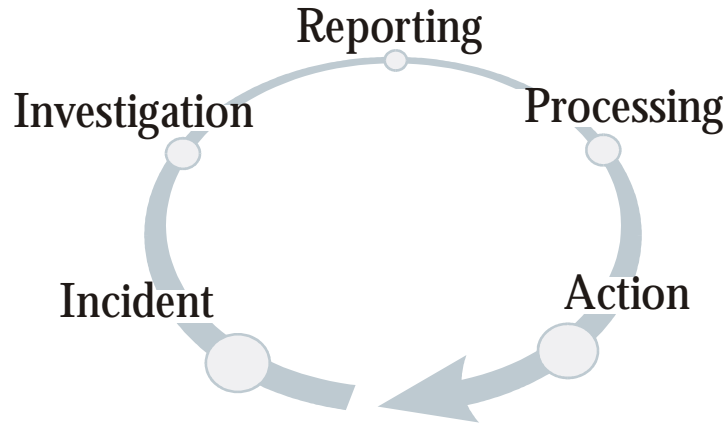
Innovative Intersection Solutions

The process of developing innovative solutions for intersectional problems follows a process, which can be circular, as illustrated below:



One particular step is extremely critical. That step is Responsible Agency Identification because several of the following steps, and maybe even the preceding step, of Alternative Solution Analysis, can involve multiple agencies. Responsible Agencies can include individuals from the staff level such as courts, police, fire, public works, as well as elected officials...and these folks can be representatives of municipal, county, state, and federal organizations. Within each are included technical, administrative, and elected people.

Each of these individuals has their own process of evaluation that we can call a circle of response as illustrated below:



This circle of response happens each time something new appears on their radar screen, even if the initial action is just to file it away until something more appropriate happens. A police officer investigates an accident (incident), he performs an investigation, fills out a report, files the report, perhaps issues a citation, and awaits the court's action. That accident report can become an incident on an engineer's radar screen, prompting an investigation looking at other accident reports, leading to a report that will be processed, and lead to some action.

For the public works director, the recommendation based on the report becomes one of many incidents. The reading of the report becomes his own investigation, perhaps he identifies that an interagency jurisdictional issue is involved. He must then initiate a call, or write a memo to the other agency, which in turn becomes an incident on their radar screen. Moreover, in a similar manner at each level it continues along—the circle of response.

At each of these levels, the proficiency in technical- and people-related skills varies immensely—some good, some not so good. Generalizing about the proficiency at each of the levels would be speculative at best. The remainder of this paper takes the perspective of an engineer, even though it may be applicable to other disciplines as well.

Engineering Education & Training

Engineers are well trained in technical-related skills. By nature, that is where they have the greatest degree of comfort. It is unusual to have to force engineers to keep their technical skill sharp. People-related skills' training for the engineer, on the other hand, relies heavily on general family upbringing, training related to general life skills interests, or on-the-job training.

Passing items along to another's radar screen is more art than science. It is done by communicating. Communication is a people-related skill. Oft times in communicating some particular conflict surfaces. Conflict resolution is a people-related skill. Many other social and personal competencies involved in dealing with another person's radar screen are people-related skills. People-related skills are generally taught in social science classes. However, undergraduate curriculums for engineers make room for only a couple of electives from the social sciences. With that extremely limited training, immediately upon graduation, new hires or candidates for advanced degrees are thrust into mandatory team situations that are formative to their budding careers. It is a formula void of interpersonal skills, bound to create hardship at one extreme and frustration at the other.

Going back to the circle of response, engineers are well trained in problem solving and the methodology behind it. Reporting and processing are areas that they might do less well due to their lack of training. Each of these steps requires communication, either orally or in writing. Both steps require collaboration and persuasion. Yet, in these critical aspects of the circle, there continues to be a lack of training in these skills that contribute to success in implementing the results of the investigation.

Emotional Intelligence

A lot of work documents the understandings of these people-related skills. According to Daniel Goleman in *Working With Emotional Intelligence*, these skills are analyzed, described, categorized, and incorporated under the heading of Emotional Intelligence¹. In the study, further research was conducted into the degree that these skills play in successful careers. By a ratio of two to one, these skills contribute more to people's success than does their technical understanding as measured by their Intelligence Quotient, or IQ. Does this not then help in making the case that these skills need to be emphasized and taught in engineering education, if we hope to turn out successful graduates?

These Emotional Intelligence (EI) skills are so important, that within engineering circles at least, they should be termed Critical Skills. Calling them softer- or people-related skills seems to be heard by some individuals within the engineering community as a condemnation or an "off-limits" signal that forbids association.

