

# Soft Skills for Engineers

IISE Seminar

September 14, 2017

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Monterey, CA

INCOSE Fellow





# Professor Cliff Whitcomb, PhD



## Education

Nuclear Engineering, Electrical Engineering and Computer Science, Naval Engineering, Mechanical Engineering

## 30+ Years Engineering/Management/Leadership

HW, SW, Systems Engineering, Engineering Competency Modeling, Science & Technology, Design, Production

## Teaching Experience

Systems Engineering, Systems Design and Management, Naval Architecture and Marine Engineering, Engineering Management, Teamwork and Interpersonal Skills

## Credentials

INCOSE Fellow

Lean Six Sigma Master Black Belt

Retired Navy EDO and Submarine Warfare Officer

## Current Role

Professor of Systems Engineering



THE UNIVERSITY of  
NEW ORLEANS

# Outline

- Soft Skills Development for Engineers
- Context for Motivation
- Soft Skills Example Applications in Design Thinking
- Identification and Development of Competencies
  - Engineering Competency Model
  - Systems Engineering Competency Model
- Microskills Development
- Moving Forward



<http://www.magic4walls.com/wallpaper/disney-and-pixar-inside-out-disney-movie-2015-36615.html>

# Soft Skills Development



“Technical skills alone are insufficient for engineering professional engineers’ career success. ‘Soft skills’ play a very important role in differentiating engineers during employment and during career development.”

Magdy Aly, Senior Process Engineer and Energy Manager

# Goal

- Develop engineers who can work together in multidisciplinary teams, overcome interpersonal challenges, and become persuasive communicators is a critical need in the classroom and for the engineering profession.

*“Every piece of information we receive in a technical communication goes through our emotional processors before it is integrated by our cognitive processors”  
(Whitcomb and Whitcomb, 2013).*

# Soft Skills Development Objective

- To understand effective interpersonal and communication skills for engineers
  - Includes general oral and interpersonal communications, as well as providing for effective teamwork, and ultimately professional engineering proficiency
- To apply these skills to all engineering disciplines
  - In an educational or a work environment, they can apply across almost all engineering courses and disciplines
  - Many are already interwoven with “communication” development

# National Academy of Engineering Engineer of 2020

- Desired Engineer Traits
  - Strong analytical skills
  - Creativity
  - Ingenuity
  - Professionalism
  - Leadership
- Engineers must understand
  - Principles of leadership
- Engineers must be able
  - To practice leadership principles in growing proportions as their careers advance



# Recent Engineers Week Poster

There's a little bit of engineer in every girl.

## Bring it Out.

**Five things** every girl  
should know about engineering.

<b>Curiosity</b> Engineers ask lots of questions.	<b>Teamwork</b> Engineers work with smart, inspiring people.	<b>Helping Others</b> Engineers work to make our world safer, cleaner, and healthier.
<b>Creativity</b> Engineers dream up creative, yet practical solutions.	<b>Opportunities</b> Engineers work in many different fields.	

**#BringItOut**  
**Visit [DiscoverE.org/girlday](http://DiscoverE.org/girlday)**

**DISCOVER**   
**GIRL DAY 2015**  
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Funding for Girl Day is provided by:  
American Society of Agricultural and Biological Engineers, Bechtel, ExxonMobil Corporation, Motorola Solutions Foundation, Northrop Grumman Foundation, Raytheon Company, Rockwell Collins, Shell Oil Company, and TE Connectivity Foundation.



# ABET EAC Criterion 3 Outcomes



a) An ability to apply knowledge of mathematics, science, and engineering.
b) An ability to design and conduct experiments, as well as to analyze and interpret data.
c) An ability to design a system, component, or process to meet desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
d) An ability to function on multidisciplinary teams.
e) An ability to identify, formulate, and solve engineering problems.
f) An understanding of professional and ethical responsibility.
g) An ability to communicate effectively.
h) The broad education necessary to understand the impact of engineering solutions in a global, economic, societal and environmental context.
i) A recognition of the need for, and an ability to engage in, life-long learning.
j) A knowledge of contemporary issues.
k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

# DoD Civilian Leader Development Continuum

DEPARTMENT OF DEFENSE



Civilian Personnel Management Service

Deliberate development through progressive learning opportunities (education, training, self development, and assignments) that broaden experience and increase responsibility.

Vision  
External Awareness  
Strategic Thinking  
Political Savvy  
Global Perspective  
National Security Strategy

**Lead the Institution**

Technology Management  
Financial Management  
Creativity and Innovation  
Partnering  
Entrepreneurship  
National Defense Integration  
National Security Environment

**Lead Organizations/Programs**

Human Capital Management  
Leveraging Diversity  
Conflict Management  
Developing Others  
DoD Corporate Perspective  
National Security Foundation

**Lead People**

Team Building  
Accountability  
Decisiveness  
Influencing/Negotiating  
DoD Mission and Culture

**Lead Teams/Projects**

Flexibility  
Resilience  
Continual Learning  
Service Motivation  
Computer Literacy

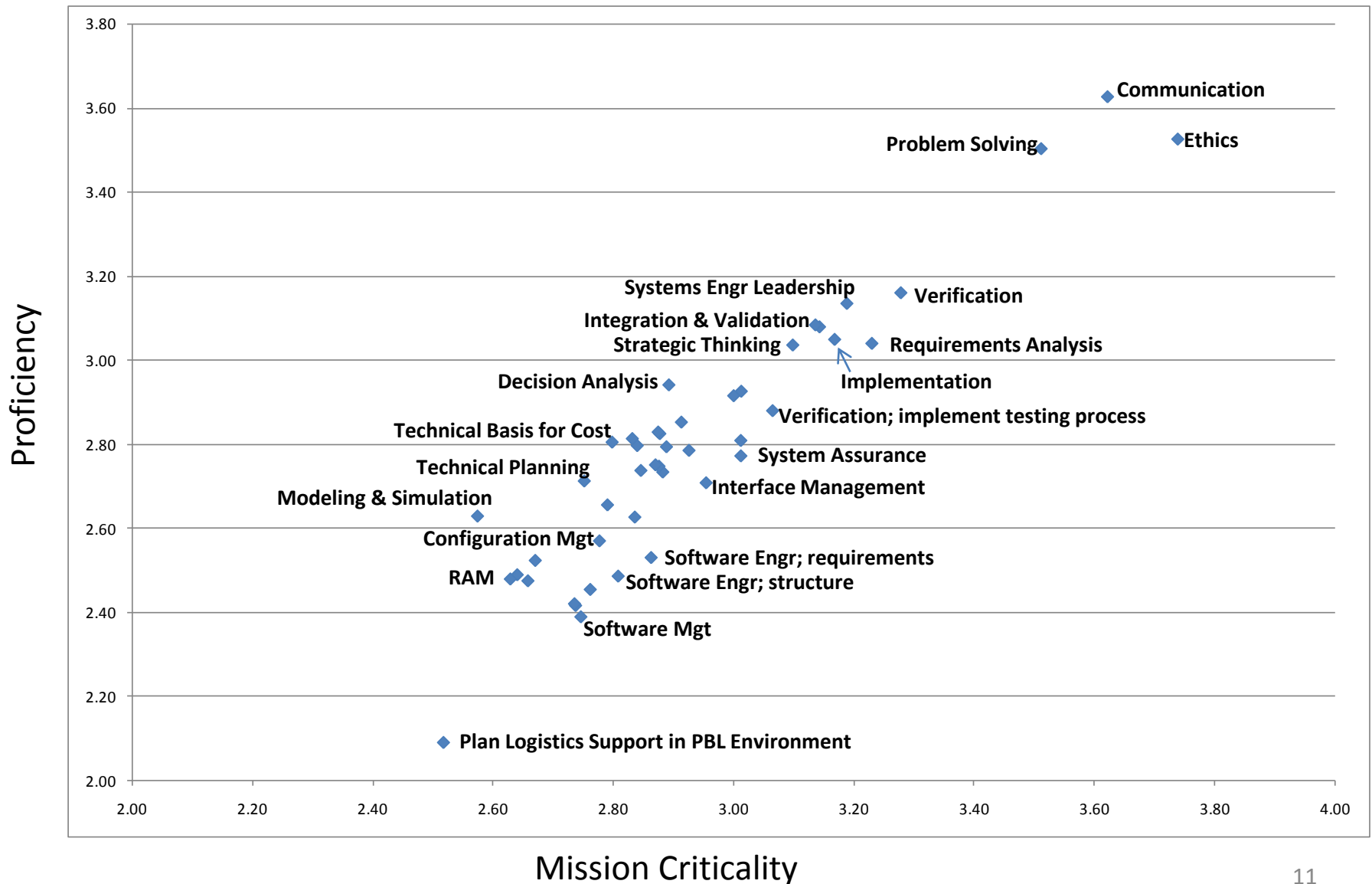
Integrity/Honesty  
Customer Service  
Problem Solving  
Technical Credibility

