An Industry Perspective on What We Should be Teaching our Next Generation of Software Practitioners in the Universities

Paul E. McMahon

www.pemsystems.com

Traditional Software Engineering Education

Versus

Real World

Transition: University to Industry

Transition: University to Industry (cont.)

Agile ?
Agile at Scale ?
Waterfall ?

Transition: University to Industry (cont.)

Learn Expected Way of Working
Improve Expected Way of Working

- First practical thing we should be teaching is how to improve an existing method

Example:
Retrospective Practice

- Focus
  - How we can teach future software practitioners to improve **any** existing method using Essence

A little background on Essence

- Object Management Group (OMG) standard in 2014. Current version 1.2, Released 2018
- A kernel and language for software engineering methods
- **NOT a method, but a common ground of essentials underlying all methods**

Essence

Examples:
Requirements
Stakeholders

- 7 Alphas
- Each Alpha has 5 or 6 states
- **Each state characterized by a list of checklist items**

Multiple examples of their use

My own background

Sharing stories

My own background

Sharing stories

Stories from real world experiences

Guidelines used in transforming real life stories into Essence checklists

- Natural language
- Not "check-the-box" checklists
  - Intentionally worded to elicit conversation
  - Teams decide on interpretation given context
- Focus on achieving the goal

Can help with effective use

Example shortly

Where we are headed

- A number of concrete examples …

- **Teaching future software developers how to conduct a root cause analysis of a problem to aid in arriving at an optimum solution**

Examples common industry challenges

- “We are always dealing with unclear requirements”
- “We can’t get our stakeholders to work with us”
- “The hardware is always late and management ends up cutting the software test time”

