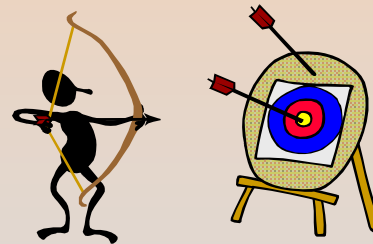


Competencies for a Software Quality Assurance Professional

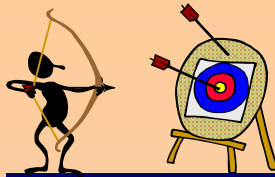


Raghav S Nandyal

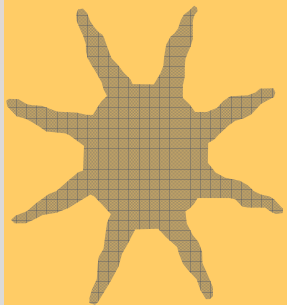
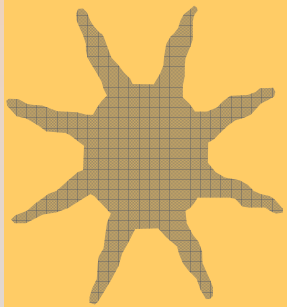
Chief Executive Officer

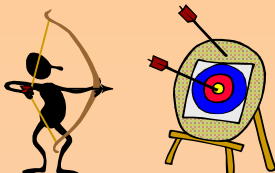
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AGENDA



- Establish the Context
- Review the Current Software Quality Assurance Crisis (SQA) – Typical issues
- Ten Recommended Competencies for the SQA Professional
- SITARA Domain-Competency Sandwich Model™ – A Formal Approach
- Conclusion





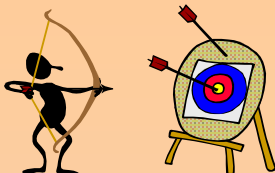
Establish the Context

Software Quality Assurance is a multifaceted function with significant strategic importance

Primary responsibilities of Software Quality Assurance are –

- To effect holistic and balanced process improvements
- Retain institutional memory of execution, and
- Periodically use audits to reinforce management commitment to the vision of excellence in execution

Since this is not the way Software Quality Assurance is generally understood, the SQA Crisis is serious



Establish the Context

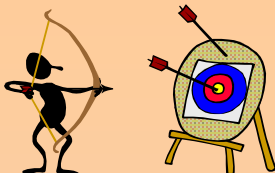
By the very nature of activities that define Software Quality Assurance –

- Quality of relationship shared between SQA and other functions is often adversarial

It is ironic to note that when cash flow is tight and cost cutting is enforced –

- Organizations with a learning disability often take the path of least resistance
- The much needed investments into software quality assurance would be the first function to get the axe!

An organizational idiosyncrasy best described as a bizarre and a cynical approach to staffing SQA is – *‘staff it with non-performers’*



Establish the Context

Such thinking stems from a misplaced reasoning abetted by a wrong compensation system in which,

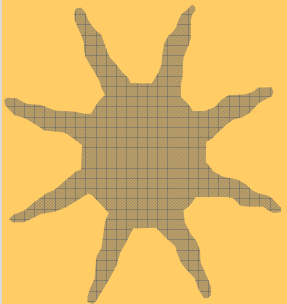
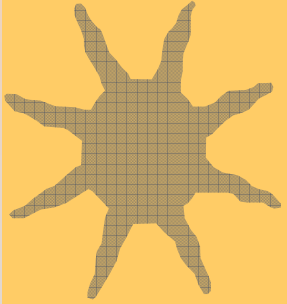
- Fire fighting is considered glamorous, whereas preventing fire is not

Such organizational cultures have not realized that a significantly more important attribute of process improvement –

- That of retention of organizational or institutional memory from execution is what is at stake

What then, are the competencies for a Software Quality Assurance Professional?