Other related work has determined the relevance of and the difference between knowledge, skills, and talents. "The distinction among the three is that knowledge and skills can be easily be taught, whereas talents cannot."² This work, documented in *First, Break All The Rules*, seeks to understand why some managers are successful and others are not. The fact is that for filling positions, managers need to first seek appropriate talents in the candidates, and then recognize that they may train successful employees in the necessary skills.

When we embrace the premise of teaching "skills" as opposed to "talents," it will follow that we can teach technically oriented individuals, such as engineers, these Critical Skills. Itemized below, in Table 1, are the skills that make up the Emotional Competence Framework. Appendix A further defines this framework.

¹ Daniel Goleman. *Working with Emotional Intelligence*. New York: Bantam Books, 1998.

² Marcus Buckingham and Curt Coffman. *First, Break All The Rules*. New York: Simon & Schuster, 1999.

Table 1 – The Emotional Competence Framework

Personal Competence	Social Competence
<p>Self-Awareness Emotional Awareness Accurate Self-Assessment Self Confidence</p> <p>Self-Regulation Self Control Trustworthiness & Conscientiousness Innovation & Adaptability</p> <p>Motivation Achievement Drive Commitment Initiative & Optimism</p>	<p>Empathy Understanding Others Developing Others Service Orientation Leveraging Diversity Political Awareness</p> <p>Social Skills Influence Communication Conflict Management Leadership Change Catalyst Building Bonds Collaboration Team Capabilities</p>

Shown above are 25 itemized skills within the framework. Twelve of the skills are categorized as Personal Competence, and 13 are categorized as Social Competence. This is certainly a daunting list. However, Daniel Goleman makes the point that a person can be successful by mastering as few as six of these skills. It is an all-encompassing list, which, when read in whole, conjures up images of the ideal employee or team member. Likewise, it seems intuitive to see how these skills can contribute to the success of both the problem solution process and the circle of response illustrated above. It is becoming critical to find a way to teach, or at least emphasize the importance of finding ways to master, critical skills. This is extremely important in the more technical disciplines such as engineering, where communication is the key to implementation.

Conclusion

The point of this paper is to illustrate that Critical Skills are twice as important as technical understanding in successful careers. It seems logical that they would be as important to the process of implementing solutions, and even arriving at innovative solutions, to problems faced by personnel dealing with intersectional safety issues. Unfortunately, recognition of the need for Critical Skills training is not a quick fix. If this type of training cannot be instituted in undergraduate curriculums, then postgraduate and continuing education must pick up the banner and continually impress on technical people in all lines of work the need to sharpen these skills. Without the ability to collaborate and communicate with and, as a result, influence decision makers about our recommendations, the solutions will be placed and remain on the shelf.

Appendix

The Emotional Competence Framework

The Emotional Competence Frameworkⁱⁱⁱ

Emotional Intelligence Dimension	Emotional Competence	People With This Competence:	Posit.	Indiv.
Personal Competence: These competencies determine how we manage ourselves.				
<p>Self-Awareness: Knowing one’s internal states, preferences, resources, and intuitions.</p>	<p>Emotional Awareness (p. 54) –Recognizing one’s emotions and their effects</p>	<ul style="list-style-type: none"> • Know which emotions they are feeling and why 		
	<ul style="list-style-type: none"> • Realize the links between their feeling and what they think, do, and say 			
	<ul style="list-style-type: none"> • Recognize how their feelings affect their performance 			
	<ul style="list-style-type: none"> • Have a guiding awareness of their values and goals 			
	<p>Accurate Self-Assessment (p. 61) –Knowing one’s inner resources, abilities, and limits</p>	<ul style="list-style-type: none"> • Are aware of their strengths and weaknesses 		
	<ul style="list-style-type: none"> • Are reflective, learning from experience 			
	<ul style="list-style-type: none"> • Are open to candid feedback, new perspectives, continuous learning, and self-development 			
	<p>Self Confidence (p. 68) –A strong sense of one’s self-worth and capabilities</p>	<ul style="list-style-type: none"> • Present themselves with self-assurance; have “presence” 		
	<ul style="list-style-type: none"> • Can voice views that are unpopular and go out on a limb for what is right 			
	<ul style="list-style-type: none"> • Are decisive, able to make sound decisions despite uncertainties and pressures 			