But before we dig into these…

Essence Education Forum

University

Requirements → Develop software

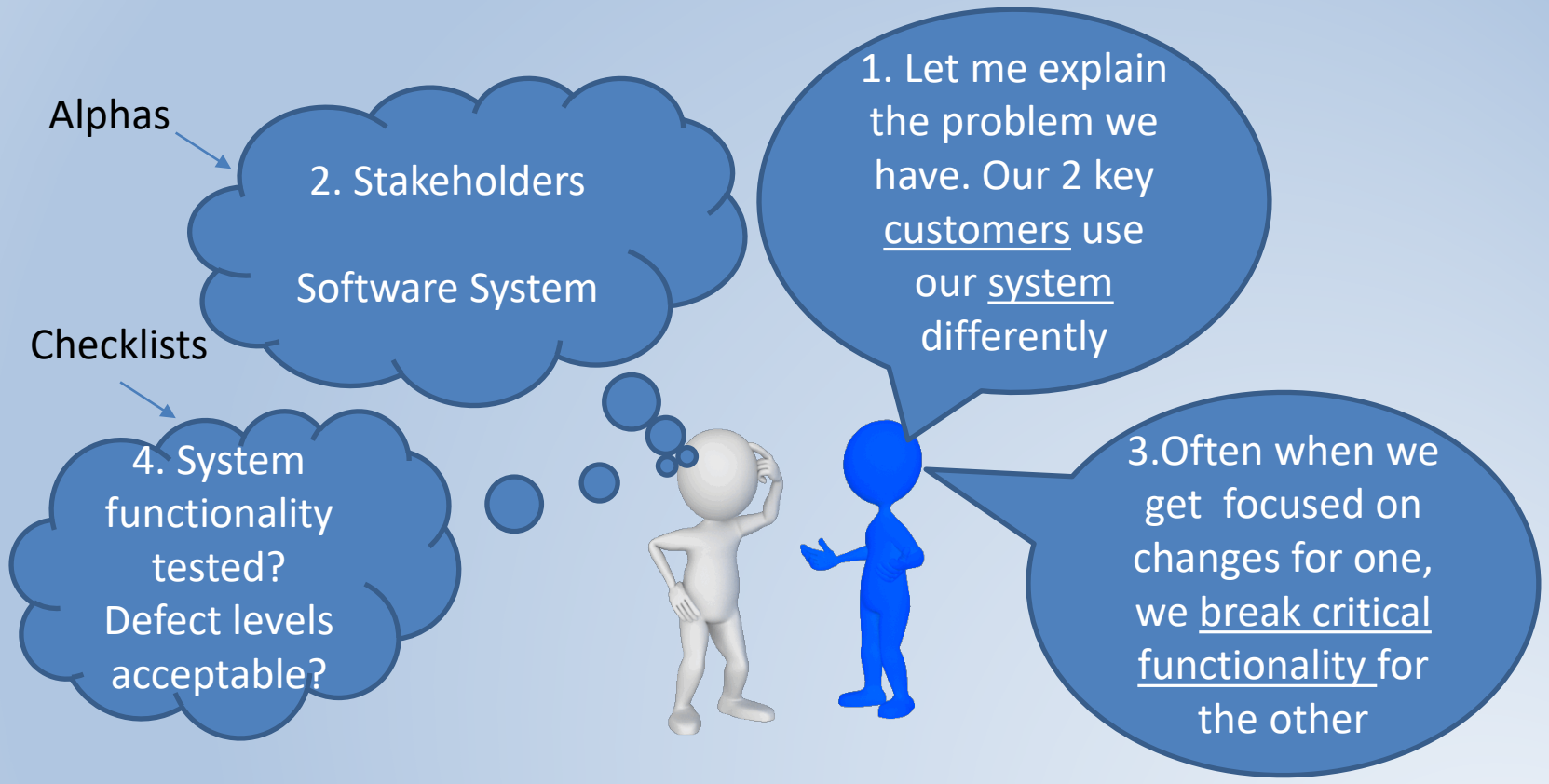
Gap

Industry

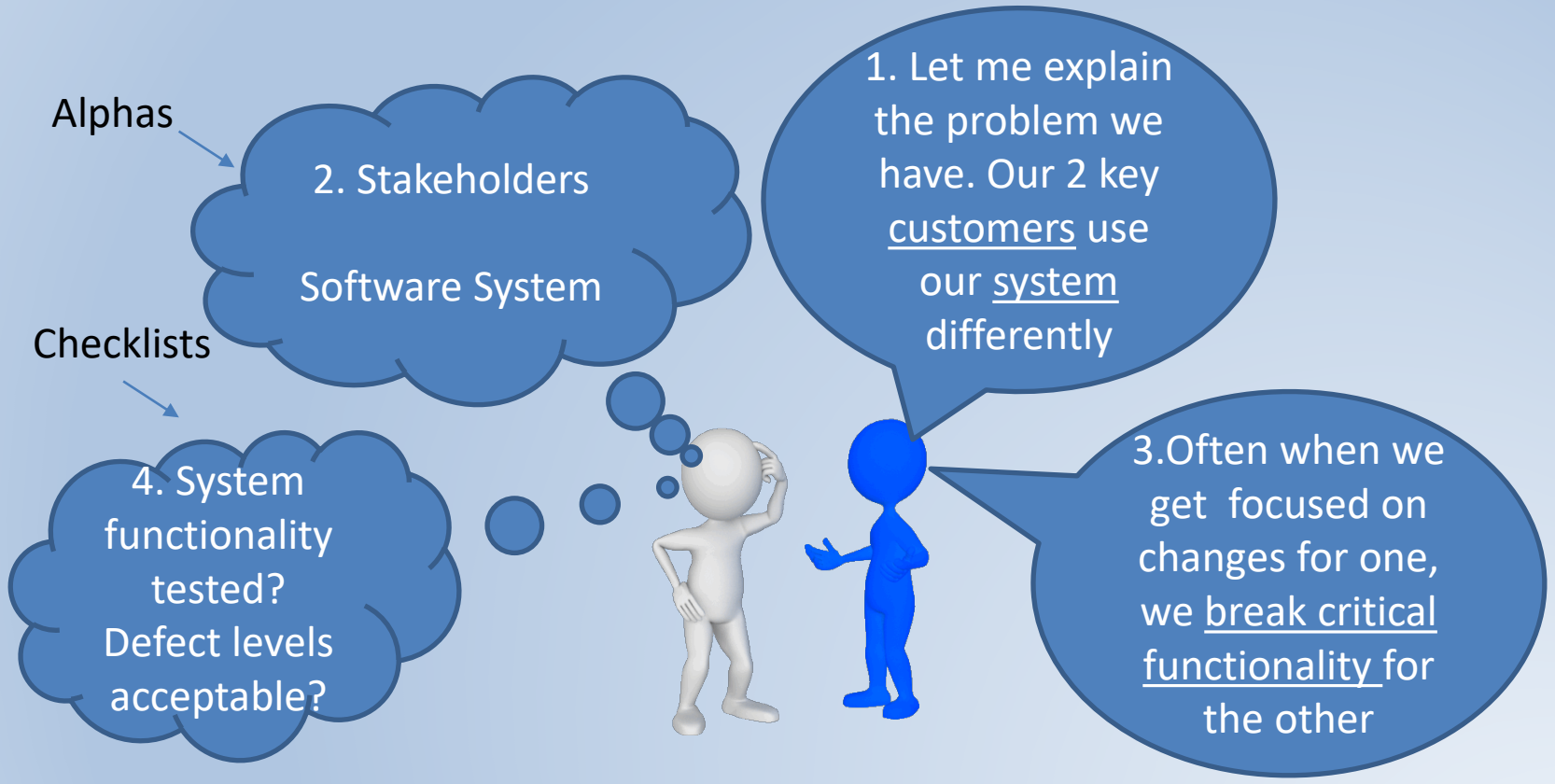
Real stakeholders?

