



WPI

Systems Engineering Leadership: It Starts on Day One!

Don S. Gelosh, Ph.D., CSEP-Acq
Director, Systems Engineering

Corporate and Professional Education

540-349-3949

dsgelosh@wpi.edu

cpe.wpi.edu

Outline

- **Expectations and Facts - The Motivation**
- **Leadership Defined**
- **Leadership vs. Management**
- **Principles of Leadership**
- **How can a Systems Engineer Lead?**
- **Learning SE and Leadership Together - What is the Best Approach?**
- **Summary**

Expectations and Facts

- **Growing expectations that effective Systems Engineers must be able to lead, starting on Day 1, without necessarily holding a position of authority**
- **Younger engineers without much experience are being put into leadership positions sooner due to Baby-Boomer retirements and other attrition**
- **Corporations and government agencies who can afford it have developed their own engineering leadership programs - shows the need and value**
- **Need for better technical leadership discussed at professional societies - International Council on SE, National Defense Industrial Association, etc.**
- **Leadership should be learned and appreciated early in one's career - too late to first learn leadership as an executive**
- **Leadership should be practiced and improved in the context of and throughout one's career - value-added life-long learning is key**

Leadership Defined

For our purposes, Leadership is best defined as “a process whereby an individual influences a group of individuals to achieve a common goal.”*

* Northouse, Peter G. (2007). Leadership: Theory and Practice. (5th ed.) Thousand Oaks, London, New Delhi, SAGE Publications, Inc.

Leadership Vs. Management

TABLE 1-1 Leaders Versus Managers

LEADER	MANAGER
Visionary	Rational
Passionate	Business-like
Creative	Persistent
Inspiring	Tough-minded
Innovative	Analytical
Courageous	Structured
Imaginative	Deliberative
Experimental	Authoritative
Independent	Stabilizing
Shares knowledge	Centralizes knowledge
Trusting	Guarded
Warm and radiant	Cool and reserved
Expresses humility	Rarely admits to being wrong
Initiator	Implementer
Acts as coach, consultant, teacher	Acts as a boss
Does the right things	Does things right
Inspires through great ideas	Commands through position
Knows results are achieved through people	Focuses on results

Source: Genevieve Capowski, "Anatomy of a Leader: Where Are the Leaders of Tomorrow?" *Management Review*, March 1994, p. 12; David Fagiano, "Managers Versus Leaders: A Corporate Fable," *Management Review*, November 1997, p. 5; Keki R. Bhote, *The Ultimate Six Sigma* (New York: AMACOM, 2002); "Leaders: Salespeople in Disguise?" *Manager's Edge*, Special Issue, 2007, p. 3.



***You cannot manage men
into battle. You manage
things; you lead people.***

Grace Hopper

Dr. Don's Principles of Leadership #1

- Lead your team as people who deserve respect, recognition and reward - don't manage them as resources.



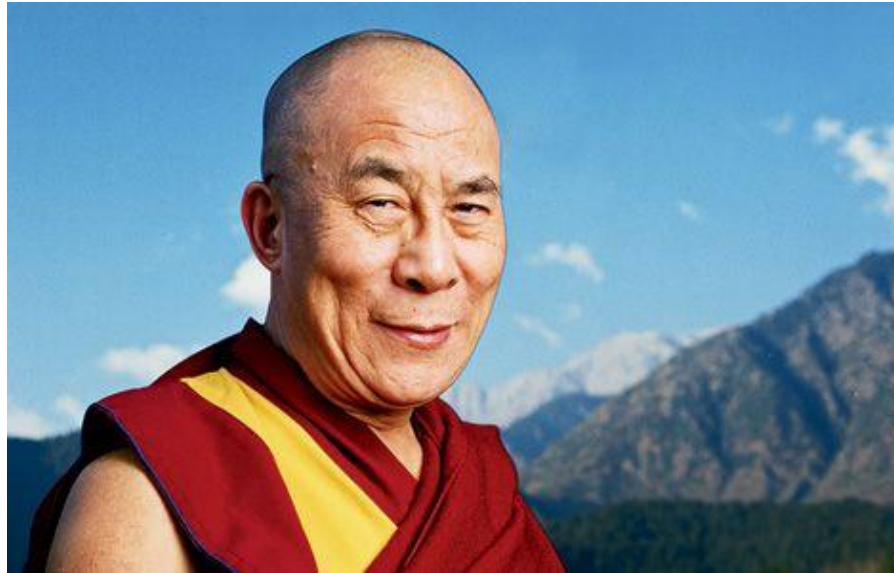
Son, never pass up the opportunity to shut the hell up!