<p>Self-Regulation: Managing one's internal states, impulses, and resources</p>	<p>Self-Control (p. 82) –Keeping disruptive emotions and impulses in check</p>	<ul style="list-style-type: none"> • Manage their impulsive feelings and distressing emotions well 		
		<ul style="list-style-type: none"> • Stay composed, positive, and unflappable even in trying moments 		
		<ul style="list-style-type: none"> • Think clearly and stay focused under pressure 		
	<p>Trustworthiness and Conscientiousness (p. 89) –(T:) Maintaining standards of honesty and integrity and (C:) taking responsibility for personal performance</p>	For trustworthiness:		
		<ul style="list-style-type: none"> • Act ethically and are above reproach 		
		<ul style="list-style-type: none"> • Build trust through their reliability and authenticity 		
		<ul style="list-style-type: none"> • Admit their own mistakes and confront unethical actions in others 		
		<ul style="list-style-type: none"> • Take tough, principled stands even if they are unpopular 		
		For conscientiousness		
		<ul style="list-style-type: none"> • Meet commitments and keep promises 		
		<ul style="list-style-type: none"> • Hold themselves accountable for meeting their objectives 		
		<ul style="list-style-type: none"> • Are organized and careful in their work 		
	<p>Innovation and Adaptability (p. 95) –(I:) Being comfortable with novel ideas, approaches, and new information and (A:) flexibility in handling change</p>	For innovation		
		<ul style="list-style-type: none"> • Seek out fresh ideas from a wide variety of sources 		
		<ul style="list-style-type: none"> • Entertain original solutions to problems 		
<ul style="list-style-type: none"> • Generate new ideas 				
<ul style="list-style-type: none"> • Take fresh perspectives and risks in their thinking 				
For adaptability				

		<ul style="list-style-type: none"> Smoothly handle multiple demands, shifting priorities, and rapid change 		
		<ul style="list-style-type: none"> Adapt their responses and tactics to fit fluid circumstances 		
		<ul style="list-style-type: none"> Are flexible in how they see events 		
<p>Motivation: Emotional tendencies that guide or facilitate reaching goals</p>	<p>Achievement Drive (p. 113) –Striving to improve or meet a standard of excellence</p>	<ul style="list-style-type: none"> Are results-oriented, with a high drive to meet their objectives and standards 		
		<ul style="list-style-type: none"> Set challenging goals and take calculated risks 		
		<ul style="list-style-type: none"> Pursue information to reduce uncertainty and find ways to do better 		
		<ul style="list-style-type: none"> Learn how to improve their performance 		
	<p>Commitment (p. 118) –Aligning with the goals of a group or organization</p>	<ul style="list-style-type: none"> Readily make sacrifices to meet a larger organizational goal 		
		<ul style="list-style-type: none"> Find a sense of purpose in the larger mission 		
		<ul style="list-style-type: none"> Use the group’s core values in making decisions and clarifying choices 		
		<ul style="list-style-type: none"> Actively seek out opportunities to fulfill the group’s mission 		
	<p>Initiative and Optimism (p. 122) –(I:) Readiness to act on opportunities, and (O:) persistence in pursuing goals despite obstacles and setbacks</p>	For initiative		
		<ul style="list-style-type: none"> Are ready to seize opportunities 		
		<ul style="list-style-type: none"> Pursue goals beyond what’s required and expected of them 		
		<ul style="list-style-type: none"> Cut through red tape and bend the rules when necessary to get the job done 		
<ul style="list-style-type: none"> Mobilize others through unusual, enterprising efforts 				
For optimism				

		<ul style="list-style-type: none"> • Persist in seeking goals despite obstacles and setbacks 		
		<ul style="list-style-type: none"> • Operate from hope of success rather than fear of failure 		
		<ul style="list-style-type: none"> • See setbacks as due to manageable circumstance rather than personal flaw 		
Social Competence: These competencies determine how we handle relationships.				
Empathy: Awareness of others' feelings, needs, and concerns	Understanding Others (p. 138) –Sensing others' feelings and perspectives, and taking an active interest in their concerns	<ul style="list-style-type: none"> • Are attentive to emotional cues and listen well 		
		<ul style="list-style-type: none"> • Show sensitivity and understand others' perspectives 		
		<ul style="list-style-type: none"> • Help out based on understanding other people's needs and feelings 		
	Developing Others (p. 146) –Sensing others' development needs and bolstering their abilities	<ul style="list-style-type: none"> • Acknowledge and reward people's strengths and accomplishments 		
		<ul style="list-style-type: none"> • Offer useful feedback and identify people's needs for further growth 		
		<ul style="list-style-type: none"> • Mentor, give timely coaching, and offer assignments that challenge and foster a person's skills 		
	Service Orientation (p. 151) –Anticipating, recognizing, and meeting customers' needs	<ul style="list-style-type: none"> • Understand customers' needs and match them to services or products 		
		<ul style="list-style-type: none"> • Seek ways to increase customers' satisfaction and loyalty 		
		<ul style="list-style-type: none"> • Gladly offer appropriate assistance 		
		<ul style="list-style-type: none"> • Grasp a customer's perspective, acting as a trusted advisor 		
Leveraging Diversity (p. 154) –Cultivating opportunities through	<ul style="list-style-type: none"> • Respect and relate well to people from varied backgrounds 			