Current SQA Crisis:

First, we shall explore the current SQA Crisis as witnessed even in some of the best-of-the-breed high-maturity work cultures

Observations in this section are based on my experiences leading several classes of SCAMPI appraisals on both the CMMI and the People CMM



Current SQA Crisis

The SQA Crisis has been noticed repeatedly during SCAMPI Appraisals among many different organizational cultures across geographies

- Even a less rigorous SCAMPI Class C appraisal was able to highlight many more process discontinuities, which the monthly SQA audits failed to expose month-after-month
- The question that prompted this research was: ‘are the right people executing the right SQA functions in the right way?’
- The other bigger question: ‘what is the current scope of SQA activity, and what should it ideally be?’



Current SQA Crisis

There is a significant problem assigning SQA responsibilities to the right person in order to provide SQA leadership for the organization

- The best people prefer line functions
- There is a belief that SQA is a non-glamorous role
- SQA is perceived by project management as a low-risk, add-on activity which is scheduled into the project plan 'only if the time permits'
- Probably because of a simplistic belief that: SQA = Audits
- From a staffing perspective: SQA role is assigned to individuals who are out-of-touch
- Perceived in some work cultures as a 'terminal job'

Current SQA Crisis



Individuals who are assigned the SQA role seldom have a robust process themselves!

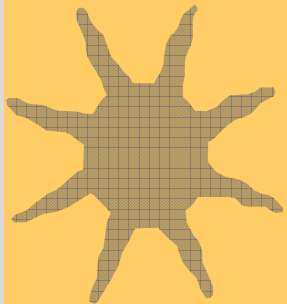
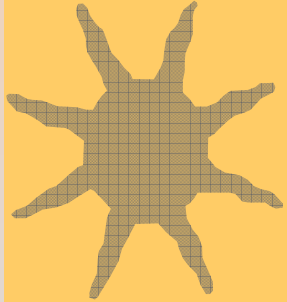
- Typical perception of project teams to SQA audits:
 - ▶ SQA folks begin with an ‘I am right, you are wrong’ posture ...
 - ▶ but, we can outsmart the auditor!
 - ▶ The auditor typically chases a prejudiced trail of potential discontinuities
 - ▶ By avoiding getting into these traps the audit often ends up in a situation where the SQA is made to feel ‘they were wrong, we are right!’
 - ▶ If the auditor is audacious, he might flag a few non-conformances!
- No one likes to be ‘audited’ – ***but is SQA’s role just limited to audits?***

Current SQA Crisis



The problem is with the way SQA leads and conducts audits as well –

- Often led using a checklist
- Tasks are verified at a very high and a superficial level
- Number of reviews and inspections in which the SQA needs to participate in a day is significant given the disproportionately low numbers of individuals in SQA roles versus those assigned project responsibilities
- Role of SQA in most reviews and inspections is very marginal – mostly, that of a recorder
- There is no value-addition from the SQA as a result and their effectiveness during audits, suffer



Current SQA Crisis



Individuals who are assigned the SQA role seldom have a robust training and development or proficiency development program

There is therefore a vicious circle in operation –

- Projects don't see the importance of the SQA function in the light of a poor role definition for SQA – **perceived mostly as an audit function**
- Aversion to SQA is also due to the fact that –
 - ▶ SQA is not composed of the cream-of-the-cream performers, and
 - ▶ is likely to strike an adversarial relationship
 - ▶ since audits are generally perceived as a 'low-trust, highly suspicious, often prejudiced and a fault-finding activity'





Ten Recommended Competencies:

So, if those were some of the problems, then what are the probable solutions? [Nandyal 2007]

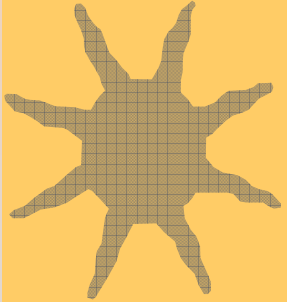
We shall use the People CMM definition for the term competency which is a **cluster of knowledge, skills and process abilities** required as an underlying characteristic of an individual to perform a particular function or type of work in the organization. [Curtis 2002]



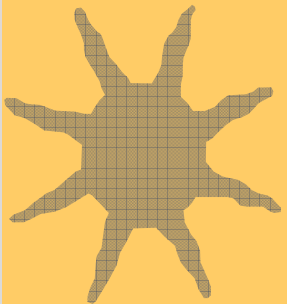
Ten Recommended Competencies



Competency is **causally related to effective and/or superior performance**, as determined by measurable, objective criteria, in a job function or situation