J.R. Ewing to his son John Ross

Dr. Don's

Principles of Leadership #2

- Lead your team as people who deserve respect, recognition and reward - don't manage them as resources.
- **Look for opportunities to be quiet and listen to others - you may learn something!**



Take into account that great love and great achievements involve great risk.

Dalai Lama

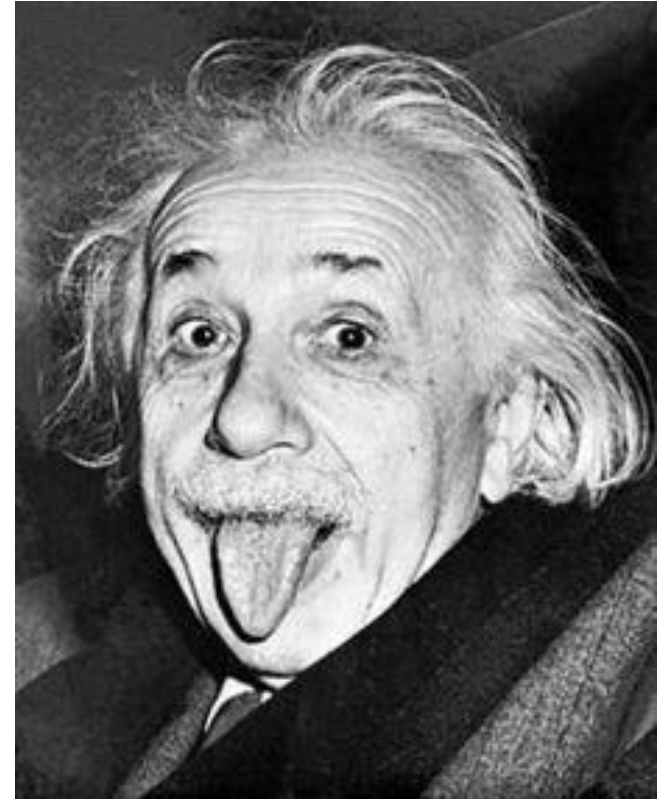
Dr. Don's

Principles of Leadership #3

- Lead your team as people who deserve respect, recognition and reward - don't manage them as resources.
- Look for opportunities to be quiet and listen to others - you may learn something!
- **Learn how to manage risk and opportunities - enable your team to learn this too.**

***It is just as important to
make knowledge live
and keep it alive as to
solve specific problems.***

Albert Einstein



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Principles of Leadership #4

- Lead your team as people who deserve respect, recognition and reward - don't manage them as resources.
- Look for opportunities to be quiet and listen to others - you may learn something!
- Learn how to manage risk and opportunities - enable your team to learn this too.
- **Know your stuff! There is no substitute for in-depth knowledge about your subject area and broad knowledge about your profession - never stop learning!**



***It is difficult to say what
is impossible, for the
dream of yesterday is
the hope of today and
the reality of tomorrow.***

**Robert H. Goddard
(WPI '08)**

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Principles of Leadership #5

- Lead your team as people who deserve respect, recognition and reward - don't manage them as resources.
- Look for opportunities to be quiet and listen to others - you may learn something!
- Learn how to manage risk and opportunities - enable your team to learn this too.
- Know your stuff! There is no substitute for in-depth knowledge about your subject area and broad knowledge about your profession - never stop learning!
- **Have a vision of what you want the team to accomplish - share it with them.**



Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has.

