School of Systems&Enterprises

Applying the Plan-Do-Check-Act Cycle to Develop Best Practices in Remote Online Systems Engineering Education

INCOSE IS
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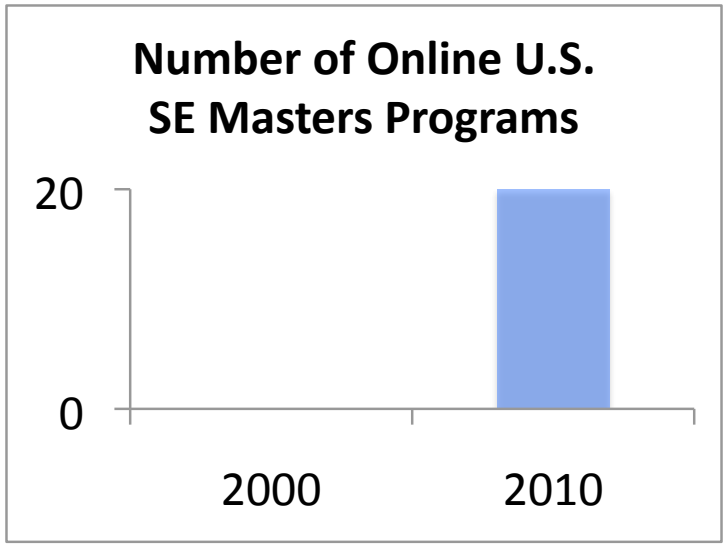
Growth in U.S. SE Program Offerings

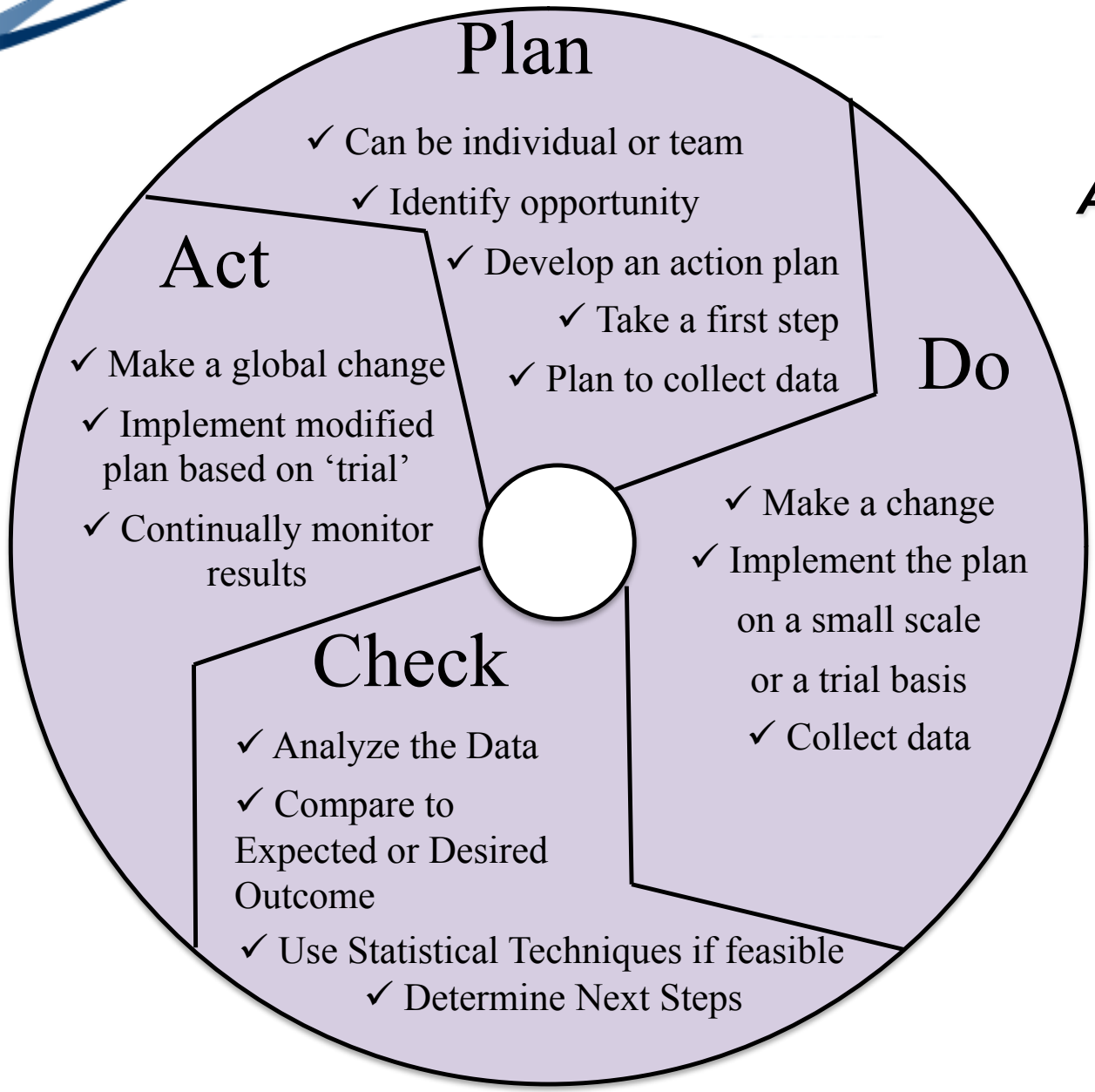
Type of SE Program	Degree Type	Brown & Scherer (2000)	Fabrycky (2010)	Increase Factor
Systems Centric	Bachelors	10	11	1.1
	Masters	10	31	3.1
	Doctorate	3	14	4.7
	Systems Centric	**23**	**56**	**2.4**
Domain Centric	Bachelors	9	44	4.9
	Masters	17	42	2.5
	Doctorate	9	23	2.6
	Domain Centric	**35**	**109**	**3.1**
All	Bachelors	19	55	2.9
	Masters	27	73	2.7
	Doctorate	12	37	3.1
Both Types	**All Degrees**	**58**	**165**	**2.8**