	different kinds of people	<ul style="list-style-type: none"> • Understand diverse worldviews and are sensitive to group differences 		
		<ul style="list-style-type: none"> • See diversity as opportunity, creating an environment where diverse people can thrive 		
		<ul style="list-style-type: none"> • Challenge bias and intolerance 		
	Political Awareness (p. 160) –Reading a group’s emotional currents and power relationships	<ul style="list-style-type: none"> • Accurately read key power relationships 		
		<ul style="list-style-type: none"> • Detect crucial social networks 		
		<ul style="list-style-type: none"> • Understand the forces that shape views and actions of clients, customers, or competitors 		
		<ul style="list-style-type: none"> • Accurately read organizational and external realities 		
Social Skills: Adeptness at inducing desirable responses in others	Influence (p.169) –Wielding effective tactics for persuasion	<ul style="list-style-type: none"> • Are skilled at winning people over 		
		<ul style="list-style-type: none"> • Fine-tune presentations to appeal to the listener 		
		<ul style="list-style-type: none"> • Use complex strategies like indirect influence to build consensus and support 		
		<ul style="list-style-type: none"> • Orchestrate dramatic events to effectively make a point 		
	Communication (p. 174) –Listening openly and sending convincing messages	<ul style="list-style-type: none"> • Are effective in give-and-take, registering emotional cues in attuning their message 		
		<ul style="list-style-type: none"> • Deal with difficult issues straightforwardly 		
		<ul style="list-style-type: none"> • Listen well, seek mutual understanding, and welcome sharing of information fully 		
		<ul style="list-style-type: none"> • Foster open communication and stay receptive to bad news as well as good 		

	Conflict Management (p. 178) –Negotiating and resolving disagreements	<ul style="list-style-type: none"> • Handle difficult people and tense situations with diplomacy and tact 		
		<ul style="list-style-type: none"> • Spot potential conflict, bring disagreements into the open, and help de-escalate 		
		<ul style="list-style-type: none"> • Encourage debate and open discussion 		
		<ul style="list-style-type: none"> • Orchestrate win-win solutions 		
	Leadership (p. 183) –Inspiring and guiding individuals and groups	<ul style="list-style-type: none"> • Articulate and arouse enthusiasm for a shared vision and mission 		
		<ul style="list-style-type: none"> • Step forward to lead as needed, regardless of position 		
		<ul style="list-style-type: none"> • Guide the performance of others while holding them accountable 		
		<ul style="list-style-type: none"> • Lead by example 		
	Change Catalyst (p. 193) –Initiating or managing change	<ul style="list-style-type: none"> • Recognize the need for change and remove barriers 		
		<ul style="list-style-type: none"> • Challenge the status quo to acknowledge the need for change 		
		<ul style="list-style-type: none"> • Champion the change and enlist others in its pursuit 		
		<ul style="list-style-type: none"> • Model the change expected of others 		
	Building Bonds (p. 206) –Nurturing instrumental relationships	<ul style="list-style-type: none"> • Cultivate and maintain extensive informal networks 		
		<ul style="list-style-type: none"> • Seek out relationships that are mutually beneficial 		
		<ul style="list-style-type: none"> • Build rapport and keep others in the loop 		
		<ul style="list-style-type: none"> • Make and maintain personal friendships among work associates 		

	Collaboration and Cooperation (p. 211) –Working with others toward shared goals	<ul style="list-style-type: none"> • Balance a focus on task with attention to relationships 		
		<ul style="list-style-type: none"> • Collaborate, sharing plans, information, and resources 		
		<ul style="list-style-type: none"> • Promote a friendly, cooperative climate 		
		<ul style="list-style-type: none"> • Spot and nurture opportunities for collaboration 		
	Team Capabilities (p. 216) –Creating group synergy in pursuing collective goals	<ul style="list-style-type: none"> • Model team qualities like respect, helpfulness, and cooperation 		
		<ul style="list-style-type: none"> • Draw all members into active and enthusiastic participation 		
		<ul style="list-style-type: none"> • Build team identity, esprit de corps, and commitment 		
		<ul style="list-style-type: none"> • Protect the group and its reputation; share credit 		

ⁱ *Working with Emotional Intelligence*, Daniel Goleman, Bantam Books, October 1998: wording for “Dimensions” and “Competencies” from Table 1 (see endnote ii), p. 26-27; remaining descriptions from page noted in “Competence” column.

ⁱⁱ Preface to Table 1: “Table 1 shows the relationship between the five dimensions of emotional intelligence and the twenty-five emotional competencies. None of us is perfect on this scale; we inevitably have the profile of strengths and limits. But, as we have strengths in a given number of these competencies, typically, at least six or so, and that the strengths be spread across all five areas of emotional intelligence. In other words, there are many paths to excellence.”, p. 25, *ibid*.