Interpersonal Skills  
Oral Communication  
Written Communication  
Mission Orientation

**Lead Self**

# Defense Systems Acquisition Competency Survey

Scale 1 – 5; 5 = very proficient, very mission critical



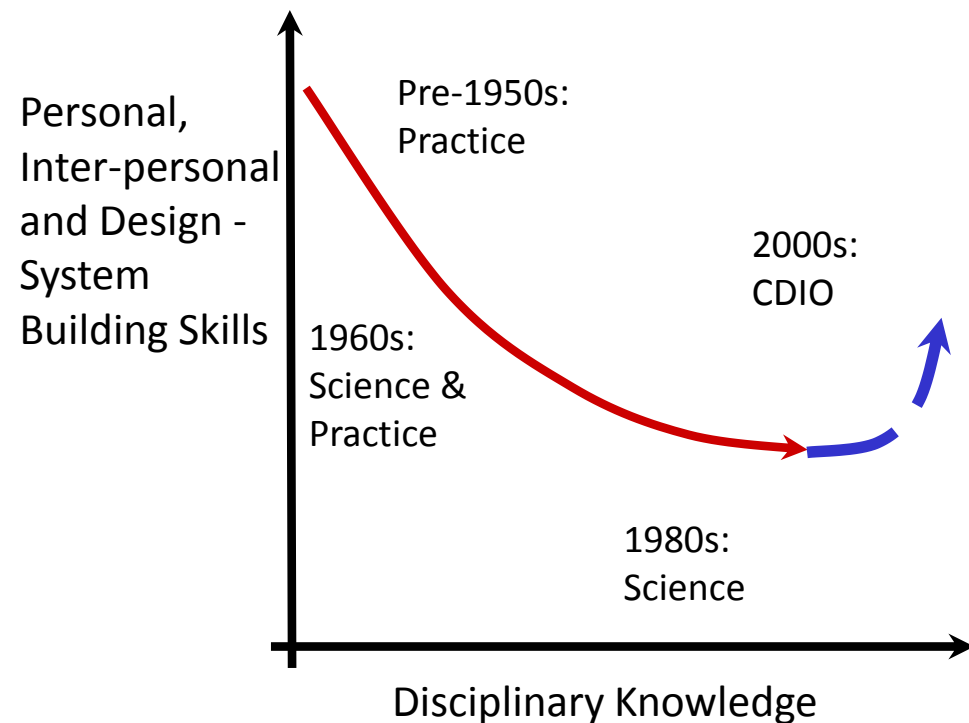
### Conceive – Design – Implement – Operate

Engineers need to be more effective contributors and leaders

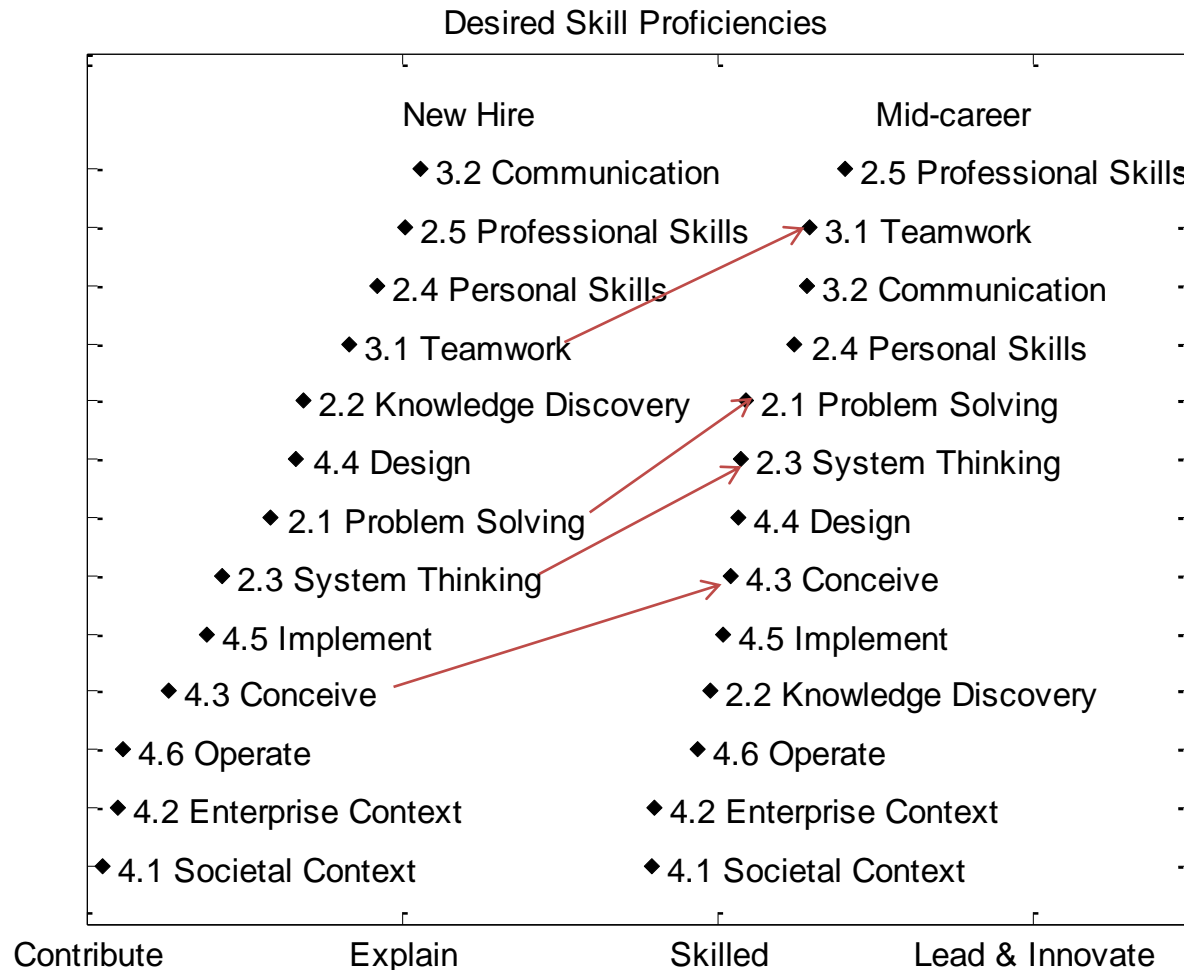
Engineers need to work in a more interdisciplinary manner