Competencies mostly **manifest as an intrinsic ability** of an individual or a team to perform specialized tasks, often noticed as behavioral traits

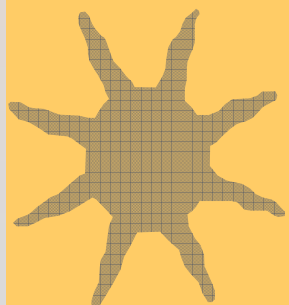
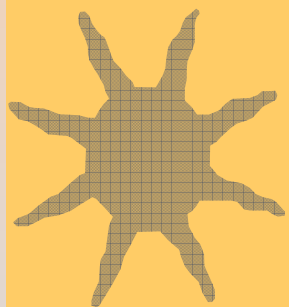


One of the behavioral traits I have observed with seasoned SQA professionals is they take informal cues as seriously as formal inputs



Ten Recommended Competencies

1. Ability to deal with ambiguity and make informed decisions based on evaluation of facts
 - Both the CMMI and People CMM frameworks require considerable practical insights into the possible 'correct' ways of rendering them to accomplish business and process objectives
 - Often, Practice Implementation Indicators point to artifacts which will only involve moving considerable quantities of ore to gain an ounce of gold
 - Certain practices of the CMMI and People CMM require considerable support from the customer's process and other interfacing processes such as when, multiple vendors are involved or when COTS solutions have to be integrated

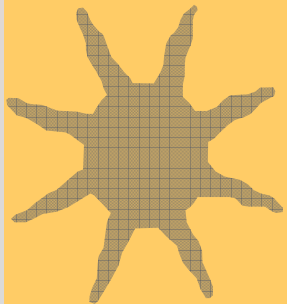
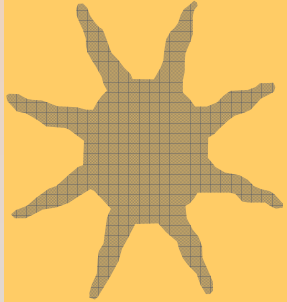




Ten Recommended Competencies

2. Ability to lead audit teams and synthesize factual information using systems thinking

- SQA Professionals are typically expected to bring a lot of experience and external perspectives of process implementation to the table
- Must be able to think holistically across multiple process areas, and if the CMMI and People CMM are attempted jointly, then the SQA must think about process discontinuities spanning across multiple frameworks as well
- As an example from People CMM:
 - ▶ Staffing ▶ **Workforce Planning** ▶ Empowered Workgroups
 - ▶ Gaps in Workforce Planning extend both ways, into Staffing at Level 2 and Empowered Workgroups at Level 4

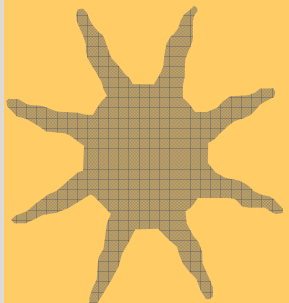
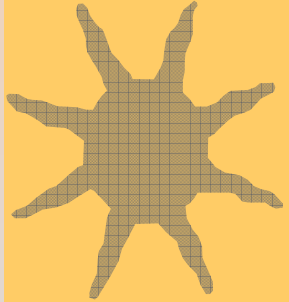




Ten Recommended Competencies

3. Ability to handle all levels of management with poise

- SQA Professionals have to interact with multiple levels of management in order to obtain an accurate understanding of the process implementation
- Data from multiple sources, those who may be both well informed and ill-informed about the state of practice in the organizational unit, would have to be elicited before informed decisions can be made
- Must have the patience and maturity to deal with all levels of management with poise and strike a balance with data that is submitted
- Sift meaningful information from the fluff without affecting the quality of the conversation or interaction

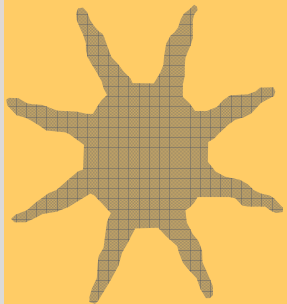
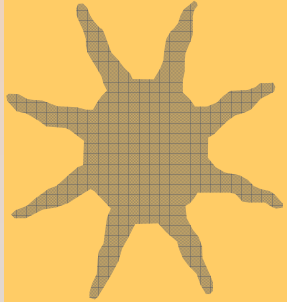