Ambiguous requirements?

Actual case study example: **Using Essence in "stealth mode"** to solve a problem



Actual case study example: Using Essence in "stealth model" to solve a problem



It's just a conversation using natural words that can help guide teams to find their own effective solutions.

Client Services

Use Essence when teach Scrum

Everyone's agile is different

Focus on the goal

Client Services (continued)

Use Essence when teach Scrum

Jeff Sutherland, co-founder of Scrum

1/3rd Scrum practices implemented well

1/3rd poorly

1/3rd not at all

Getting back to client with 2 key customers who use product differently

Getting back to client with 2 key customers who use product differently

Real Goal –
Get stakeholder feedback

Stakeholder

Involved

- Representatives assist the team
- Timely feedback and decisions provided
- Changes promptly communicated

Helps teams focus on the goal

Note: Alpha State Cards
(available for download from SEMAT Website)

SEMAT **3 / 6**

Stakeholder

In Agreement

- ❑ Minimal expectations agreed
- ❑ Rep's happy with their involvement
- ❑ Rep's input valued
- ❑ Team's input valued
- ❑ Priorities clear & perspectives balanced

Often misunderstood

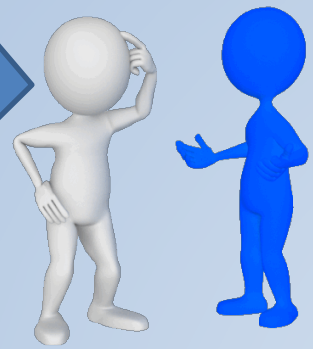
Words carefully chosen from real world situations

Students can be taught situations so don't get big surprise in industry

SEMAT **4 / 6**

1st International Workshop on Essence in Education and Training (WEE&T'20)

Essence sounds like a new method and its inconsistent with agile



Software System

Usable

- ❑ System can be operated
- ❑ System functionality tested
- ❑ System performance acceptable
- ❑ Defect levels acceptable
- ❑ System fully documented
- ❑ Release content known
- ❑ Added value clear