Margaret Mead

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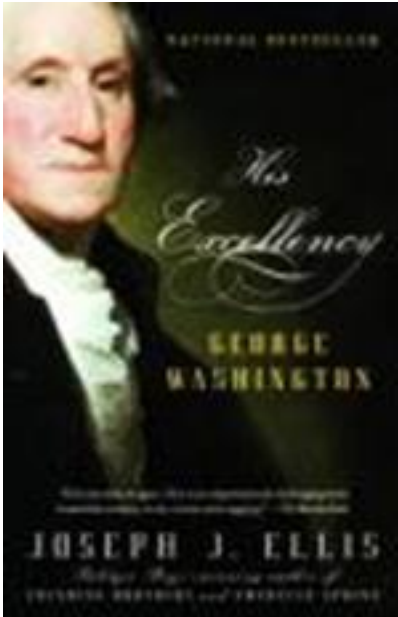
Principles of Leadership #6

- Lead your team as people who deserve respect, recognition and reward - don't manage them as resources.
- Look for opportunities to be quiet and listen to others - you may learn something!
- Learn how to manage risk and opportunities - enable your team to learn this too.
- Know your stuff! There is no substitute for in-depth knowledge about your subject area and broad knowledge about your profession - never stop learning!
- Have a vision of what you want the team to accomplish - share it with them.
- **Believe in what you're trying to achieve - if you believe, your team will believe and you may actually succeed!**

How Can a Systems Engineer Lead?

- Start leading on day one, don't wait for a position of authority to come your way
- Be proactive, help the person in charge, relieve some of their burden
- Be a team player, help facilitate meetings and working sessions, encourage others to excel, share the credit, help others learn how to lead
- Try to understand the problem before you try to solve it, help others to understand
- Try to understand the issues before you speak
- Sometimes, all you have to do is “Show Up!”

George Washington & The Art of ‘Showing Up’*

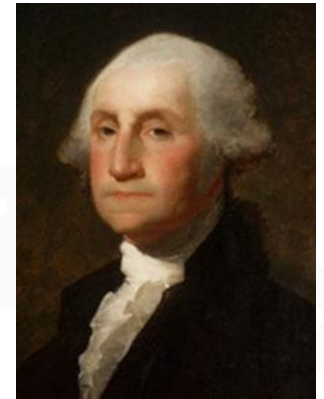


- George’s Father Died Young and His Formal Education Was Lacking
- In His Excellency, Joseph Ellis Says That Franklin Was Wiser, Hamilton More Brilliant, Adams Was Better Read, Jefferson Was More Intellectually Sophisticated, and Madison Was More Politically Astute
- So Why Did the Other Founding Fathers All Look to George Washington for Leadership?

* "Leadership, IIE, and You", G. Don Taylor, Ph.D., P.E., Charles O. Gordon Professor and Head, Grado Dept. of ISE, Virginia Tech, with permission.

George Washington & The Art of 'Showing Up' (con't)

- He had **AMBITION**
- He **ENDURED**
- He **FOCUSED**
- He **ADAPTED**
- He **EXECUTED** his plan
- He **NEVER COMPROMISED**
- He had **EMOTIONAL MATURITY & VISION**
- He was the first to **SHOW UP**



These are also excellent traits for Systems Engineers!

Learning SE and Leadership Together

The following charts show the importance of learning systems engineering and leadership techniques as an integrated and complementary set of knowledge, skills and abilities throughout one's career.

Learning SE and Leadership

Ideally, the most effective Systems Engineer, the “Star”, learns to deliver the highest quality SE with the most influence and leadership*.

However, the path to achieving Star status is very important!

What is the best approach?