Engineers need to be aware of increasing globalization

Engineers need to increase awareness and response to environmental changes



# CDIO Syllabus Survey for Graduate Engineering Education

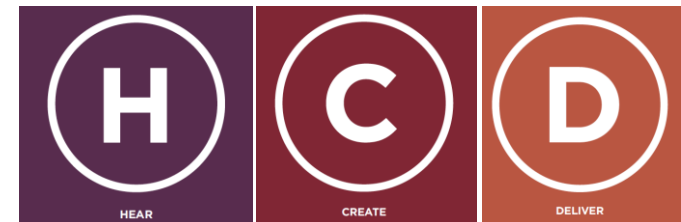


*Professor Rob Niewoehner, PhD, CAPT, USN, US Naval Academy*

# Design Thinking and Human Centered Design

- Term used for the combination of the processes, skills, cognitive processes, and attitudes prevalent in design
- Building is a new way of thinking
- Using a human-centered design process with rapid prototyping and iterative approach to solve complex problems
- Combining intentionality, design expression and a questioning of larger implications
- Starts with the people we are designing for...

**IDEO**



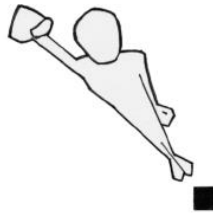
<http://www.designkit.org/resources/1/>

# Design Thinking Mindsets

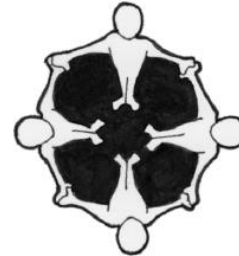
EMPATHY  
FIELDGUIDE



d.   
HASSO PLATTNER  
Institute of Design at Stanford



bias toward action



collaborate across boundaries



focus on human values



be mindful of process



prototype toward a solution



show don't tell

Image from: d.mindsets

# Engineering Education Learning Context

- Engineering education typically involves learning objectives, which are typically organized around Bloom's taxonomy of cognitive and affective processes
- The context of how engineers learn is often categorized using Bloom's taxonomic classification schema
- Categorizing KSAs using Bloom's taxonomic classification schema defines affective learning levels needed for achievement of competencies needed for development of intentional engineers



# Bloom's Taxonomy

## **Cognitive Domain**

Includes knowledge, critical thinking and development of intellectual skills

- Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create

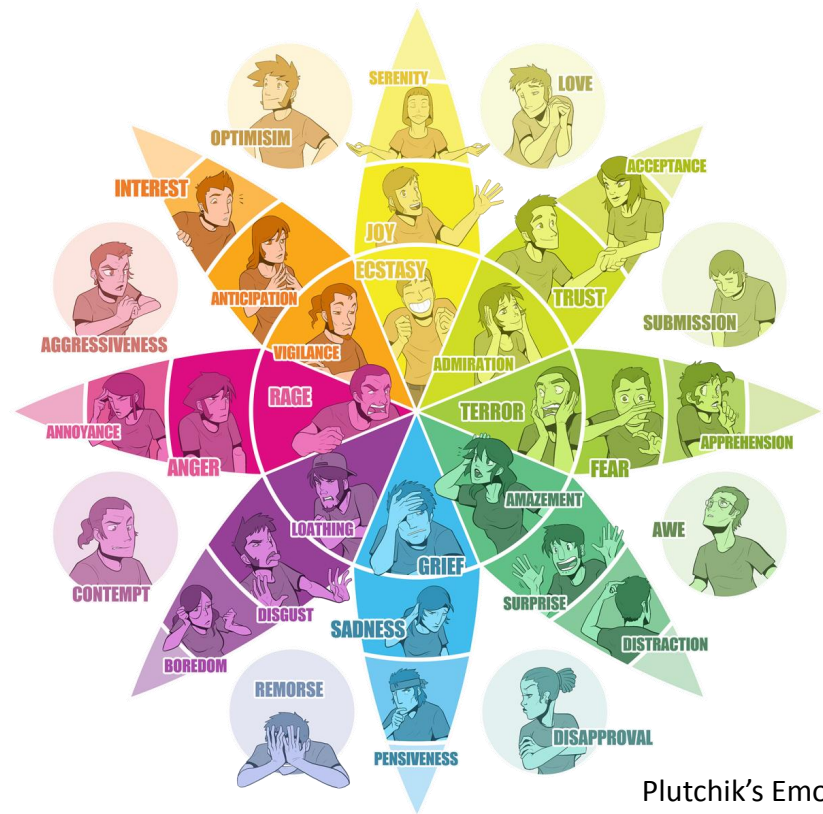
## **Affective Domain**

Describes growth in awareness, attitude, emotion, changes in interest, judgment and the development of appreciation