SEMAT 3 / 6

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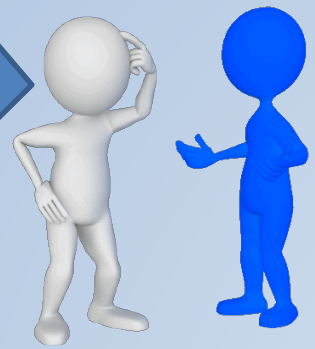

Must be interpreted within the context of your agreed to practices

How to use checklists needs to be taught to students. Best done through concrete examples

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SEMAT 3 / 6

Requirements

Coherent

- ❑ Requirements shared
- ❑ Requirements' origin clear
- ❑ Rationale clear
- ❑ Conflicts addressed
- ❑ Essential characteristics clear
- ❑ Key usage scenarios explained
- ❑ Priorities clear
- ❑ Impact understood
- ❑ Team knows & agrees on what to deliver

Conflicting requirements identified and attended to

Not telling you "how to" do this

SEMAT 3 / 6

When new developers leave University

Taught “Backlog Grooming” Practice

Big surprise!

Organization 1:
Way of Working X

Big surprise!

Organization 2:
Way of Working Y

Back to the Essence Workshop…

Back to the Essence Workshop…

Requirements

Addressed

- ❑ Enough addressed to be acceptable
- ❑ Requirements and system match
- ❑ Value realized clear
- ❑ System worth making operational

Students should be taught this because it is the way the real world of industry operates

SEMAT **5 / 6**

Stakeholders

Recognized

Represented

Involved

In Agreement

Satisfied for Deployment

Satisfied in Use

The people, groups, or organizations who affect or are affected by a software system.

The stakeholders:

- Provide the opportunity and are the source of the requirements
- Use and consume the software system
- Fund the development of the software system
- Actively represent the groups and organizations affected by the software system
- Are actively involved all the way through the endeavor
- Have representatives that collaborate with the team to reach agreement on an acceptable system

Note: Alpha Definition Cards
(available for download from SEMAT Website)

Stakeholders need to have a stake

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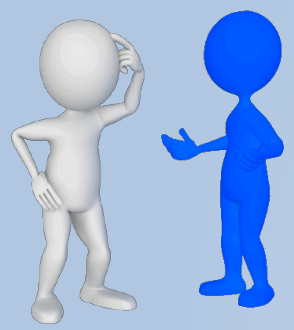
Who do I need to talk to in order to get the data we need?



Students can understand these kind of real stories

Stakeholder

Involved

- ❑ Representatives assist the team
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SEMAT 3 / 6

Stakeholder

Represented

- ❑ Responsibilities agreed
- ❑ Representatives authorized
- ❑ Collaboration approach agreed
- ❑ Way of working supported & respected

SEMAT 2 / 6

Stakeholder

Recognized

- ❑ Stakeholder groups identified
- ❑ Key stakeholder groups represented
- ❑ Responsibilities defined

SEMAT 1 / 6

Stakeholders need to have a stake

Students can be better prepared to help their organization on day 1 when they start their first job in industry

Teaching students to effectively apply checklists to aid critical thinking

150
Checklist
Items

Not Essence checklists
Expect teams to add own

Teaching students to effectively apply checklists to aid critical thinking

All checklists don't carry the same weight!

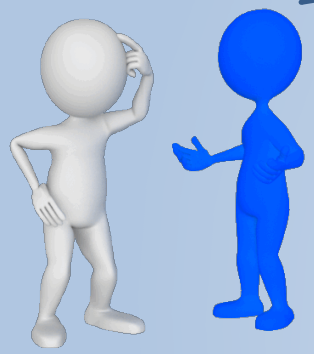
150 Checklist Items

Not Essence checklists
Expect teams to add own

Need to teach next generation how to be good critical thinkers

The Heart of Agile

We are trying to create a culture of listening… If our tone is dialogue based people will self-include and exclude… Today more and more people are growing up in dialogue rather than edict