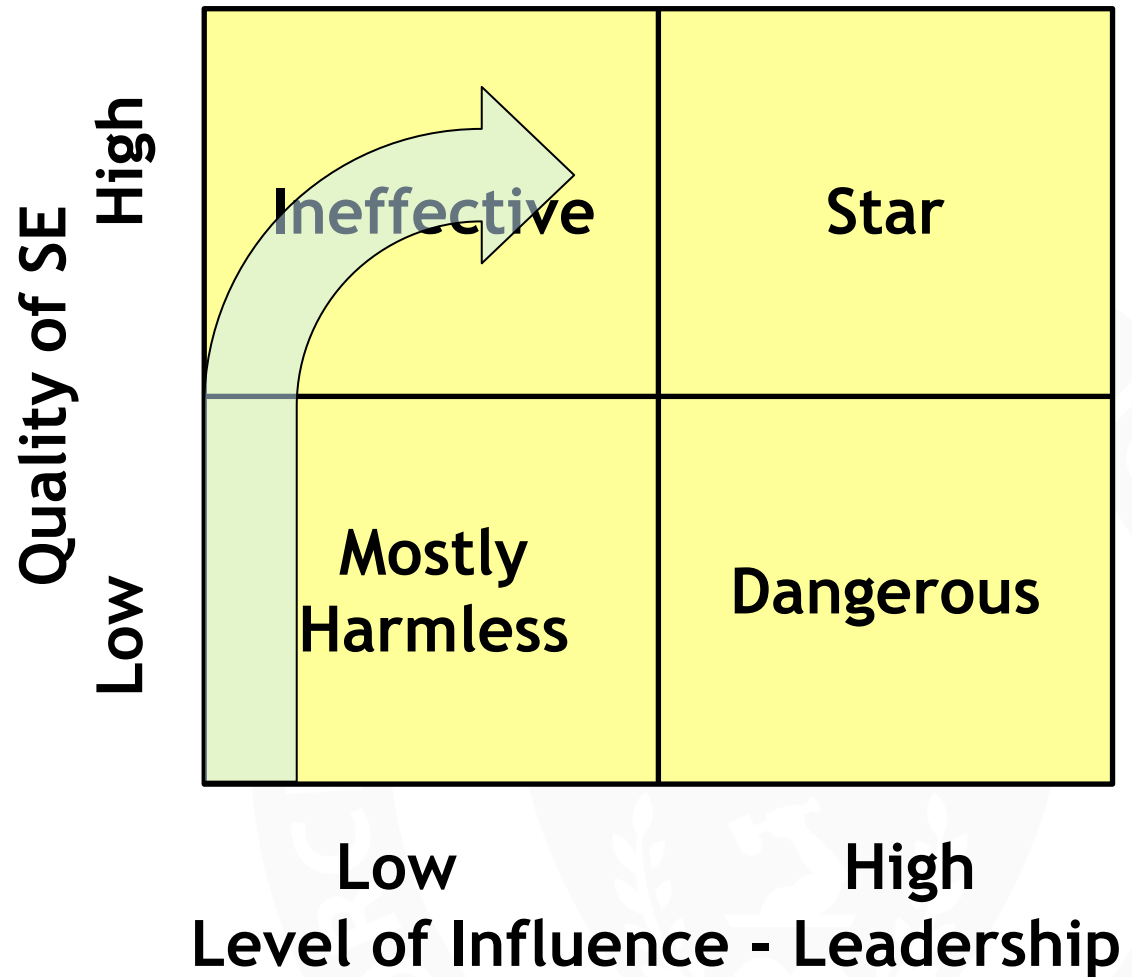
Quality of SE	High	Ineffective	Star
	Low	Mostly Harmless	Dangerous
		Low	High
		Level of Influence - Leadership	

*Discussions at INCOSE IS 2012 with Duncan Kemp

What is the Best Approach?

If students only learn and apply SE techniques without any leadership until later in their career, the path mostly follows a line into the Ineffective area.

Unfortunately, most tend to stay in this area and it takes a considerable amount of effort to progress to Star.