Ten Recommended Competencies

4. Ability to phrase open ended questions and follow up questions,

- To explore the process discontinuities while remaining attentive to what is being said
- Requires an ability to think through the audit based on coverage obtained and what remains yet to be explored while synthesizing information continuously
- Requires good listening and information processing skills besides the necessary domain and process knowledge about knowing or anticipating about—*what can go wrong with the way the process is being represented*
- Knowing enough about the project's context and the most important ability—*knowing what to look for and ask for*—is extremely important

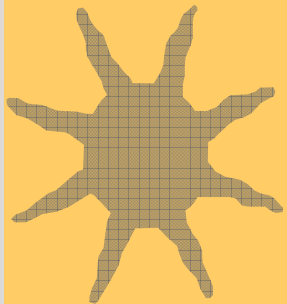
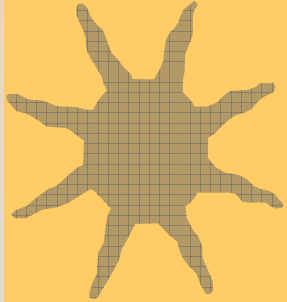




Ten Recommended Competencies

5. Active listening and empathy to appreciate current process and/or organizational limitations

- Active listening is to be able to comprehend **what was said, what is being said, and to be able to look ahead** and pose a question that might lead to a new body of audit data that would prove useful to establish corroboration
- Being able to communicate without interruption, but being able to steer the discussion in a direction without appearing to be imposing or intrusive
- Even the best of processes and organizational contexts suffer limitations which are not due to the process, but is extrinsic to the process
- Most issues highlighted by practitioners during audits come jumbled up





Ten Recommended Competencies

6. Being a witness during the audit without inflicting uncalled for external opinions or biases or prejudices

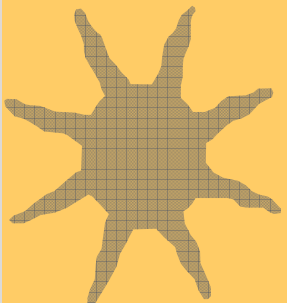
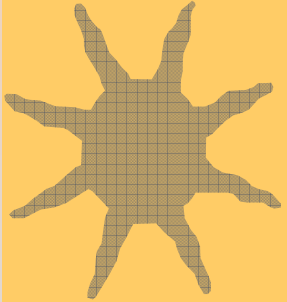
- Requires actively querying the process while making qualitative judgments of what is being demonstrated,
- To enable projects to explore – ‘*what else could exist that has not be demonstrated?*’
- Take a proactive position, to serve as a crucial catalytic input from an external perspective to facilitate/render process improvements while helping to optimize process institutionalization
- Set projects and individuals up to succeed – and not fail!



Ten Recommended Competencies

7. Effective presentation skills and clarity of thought

- Must be prepared to give examples of why a finding is considered an opportunity for follow up closure action plan
- If required, it is important to qualify each opportunity for improvement with a well reasoned justification using the audit context
- Audits must capture and present opportunities for improvement from the participants' view-point for transfer of ownership to the findings to be effective





Ten Recommended Competencies

8. Expert knowledge about the model and possible range of acceptable alternatives or solutions
- SQA professional is the model and audit method expert
 - Should be able to articulate acceptable approaches of process implementation when there is a conflict while accepting the manifest practices of the process
 - Knowledge about **acceptable alternatives or range of possible solutions**
 - Interpret model practices given the many implementation options while meeting the intent of the goals of the process area
 - Know both, the pulse beats and the Achilles' heel of projects



Ten Recommended Competencies

9. Knowledge about the project, organizational culture and the typical process descriptions and standards available for use