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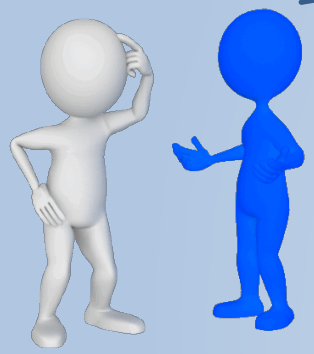

Team

Collaborating

- ❑ Works as one unit
- ❑ Communication open and honest
- ❑ Focused on mission
- ❑ Members know each other

SEMAT 3 / 5

Principles, Values and Cybersecurity

Safety ?

Security ?

Privacy ?

Way of Working

Principles Established

- ❑ Team actively support principles
- ❑ Stakeholders agree with principles
- ❑ Tool needs agreed
- ❑ Approach recommended
- ❑ Operational context understood
- ❑ Practice & tool constraints known

SEMAT 1 / 6

Way of Working

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SEMAT 1 / 6

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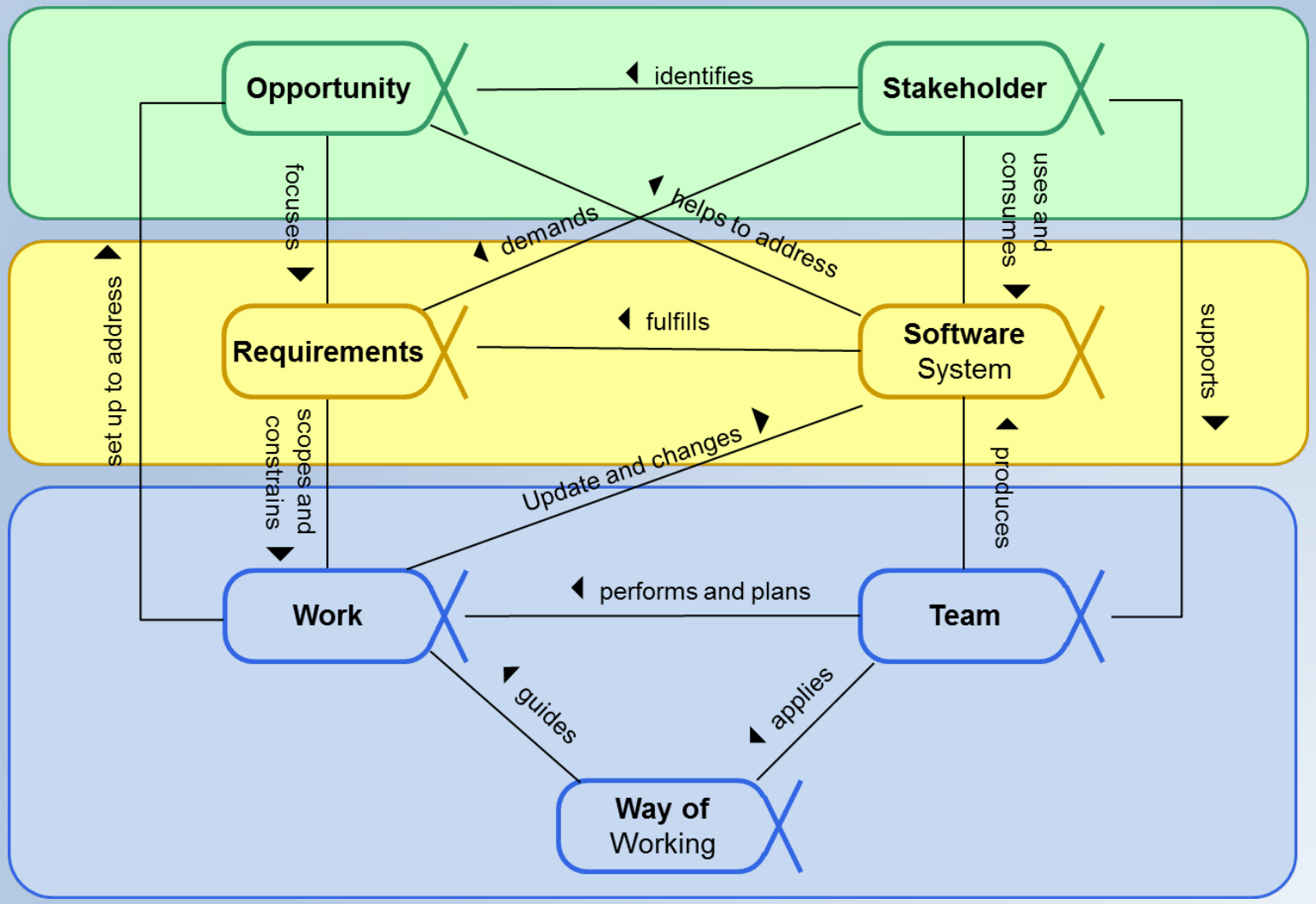
SEMAT 3 / 5