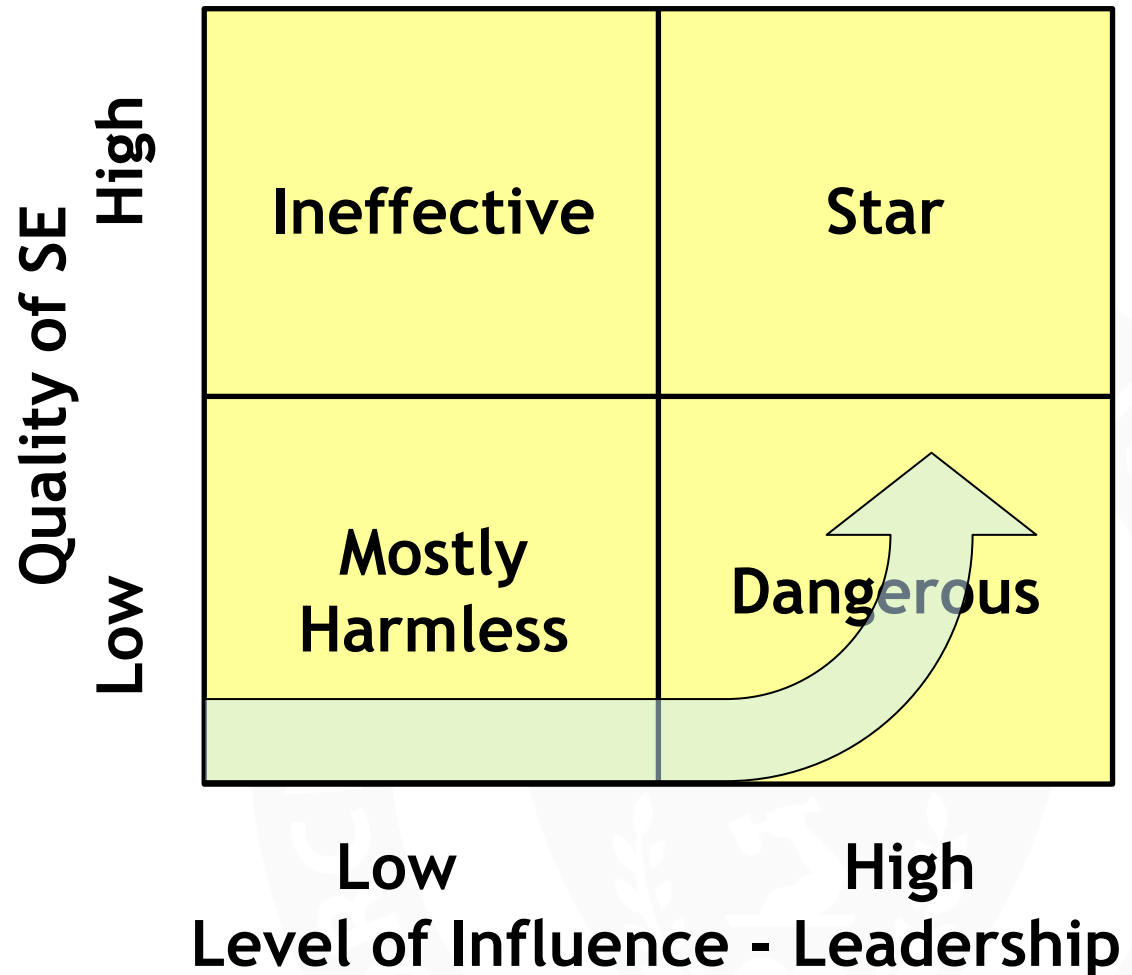


What is the Best Approach?

If students only learn and apply leadership principles and influence without real SE substance, they become Dangerous.

Most are found out eventually and tend to stay in this area until dismissed or retired.