- Receive
- Respond
- Value
- Organize
- Characterize

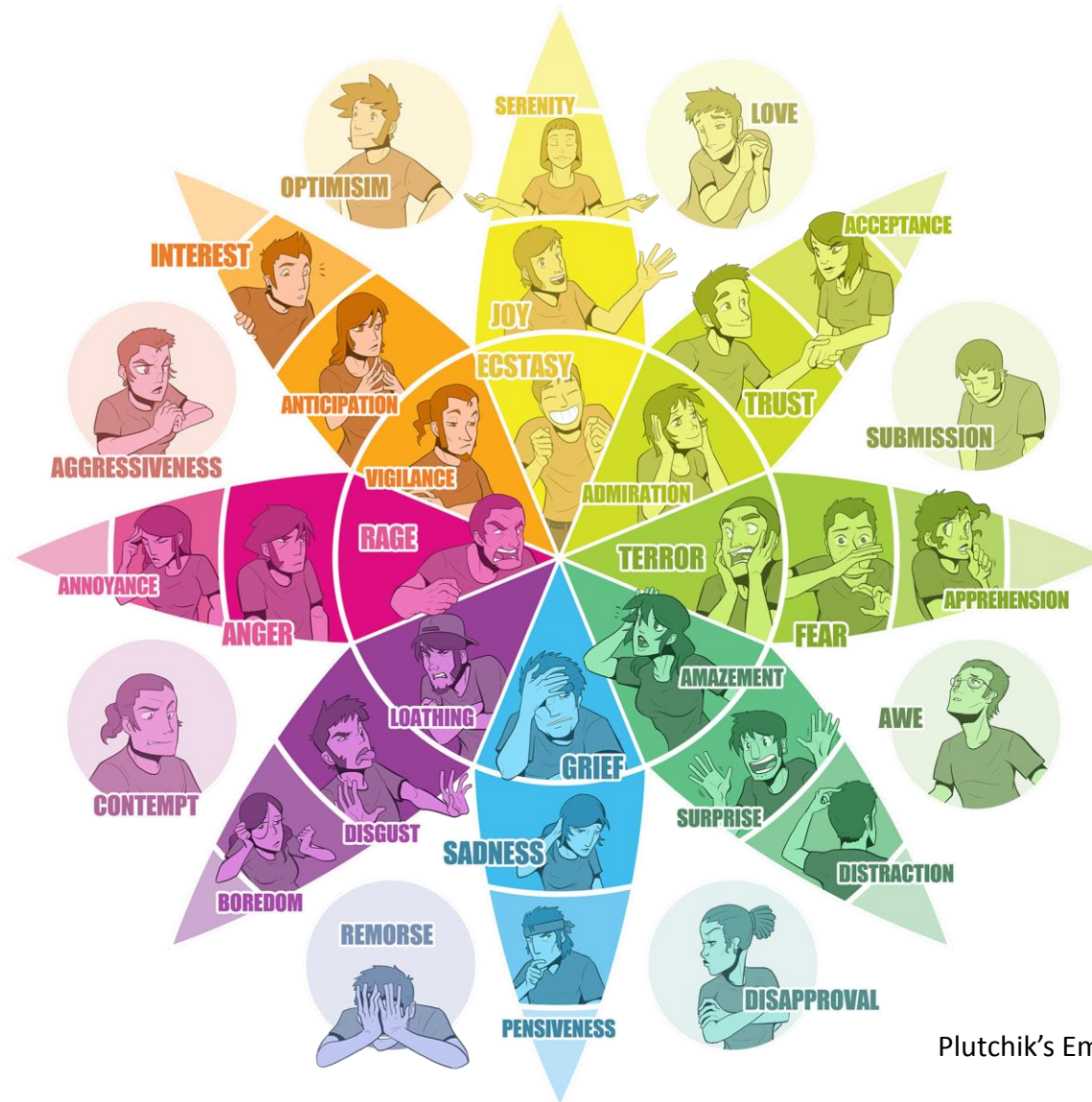
# Empathy and Empathetic Design

- Empathy - deep understanding of problems and realities of people you are designing for
- Understand “walk in their shoes” before early stage design
- Understand the problem mentally
- Create solutions from a connection to deep thoughts and feelings



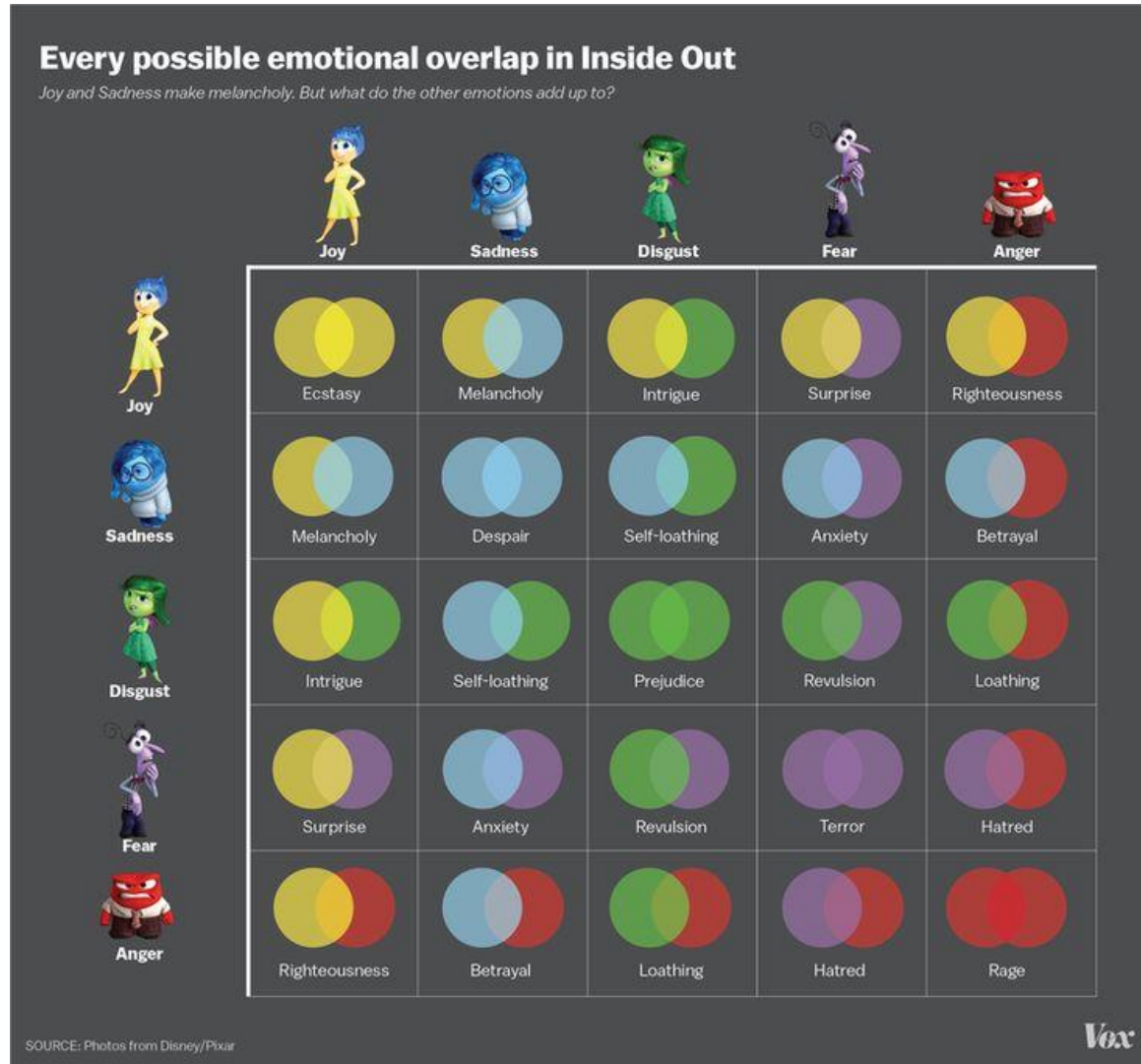
See also: “Spark Innovation Through Empathetic Design”, Dorothy Leonard and Susaan Straus, originally published July-August 1997, Breakthrough Thinking, Harvard Business Review

# Emotions



Plutchik's Emotion Wheel

# Emotional Overlaps



# Cognitive and Affective Brain Regions

Emotion is critical to understanding behavior, because it predominantly initiates behavior. The feeling part of the brain (ie the limbic system, see Figure 1) kicks in before the thinking part (*i.e.* the neocortex) of the brain.

Our brains are set up in such a way that we are able to process emotional responses without having to draw on thought processing and consider them rationally.