Essence doesn't tell teams what their principles or values need to be, but…

Risk and critical thinking



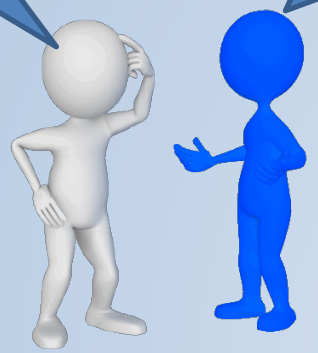
Critical thinking and Cybersecurity

Critical thinking and Cybersecurity (cont.)

Critical thinking and Cybersecurity (cont.)

But how do we decide which 25% to cut?

Our conventional programs seek 99% solutions that take years, whereas the wars we are in today require 75% solutions in months.



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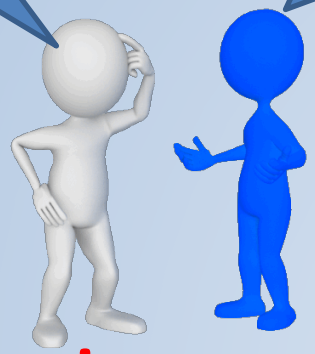

Risk to safety, security or privacy?

Need for critical thinking and balancing trade-offs

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SEMAT 3 / 6

Another essential skill to teach next generation: Estimating

Work

Prepared

- ❑ Commitment made
- ❑ Cost and effort estimated
- ❑ Resource availability understood
- ❑ Risk exposure understood
- ❑ Acceptance criteria established
- ❑ Sufficiently broken down to start
- ❑ Tasks identified and prioritized
- ❑ Credible plan in place
- ❑ At least one team member ready
- ❑ Integration points defined

SEMAT 2 / 6

Work

Under Control

- ❑ Tasks being completed
- ❑ Unplanned work under control
- ❑ Risks under control
- ❑ Estimates revised to reflect performance
- ❑ Progress measured
- ❑ Re-work under control
- ❑ Commitments consistently met

SEMAT 4 / 6

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SEMAT 4 / 6

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SEMAT 4 / 6

Team

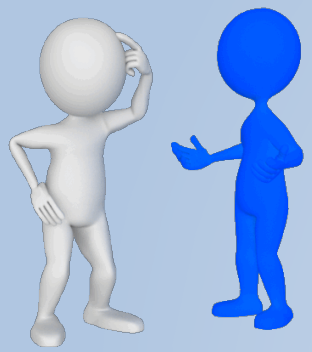
Seeded

- ❑ Mission defined
- ❑ Constraints known and defined
- ❑ Growth mechanisms in place
- ❑ Composition defined
- ❑ Responsibilities outlined
- ❑ Required commitment level clear
- ❑ Required competencies identified
- ❑ Size determined
- ❑ Governance rules defined
- ❑ Leadership model selected