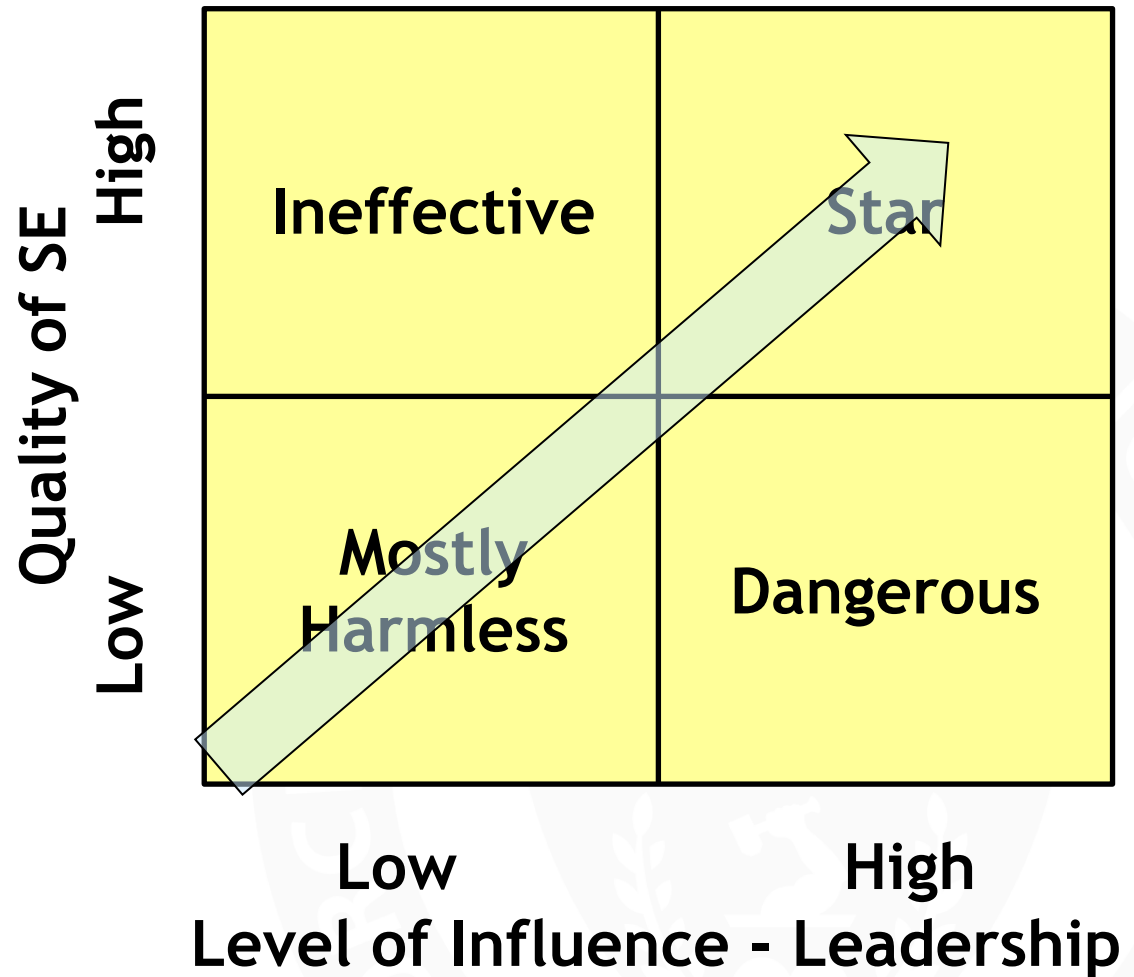
Unfortunately, no amount of effort can undo the damage.



What is the Best Approach?

If students learn and apply leadership principles as they learn and apply SE techniques from the beginning, they can follow a path to Star that avoids the Ineffective and Dangerous areas.

Systems Engineers can learn to be Star leaders with respectable influence early in and throughout their careers.



Summary

- It is possible and expected for Systems Engineers to start leading on Day 1 without being in a position of authority.
- You can manage things, but always lead people.
- Listen! You may learn something!
- Never stop learning! Know your stuff.
- Don't be afraid to take some risks.
- Have a Vision! Share it!
- Believe in what you are doing - belief is contagious.
- Sometimes, all you have to do is "Show Up!"
- Don't let yourself become Ineffective or Dangerous - Be a Star!



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Thank You!

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