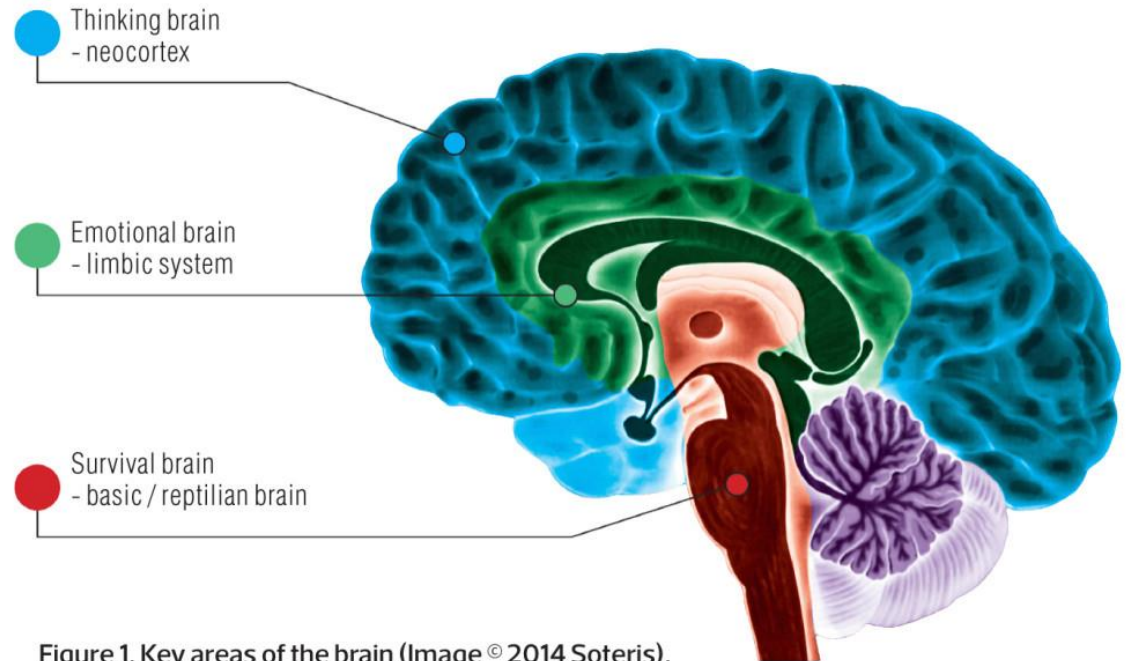


Figure 1. Key areas of the brain (Image © 2014 Soteris).

<https://www.ausimmbulletin.com/feature/social-neuroscience-the-brains-behind-positive-safety-culture/>



# Emotions and Affective Processing

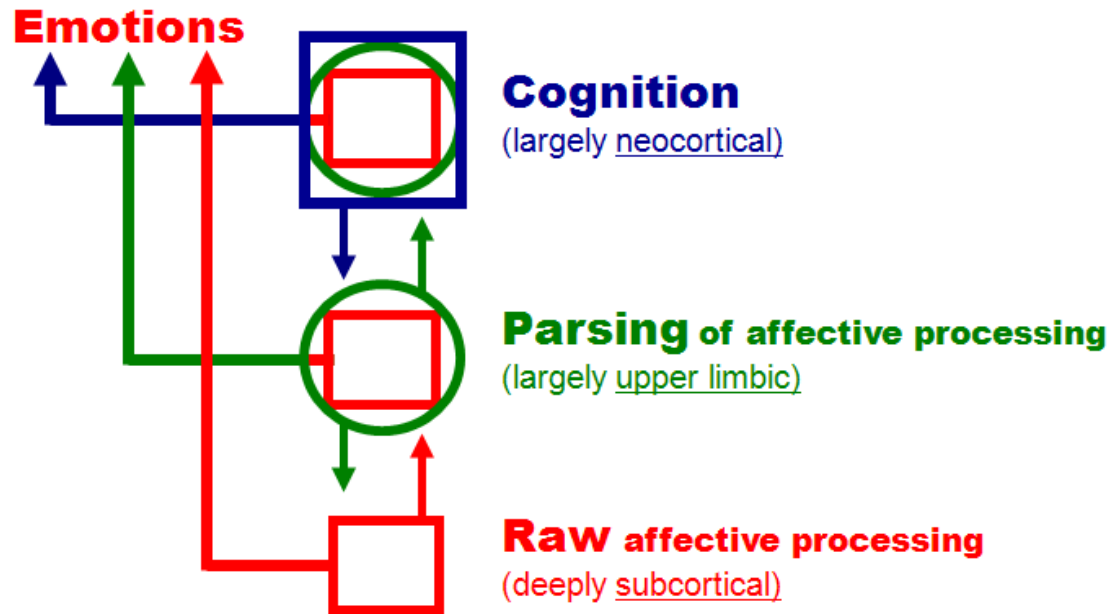
Emotions are consequences of raw affective processing

Emotions can be modified by information of higher order processes

Raw affective information is able to elicit more than just one emotion

Affective processing also occurs in the absence of emotion generation

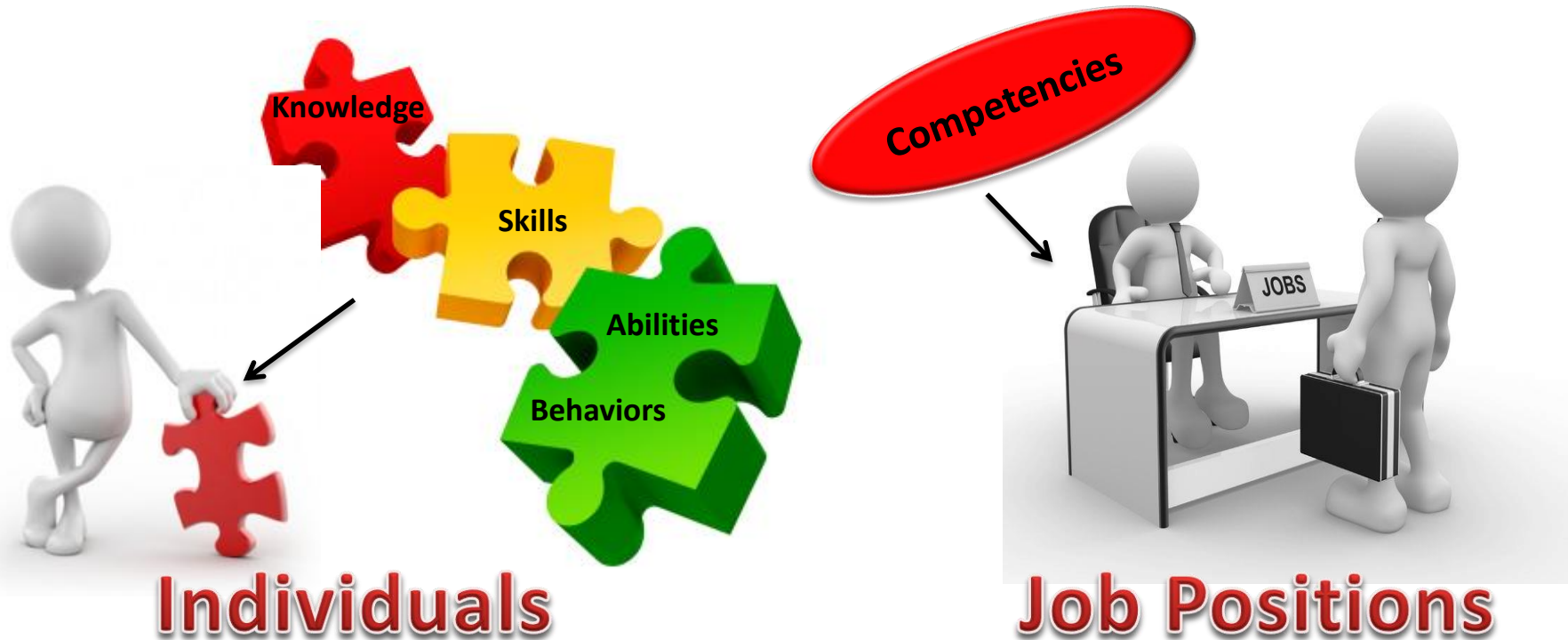
Emotions are principally independent from cognition



