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Gender-based Differences in the INCOSE Professional Competencies

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Focus of This Presentation

- The INCOSE Professional Competencies
  - Communications
  - Ethics and Professionalism
  - Technical Leadership
  - Negotiation
  - Team Dynamics
  - Facilitation
  - Emotional Intelligence
  - Coaching and Mentoring
- Why?
  - **Being able to capitalize on systems engineers' strengths while minimizing weaknesses regarding the Professional Competencies is key to project success**

Approach

- Literature survey of gender-related research on the Professional Competencies
  - Need to differentiate between sex, a biological variable, and gender, a multidimensional construct
- Preference given to research specific to engineering science, STEM, or R&D
- Multiple sources where possible

Differences in Communications

- Communications have verbal and non-verbal elements
  - There are gender-based differences in both
- Effective communication requires balancing warmth (feminine) and authority (masculine) (Goman 2016)
  - Accounts for most gender-based differences in communications
- Men and women have different reasons for communicating (vomSaal 2005)
  - Men to transmit info, women to build relationships

Differences in Verbal Communications

Men tend to

- Use blunt, direct language (Goman 2016)
- Process internally (Goman)
- Be adversarial (vomSaal 2005)
- Engage in monologues (Goman)
- Be more self-promoting (*The Economist* 2011)

Women tend to

- Come to the point indirectly
- Process aloud
- Seek synergy
- Engage in dialogues
- Believe that others will notice their positive results (Goman)

Differences in Non-Verbal Communications

Men tend to

- Use fewer facial expressions (Goman 2016)
- Use less paralanguage, but when used it is to express agreement (PPU-PR&A)
- Expand into the physical space (Goman)
- Use physical contact and sharp hand gestures as a show of dominance (PPU-PR&A)
- Use eye contact to exert power or position (PPU-PR&A)

Women tend to

- Nod and make eye contact to express emotions (PPU-PR&A 2017)
- Use paralanguage for encouragement and to show they are listening
- Try to take up as little space as possible
- Use physical contact and fluid hand gestures to show support or build a connection
- Use eye contact to create relationship

Differences in Ethics and Professionalism

- Most research focuses on business ethics not professionalism and is indirect
- McCabe, Ingram, and Dato-on (2006)
  - Used Ruch and Newstrom Scale that asks about unethical employee behaviors
  - Found that respondents with socially-oriented, expressive traits were more able to identify unethical behaviors as unethical
  - Also that those with an egalitarian view of gender roles more likely to view bribery as unethical
- Stedham, Yamamura, and Beekun (2007)
  - Used Redenbach and Robin survey that asks respondents to rate ethics scenarios using relativistic and justice-related scale dimensions
  - Found that intention to behave is related to relativistic dimensions
  - Also that, independent of the dimension used, women found the scenarios to be less ethical than did men
    - Speculate that women use relativistic factors regardless of the criteria provided