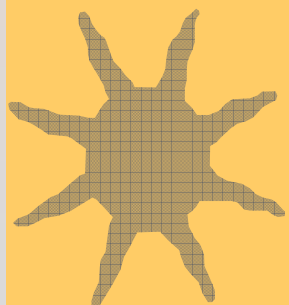
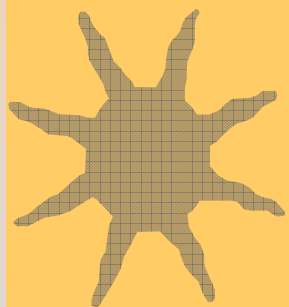
- Understand the nature of projects being executed in the organization
- Understand the typical process descriptions and standards available for use on projects
 - ▶ To ensure alignment of business objectives with the process objectives
- Facilitate knowledge transfer and knowledge capture activities (knowledge management)
- Conduct project introspection meetings, post-mortems and retrospectives
 - ▶ To capture and build knowledge assets

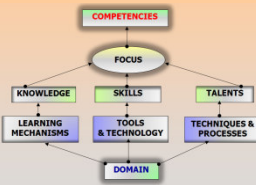


Ten Recommended Competencies

10. Think beyond the audit opportunity

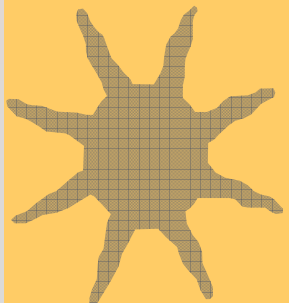
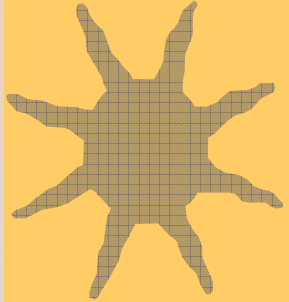
- It is natural for the projects to adopt an approach which is to – *'think in the moment'* or *'to get done with the audit!'*
- Explore follow up improvements to institutionalize untried best practices for the future
- Develop the right organizational thinking to enable organizational development and competency development
- Serve as the conscience keepers of the process program
- Ensure audits don't become a mockery in the eyes of the practitioner!



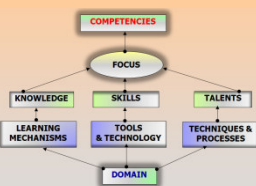


SITARA Domain-Competency Sandwich Model™ :

How does a more formal approach to developing SQA competency look? [Nandyal 2003]