SEMAT **1 / 5**

The Essence of Essence

The power of Essence checklists isn't so much the checklists themselves, but the opportunity they bring to share experiences and stories from the volunteers who developed them…



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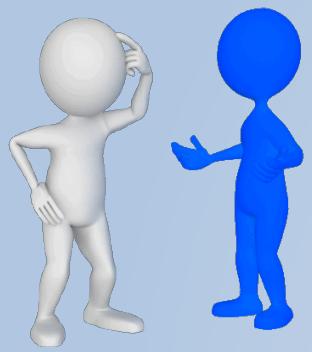

<u>Another way to say this is</u>:

We are sharing past experiences to help new University graduates raise their competency level faster so they can start contributing on day 1 when they leave the University and enter Industry

Conclusion

If you are interested in more info on this subject refer to www.essence-in-use.com for references to related blogs, books and training course

Contact Info:
Paul E. McMahon
pemcmahon@acm.org
www.pemsystems.com

References

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- [2] https://paulemcmahon.wordpress.com/2020/12/20/using-essence-to-teach-software-practitioners-in-industry/
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- [4] For more information on Essence including training course https://essence-in-use.com/
- [5]Alistair Cockburn Interview https://www.youtube.com/watch?v=xDlz6mEm-7I,
- [6] For more information on Essence in use training https://leanpub.com/c/essence
- [7] More info on background and rationale for Essence checklists https://leanpub.com/shyboys
- [8] More Info on SEMAT refer to www.semat.org . See next slide for info on downloading Essence CARDS
- [9] More Real world stories and related Essence checklists https://leanpub.com/itsallupsidedown
- [10]Blog with example using Essence to help solve a Cybersecurity challenge https://paulemcmahon.wordpress.com/2019/05/16/using-essence-in-stealth-mode-to-help-solve-a-cybersecurity-challenge/
- [11] Blog responding to comment on previous blog on using Essence with Cybersecurity Challenge https://paulemcmahon.wordpress.com/2019/06/09/scaling-essence-in-stealth-mode-and-why-you-should-care/
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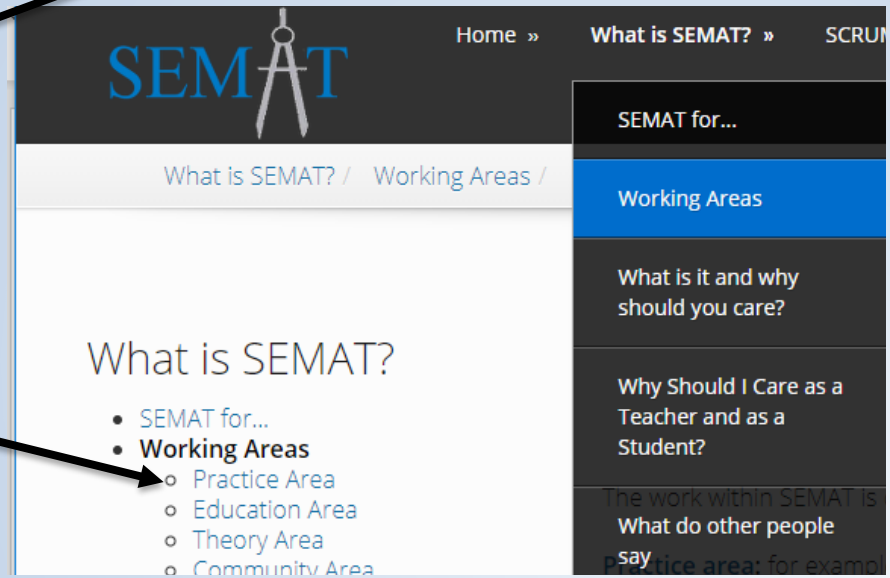
Overview Card

State Cards

Full Checklist



WWW.SEMAT.ORG

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for full checklists
Clippable cards
(Need to register for downloads)