<https://www.intechopen.com/books/novel-frontiers-of-advanced-neuroimaging/neuroimaging-helps-to-clarify-brain-affective-processing-without-necessarily-clarifying-emotions>

# Developing Related Competencies & KSAB

**Competency:** An observable, measurable pattern of skills, knowledge, abilities, behaviors and other characteristics that an individual needs to perform work roles or occupational functions successfully (OPM).



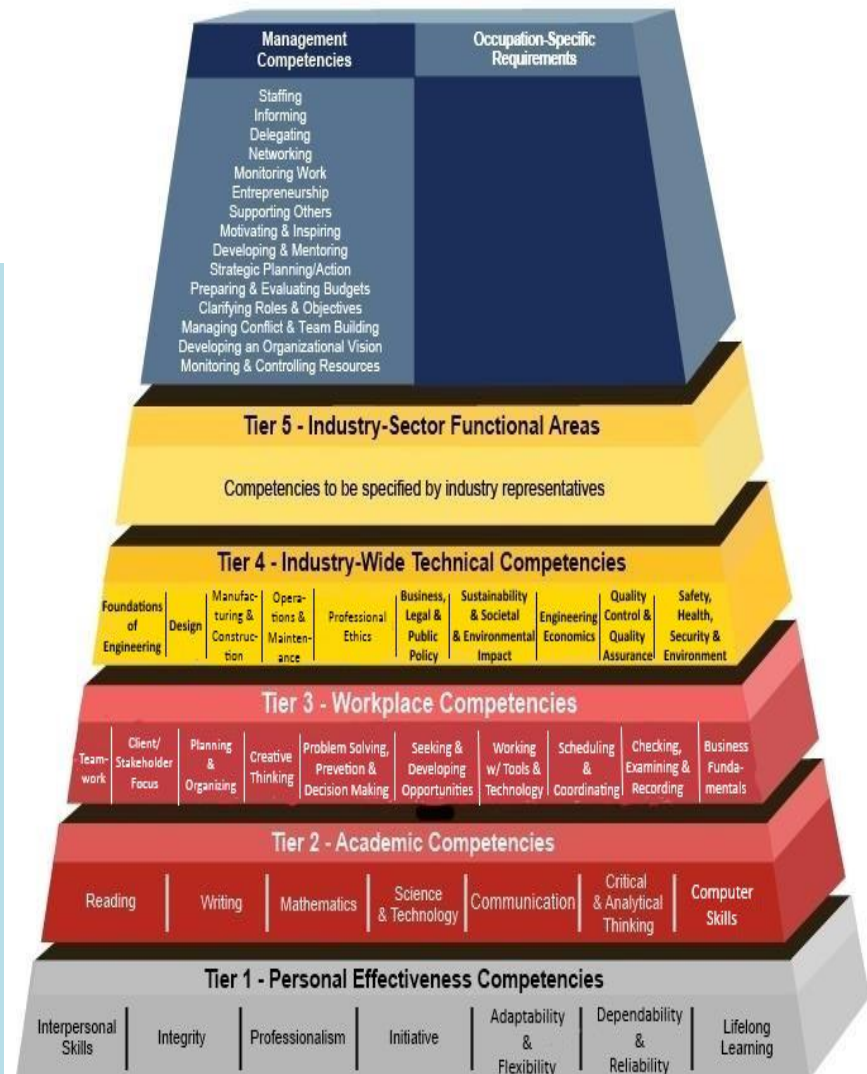
# Engineering Competency Model



AAES and the U.S. Department of Labor (USDOL) have developed an Engineering Competency Model to serve as a guide for the development of the engineering workforce.

The model outlines the core competencies for advancement and success in the engineering profession.

<http://aaes.org/model>





# Foundational Competencies

Tiers 1 through 3 represent both work readiness skills and “soft skills” that most employers demand. Each tier covers a different group of competencies:

**Tier 1 – Personal Effectiveness Competencies** are personal attributes essential for all life roles. Often referred to as "soft skills," personal effectiveness competencies are generally learned in the home or community and honed at school and in the workplace.

**Tier 2 – Academic Competencies** are primarily learned in a school setting. They include cognitive functions and thinking styles. Academic competencies are likely to apply to all industries and occupations.

**Tier 3 – Workplace Competencies** represent motives and traits, as well as interpersonal and self-management styles. They are generally applicable to a large number of occupations and industries.

# ECM: Interpersonal Skills

- Show sincere interest in others and their concerns
- Demonstrate sensitivity to the needs and feelings of others
- Look for ways to help people and deliver assistance
- Recognize and accurately interpret the communications of others as expressed through various formats (e.g., writing, speech, American Sign Language, computers, etc.)
- Recognize when relationships with others are strained
- Show understanding of other's behaviors and motives by demonstrating appropriate responses
- Understand the impact of unconscious bias
- Maintain open lines of communication with other
- Encourage others to share problems and successes

# ECM: Professionalism

- Maintain composure and keep emotions in check
- Deal calmly and effectively with stressful or difficult situations
- Accept criticism tactfully and attempt to learn from it
- Dress appropriately for occupational and worksite requirements
- Maintain appropriate personal hygiene
- Project a positive image of oneself and the organization

# ECM: Communication

- Express relevant information appropriately to individuals or groups taking into account the audience and the nature of the information (e.g., technical or controversial)
- Convey information clearly, correctly, and succinctly
- Effectively establish interpersonal contact with one or more individuals using eye contact, body language and non-verbal expression as appropriate to the person's culture
- Identify feelings and concerns communicated in various formats, such as writing, speech, American Sign Language, computers, etc. and respond appropriately
- Comprehend complex instructions
- Consider others' viewpoints and alter opinion when it is appropriate to do so
- Apply active interpersonal communication skills using reflection, restatement, questioning, and clarification
- Effectively answer questions of others or communicate an inability to do so and suggest other sources of answers
- Notice nonverbal cues and respond appropriately
- Influence others
- Persuasively present thoughts and ideas
- Gain commitment and ensure support for proposed ideas