SITARA Domain-Competency Sandwich Model™

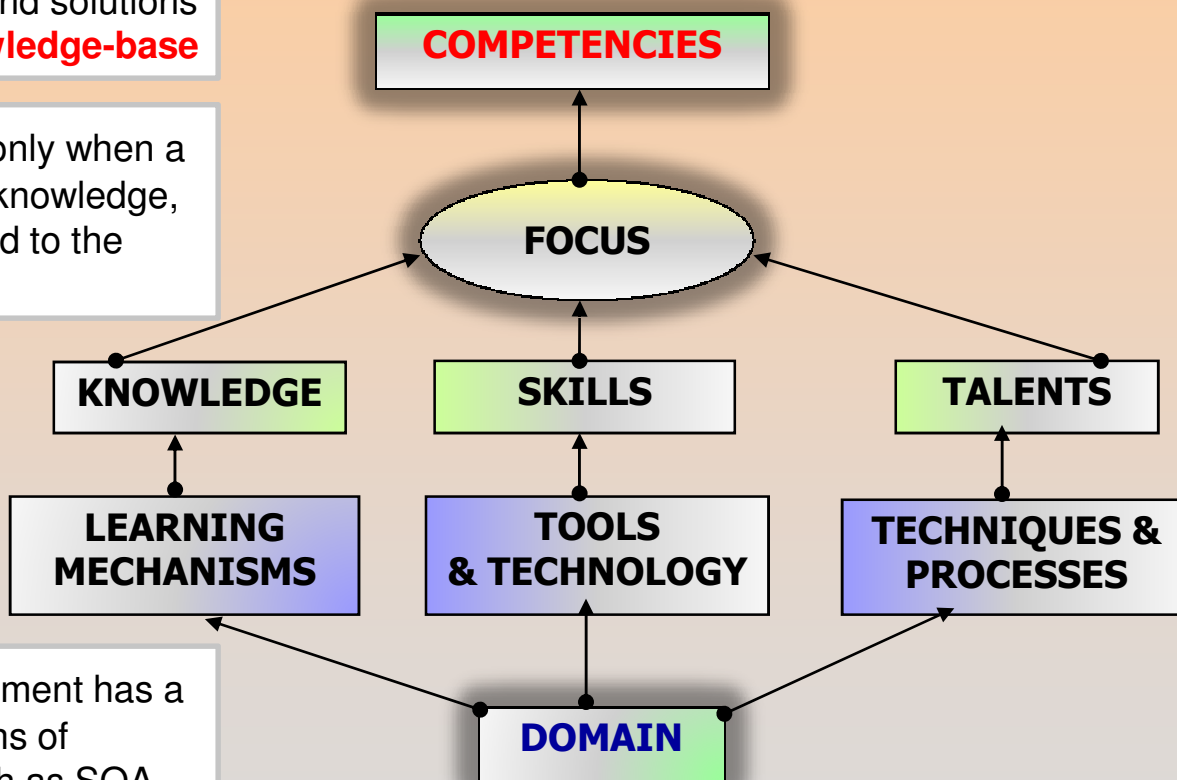


4. Gain familiarity with the types of problems encountered and solutions developed – **grow knowledge-base**

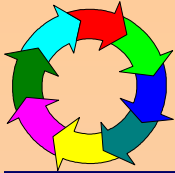
3. Competencies grow only when a focused combination of knowledge, skills and talent is applied to the domains of expertise

2. Enablers to grow SQA specific knowledge, skills and talents must be provided

1. Competency development has a bearing upon the domains of expertise required – such as SQA



Conclusion

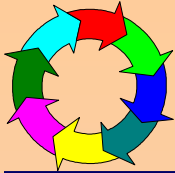


Practitioners know enough about what works, and what does not, in a system!

Software Quality Assurance Professionals must ensure that they know at least as much as a practitioner does, if not more about the process context

- This calls for a re-thinking of the roles and responsibilities of the SQA to go beyond – audits
- SQA Professional must serve as a mentor and coach for the projects to facilitate knowledge management
- Must serve as a conscience keeper of the process program
- Possible only if the right people are in the right seats

Conclusion

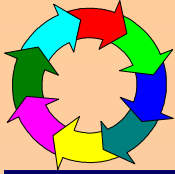


Practitioners best receive audit results if they can clearly relate to the findings and if they can see value from the findings

- Just checking to see that a process is documented and followed is only a small part of an audit and
- a very constricted view of Software Quality Assurance

There is a need for competent SQA professionals who apply judgments to provide findings which carefully examines the degree of rigour in the process

The rigour, seriousness and eye-for-detail therefore mandates certain competencies for the SQA professional



Conclusion

When done right, Software Quality Assurance is not just about conducting software quality audits or inspections, but extends far beyond into the realms of competency management, competency development, knowledge retention and knowledge hiving as well

We explored some of the competencies required for the Software Quality Assurance Professional for –

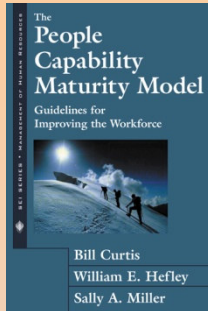
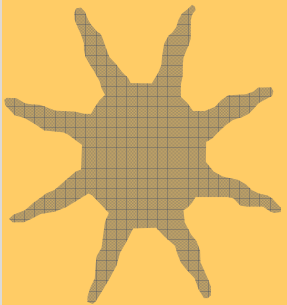
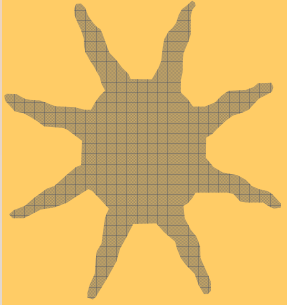
- Effecting holistic and balanced process improvements
- Retaining institutional memory of execution, and
- Periodically use audits to reinforce management commitment to the vision of excellence in execution





Excellence Combining Expertise™

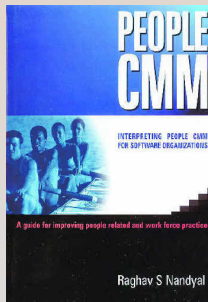
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Thank You!

DISCUSSIONS, Q&A

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