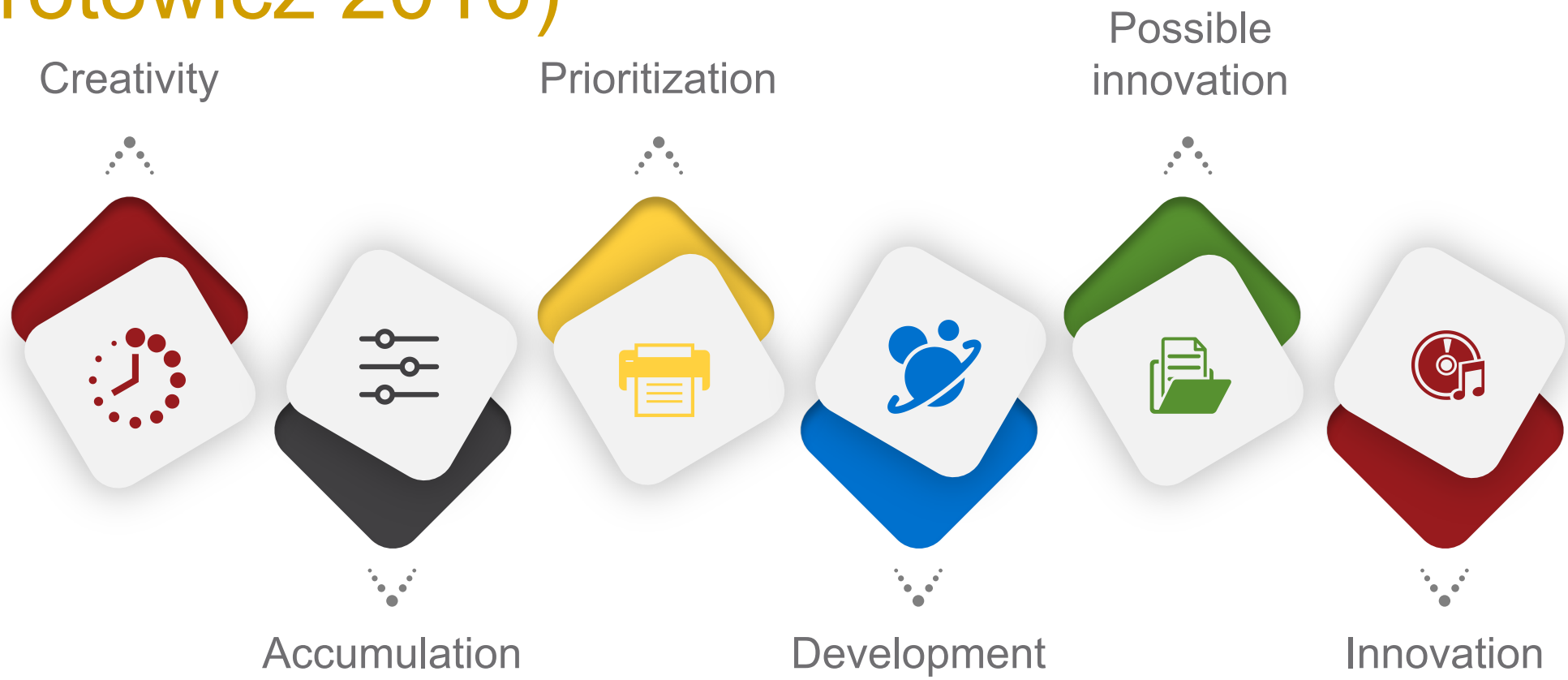
Differences in Technical Leadership

- Most literature on leadership is generic
  - Styles vary by gender: women more consensus-building, men more hierarchical (Lieberman 2017)
  - Genders not different in leadership competence, but women less likely to be seen as effective (Strebler, Thompson, and Heron 1997)
- Instead, focus is on creative problem solving and innovation

Creative Problem Solving and Innovation

- Core principles of creative problem solving (from Mind Tools Content Team n.d.)
  - Balancing divergent and convergent thinking
  - Framing problems as questions
  - Deferring judgment on solutions
  - Using expansive language

Innovation Stages (Okon-Horodynska, Zachorowska-Mazurkiewicz, Wisla, and Sierotowicz 2016)



Differences in Creative Problem Solving

- Women outperform men in knowledge acquisition; men outperform women in knowledge application (Mustafic, Niepel, and Grieff 2015)
- Hardy and Gibson (2015) used the Besemer and O'Quin three facet model of creativity – quality, originality, and elegance of the solution – in a meta-analysis of gender differences in creative problem solving
  - Found that women outperform men on all three aspects

Differences in Innovation (Okon-Horodynska, Zachorowska-Mazurkiewicz, Wisla, and Sierotowicz 2016)

- Differences in how the genders perceive innovation leads to differences in how they participate
  - Women tend to describe themselves as team members, men as “idea sowers”
  - Women more involved in organizing, men in developing
  - Men tend to focus on tasks, women on the ability to make decisions

Differences in Negotiation

- Most literature focuses on qualitative experiences or negotiation styles
  - Using a social role model, Stuhlmacher and Linnabery (2013) found differences in initiating a negotiation, the behaviors displayed, perceptions of the negotiators, and reactions of the counterparts
    - Explain these as due to the typically agentic traits of the negotiation role
- In a meta-analysis on negotiation outcomes, Stuhlmacher and Walter (2006) found that men had slightly better results
  - Effect moderated by ambiguity of potential areas of agreement
  - Also by goal setting behavior (Stuhlmacher and Linnabery 2013)

Differences in Team Dynamics

- Most research focuses on gender composition of teams
  - The presence of women on teams enhances team collaboration, less loafing, and more equitable contributions (Bear and Woolley 2011; Takeda and Homberg 2014)
    - But does not necessarily lead to better outcomes – research is equivocal
    - Moderated by organizational context (Bear and Woolley)

Differences in Facilitation

- Little relevant literature about gender-based differences in facilitation styles
  - Gender differences in communication styles can affect facilitation
- Women and men have equal potential to facilitate small groups successfully (Andrews 1992)

Differences in Emotional Intelligence

- Meshkat and Nejati (2017) used the Bar-On Emotional Quotient Inventory
  - Found no gender differences in overall EI
  - Found women to be higher than men in several EI components
- Dunaway (2013) looked at the EI of teams using the Workgroup Emotional Intelligence Scale
  - Found women scored higher on managing their own emotions; men scored higher on managing others' emotions

Differences in Coaching

- Bergquist (2016) gave Development of Coaches surveys to professional business coaches
  - Found no gender-related differences
  - Observed that there is a lack of research on differences in coaching based on client gender

Differences in Mentoring

- In a meta-analysis of mentee and mentor experiences, O'Brien, Biga, Kessler, and Allen (2017) found
  - No gender-based differences in mentee perceptions of the experience though there were differences in the support provided
    - Males received less psychosocial support
    - And male mentors provided more career advice while female mentors provided more psychosocial support
- Sosik and Godshalk (2000) had similar results
  - Results were moderated by the type of mentor-mentee relationship
    - Female mentors provided more role modeling and less career advice than males regardless of the type of relationship
    - Male mentors in homogeneous relationships provided less role modeling and less psychosocial support
    - Male mentors in diversified relationships provided more career development than in any other relationship type

Conclusions

- Gender differences equivocal for all of the Professional Competencies
  - No support for one gender being “better” than the other – just different
  - May be attributable to differences in treatment of the variable
- Generalizations not universally true
  - Hence the use of “tend to” language

Implications for Systems Engineers

- Guidelines for selecting Systems Engineers and for forming systems teams
  - Use gender-neutral position descriptions
  - Balance role modeling, and giving psychosocial support and career advice in mentoring relationships
  - Ensure gender parity when forming teams
  - Avoid gender-based stereotypes when making team role assignments
  - Educate team members about diversity-related differences and the need to avoid stereotypes
- Should enable individuals to leverage positives and minimize negatives and maximize team success – both process and performance

Future Research

- Survey research
  - Scope of the gender-bias problem in Systems Engineering
  - Gender-based differences in reactions to unethical behaviors
- Observational research
  - Team performance in different organizational contexts

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