# ECM: Teamwork

- Encourage others to express their ideas and opinions
- Exhibit tact and diplomacy and strive to build consensus
- Deliver feedback and constructive criticism and voice objections to others' ideas and opinions in a supportive, non-accusatory manner
- Respond appropriately to positive and negative feedback
- Choose behaviors and actions that best support the team and accomplishment of work tasks
- Use a group approach to identify problems and develop solutions based on group consensus
- Bring others together to reconcile differences
- Handle conflicts maturely by exercising “give and take” to achieve positive results for all parties

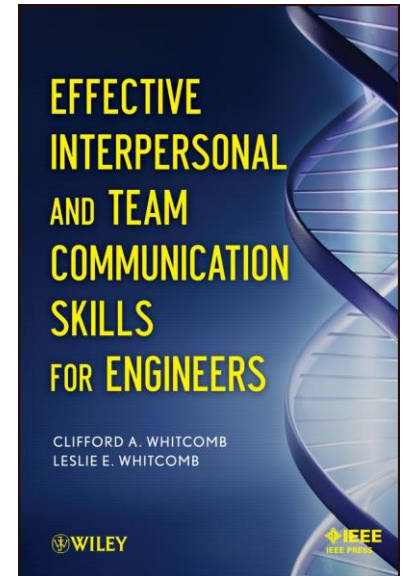
# Defense Systems Engineering Career Competency Model

Technical Management	Business Acumen	Analytical	Professional
<ul style="list-style-type: none"><li>• Acquisition</li><li>• Risk Management</li><li>• Requirements Management</li><li>• Configuration Management</li><li>• Technical Assessment</li><li>• Data Management</li><li>• Software Engineering Management</li><li>• Decision Analysis</li><li>• Interface Management</li><li>• Technical Planning</li></ul>	<ul style="list-style-type: none"><li>• Industry Awareness</li><li>• Organization</li><li>• Cost Estimating</li><li>• Proposal Process</li><li>• Supplier Management</li><li>• Negotiations</li><li>• Cost, Pricing and Rates/Cost Management</li><li>• Financial Reporting and Metrics</li><li>• Business Strategy</li><li>• Industry Motivation, Incentives, Rewards</li><li>• Contract Negotiations</li></ul>	<ul style="list-style-type: none"><li>• Transition</li><li>• Integration</li><li>• Design Considerations</li><li>• Tools and Techniques</li><li>• Stakeholders Requirements Definition</li><li>• Requirements Analysis</li><li>• Validation</li><li>• Verification</li><li>• Mission-Level Assessment</li><li>• Architecture Design</li><li>• Implementation</li><li>• Engineering Disciplines</li><li>• Requirements Analysis</li></ul>	<ul style="list-style-type: none"><li>• Communication</li><li>• Leading High Performance Teams</li><li>• Personal Effectiveness/Peer Interaction</li><li>• Problem Solving</li><li>• Professional Ethics</li><li>• Strategic Thinking</li><li>• Coaching &amp; Mentoring</li><li>• Managing Stakeholders</li><li>• Mission and Results Focus</li><li>• Sound Judgment</li><li>• Continual Learning</li></ul>

Associated KSAB: 79% Cognitive Domain and 21% Affective Domain

# The Intentional Engineer

- CONFRONTATION & CONFLICT NEGOTIATION
- COMMUNICATION STRUCTURE
- REFLECTION OF FEELING
- ENCOURAGING, PARAPHRASING, AND SUMMARIZING
- MULTIMODAL ATTENDING SKILLS
- OPEN AND CLOSED QUESTIONS
- ATTENDING BEHAVIORS
- ETHICS, COMPETENCE, SELF-UNDERSTANDING AND EMOTIONAL INTELLIGENCE



Becoming an intentional engineer means working with others to get results, being able to influence others to create a shared goal, and reaching that goal. It means becoming a proficient and competent engineer who is valued within the shared system of primary social needs and services that are at the foundation of your profession.

# **Skills Development Context**

## **Intentional Engineer**

- Identify own needs, challenges; Address affect and social/technical issues; clear affect; create equilibrium; teach others

## **Ethics, Competence, Self-Understanding and Emotional Intelligence**

- Ethics, Socially Effective Technical Competence, Engineering Excellence, Self-Awareness

## **Learn Using Microskills**



# “I, You and Team”

- Serve as invitations to use more dynamic, resolution focused information exchanges in interpersonal and technical engineering situations
- Use “I” and “You” statements appropriately

	1 = Not Attained	3 = Satisfactory	5 = Outstanding
<b>I, You and Team Statements</b>	Communication exchanges include criticism and/or blame. Personal responsibility is not articulated for opinions and feelings expressed.	Personal responsibility is expressed. Articulates balanced interpersonal and technical content. Capacity to reorient communication flows toward productive outcomes is not yet exhibited.	Personal responsibility is expressed. Articulates balanced interpersonal and technical content. Reorient communication flows toward productive outcomes.

# Paying Attention with Attending Behaviors

- Balance potentially polarized affect processing in interpersonal and technical exchanges
- Verbal and non-verbal communication

	1 = Not Attained	3 = Satisfactory	5 = Outstanding
<b>Attending Behaviors</b>	Is not receiving or transmitting accurate interpersonal and technical content. Is missing visual and audio cues transmitted by self and others during communication exchanges.	Receives and transmits accurate interpersonal and technical content. Catches visual and audio cues transmitted by self and others during communication exchanges. Clarity in communication flows is not yet present.	Anticipates the impact of verbal and non-verbal missed cues on communication exchanges. Maintains clear and accurate interpersonal and content flow.

*Microskill*

# Open and Closed Questions

- Shape your communications
- Give affective and attending behavior skills a structure through which to shape and drive interpersonal and technical communications

	1 = Not Attained	3 = Satisfactory	5 = Outstanding
<b>Open and Closed Questions</b>	Inadequate usage of open or closed questions to elicit necessary information that furthers interpersonal and/or technical communication flows.	Uses open and closed questions to elicit necessary information to further interpersonal and technical communication flows. Ability to shape the flow of communication not yet present.	Uses open and closed questions to elicit necessary interpersonal and technical communication flows that shape productive outcomes.

# Multimodal Attending

- Allows all the microskills to work in multiple combinations of pairings and settings
- Attend to both technical information reception and interpersonal/group dynamic data reception simultaneously
- Multimodal attending works because both technical and interpersonal transmission/reception of information occur in a shared field of sensory, affective and cognitive processing
- Unless you actively self-monitor and track others in all three processing modes, you are missing cues and information and losing accuracy in your engineering communications

# Encouraging, Paraphrasing, and Summarizing

- Clarify the synergistic effects of Multimodal Attending
- Useful during cycles of problem resolution and conflict negotiation in engineering communication exchanges
- Reflect content received back to originator with originator's intended technical and interpersonal meaning intact

# Reflection of Feeling

- Shape a communication exchange even as interpersonal and technical content is cycled through multiple levels of intensive information reception and feedback
- Reflect core communication content with synchronous internal affect that supports further clarification if and when necessary



*Microskill*

<https://onthegoimco.com/wp-content/uploads/2014/12/Inside-Out-Collage.jpg>

# Making it Real Integrates

- Practicing Self-Awareness
- Using Emotional Intelligence
- Using Appropriate I, You and Team Statements
- Asking Open and Closed Questions
- Using Attending Behaviors
- Practicing Multimodal Attention
- Using Encouraging, Paraphrasing, Summarizing
- Using Reflection of Feeling

# Six Step Cycle

Combines and recombines your own microskills usage with that of others during resolution focused, interpersonal and technical engineering communication exchanges

1. Identify Context
2. Define the Problem
3. Define the Goals
4. Generate Alternative Solutions
5. Take Action
6. Iterate

	1 = Not Attained	3 = Satisfactory	5 = Outstanding
<b>Six Step Cycle</b>	Does not create workable problem solving context. Does not define goals to adequately address problem. Does not explore alternatives. Does not choose an action for follow through.	Establishes rapport and understanding. Defines concerns and issues while accepting personal responsibility. Defines desired outcomes. Explores alternatives. Chooses actions and follows through.	Establishes rapport and understanding that actively engages others and invites collaboration. Reflects the big picture of concerns and issues. Elicits and defines desired outcomes. Creates intentionality in exploring alternatives. Obtains consensus on potential actions that empower everyone to follow through.