The Challenge



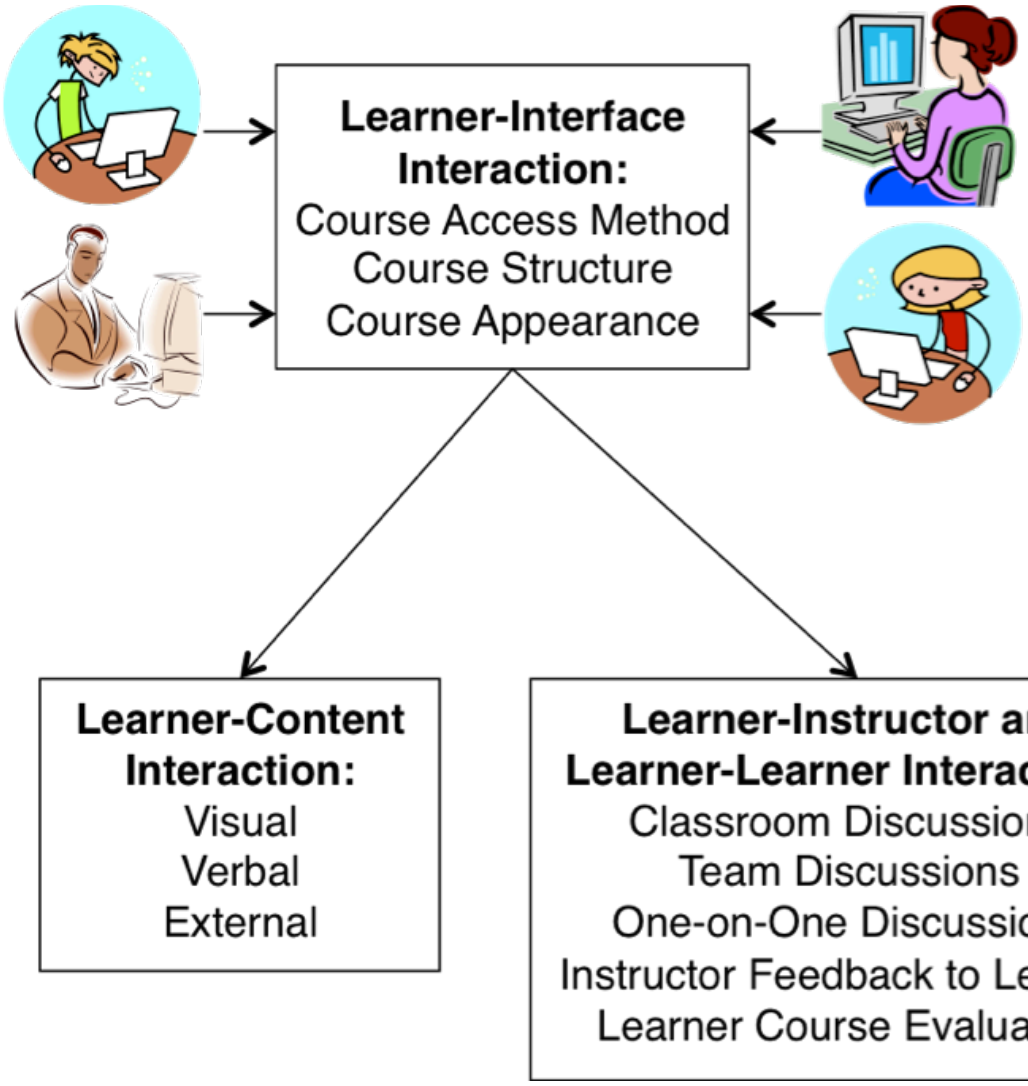
How might we develop the best practices in remote online systems engineering education?

Plan-Do-Check-Act Cycle Defined



Plan-Do-Check-Act Cycle Applied

Online Course Architecture



Plan

- Understand the System Context
  - Know how to use the technology; understand how to make its use as easy as possible for the students
- Address Requirements Beginning to End
  - Have all developed materials available from the start (including minor tweaks)
  - Develop new materials during the course
  - Provide/Develop/Maintain a FAQ list
- Consult with SMEs
  - Expectations are different
  - Seek and Give lots of feedback

Do

- Experiment with Schedule
  - Make assignments due Sunday night/Monday morning
  - Provide feedback within 24 / 48 / 72 hours
- Right Size the System
  - Class size and team size
- Address Multiple Learning Perspectives
  - Use multiple approaches to deliver lectures (slides, text/ speaker notes, audio recorded/live)
  - And discuss course content (text-based, audio-based)
- Establish Strong Relationship
  - Address student isolation
  - Find ways to incorporate personal touch points

Check

- Define/Evaluate Success Criteria
  - What is important to you, your students, the institution
- Seek True Cause and Effect
  - "Good judgment comes from experience, and experience comes from bad judgment."
- Take 'In-Performance' Measures
  - Midway assessments
  - Pilot Discussion Questions
- Keep the Situation in Perspective
  - "There are trivial truths and the great truths. The opposite of a trivial truth is plainly false. The opposite of a great truth is also true." Neils Bohr

Act

- Focus on the Long Term
  - Greater amount of work versus Schedule Flexibility
  - Inadequate Mentoring versus Long Term Payback
  - Content 'life expectancy' and re-use
- Apply Multiple Views
  - future instructors, students, administration, institution
- Stay Current Technology/Leading Edge
  - Average Age SE student: Early 30s
- Adapt to the System Behavior
  - Expect the unexpected
  - Focus on what is under your control to address
  - Allow redo's

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Set expectations, provide frequent clear communications, take a long term view. Good luck!

Questions?

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