# Confrontation & Conflict Negotiation

- Human interaction that is going to be present in a work setting regardless of whether you want it to or not
- Microskills provide you with codes to master some of the most challenging aspects of effective communication

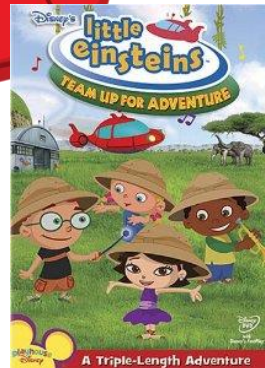
# 5 Rules for Handling Conflict

1. When you are in conflict, stabilize and then keep re-stabilizing yourself
2. Observe the other person or group members carefully so that you don't escalate their interpersonal responses by your own non-verbal and verbal choices
3. Back off and give yourself a break from the action
4. Focus on the positives and strengths of each of your teammates or your individual peers. Focus on your own positives and strengths. Use the positives about your teammates as you highlight situational discrepancies to them while using constructive verbal communication choices
5. Don't criticize, don't use sarcasm, don't use non-verbal body postures, voice tone and facial expressions that broadcast anger, hurt, disgust, contempt, blame or disconnect
  - These emotions, when used during communication in conflict, have been proven by research (Dr. John Gottman and peers) to be 94% accurate in predicting very low relationship satisfaction and very high rates of relationship dissolution

# Cultural Context Shifts Related to Teamwork



What's Gonna Work?



# Cultural Context Shifts Related to Interpersonal Dynamics and Emotions



Leonard: Have you considered telling her your feelings?  
Sheldon: Leonard, I'm a physicist, not a hippie.

# Moving Forward

- Soft Skills are an Important Part of Engineer's Development
- Relate to Competencies Identified by Several Sources
- Basis formed for Development of Learning Objectives
- Microskills Defined to Specifically Address Incremental Development

# References

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- Competency Model Clearing House, [www.careeronestop.org/competencymodel/](http://www.careeronestop.org/competencymodel/)
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- Whitcomb, C. and Whitcomb, L., Chapter 5 in Smith, K., Teamwork and Project Management in Engineering, 4th Edition, McGraw-Hill, 2013, ISBN 978-0073534909

# ECM: Interpersonal Skills

- Show sincere interest in others and their concerns
- Demonstrate sensitivity to the needs and feelings of others
- Look for ways to help people and deliver assistance
- Recognize and accurately interpret the communications of others as expressed through various formats (e.g., writing, speech, American Sign Language, computers, etc.)
- Recognize when relationships with others are strained
- Show understanding of other's behaviors and motives by demonstrating appropriate responses
- Demonstrate flexibility for change based on the ideas and actions of others
- Understand the impact of unconscious bias
- Maintain open lines of communication with other
- Encourage others to share problems and successes
- Establish a high degree of trust and credibility with others
- Demonstrate respect for coworkers, colleagues, and clients
- Interact respectfully and cooperatively with others who are of a different race, religion, culture, or age, or have different abilities, gender, sexual orientation, marital or family status
- Demonstrate sensitivity, flexibility, open-mindedness, and inclusivity when dealing with different values, beliefs, perspectives, customs, or opinions
- Value an environment that supports and accommodates a diversity of people and ideas

# ECM: Professionalism

- Maintain composure and keep emotions in check
- Deal calmly and effectively with stressful or difficult situations
- Accept criticism tactfully and attempt to learn from it
- Maintain a professional demeanor.
- Dress appropriately for occupational and worksite requirements
- Maintain appropriate personal hygiene
- Project a positive image of oneself and the organization
- Demonstrate attitudes supportive of professional work such as commitment, curiosity, entrepreneurship, and optimism
- Take pride in one's work and the work of the organization
- Demonstrate good personal and professional judgment



# ECM: Communication

- Express relevant information appropriately to individuals or groups taking into account the audience and the nature of the information (e.g., technical or controversial)
- Convey information clearly, correctly, and succinctly
- Use common English conventions including proper grammar, tone, and pace
- Effectively establish interpersonal contact with one or more individuals using eye contact, body language and non-verbal expression as appropriate to the person's culture
- Explain the technical aspects and benefits of an engineering project to nontechnical audiences
- Plan, prepare, and deliver an oral presentation with appropriate visual aids, handouts, and/or other support materials
- Attend to, understand, interpret, and respond to messages received in a variety of ways, including hearing, American Sign Language, instant messaging, text-to-speech devices, and other methods
- Identify feelings and concerns communicated in various formats, such as writing, speech, American Sign Language, computers, etc. and respond appropriately
- Comprehend complex instructions
- Consider others' viewpoints and alter opinion when it is appropriate to do so
- Apply active interpersonal communication skills using reflection, restatement, questioning, and clarification
- Effectively answer questions of others or communicate an inability to do so and suggest other sources of answers
- Notice nonverbal cues and respond appropriately
- Attend to visual sources of information (e.g., video)
- Ascertain relevant visual information and use appropriately
- Influence others
- Persuasively present thoughts and ideas
- Gain commitment and ensure support for proposed ideas

# ECM: Teamwork

- Serve as a leader or a follower, depending on what is needed to achieve the team's goals and objectives
- Identify and draw upon team members' strengths and weaknesses to achieve results
- Instruct others in learning new knowledge and acquiring new skills and learn from other team members
- Assist others who have less experience or have heavy workloads
- Encourage others to express their ideas and opinions
- Develop constructive and cooperative working relationships with others
- Exhibit tact and diplomacy and strive to build consensus
- Deliver feedback and constructive criticism and voice objections to others' ideas and opinions in a supportive, non-accusatory manner
- Respond appropriately to positive and negative feedback
- Effectively communicate with all members of the group or team to achieve team goals and objectives
- Use tools and approach that can facilitate a productive virtual team environment
- Work as part of a team, contributing to the group's effort to achieve goals
- Identify and commit to the goals, norms, values, and customs of the team
- Choose behaviors and actions that best support the team and accomplishment of work tasks
- Use a group approach to identify problems and develop solutions based on group consensus
- Identify elements of successful teamwork
- Bring others together to reconcile differences
- Handle conflicts maturely by exercising "give and take" to achieve positive results for all parties
- Reach formal or informal agreements that promote mutual goals and interests, and obtain commitment to those agreements from individuals or groups