Judging the Suitability of Alternative Practices

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Background

alternative practice - A practice that is a substitute for one or more generic or specific practices contained in CMMI models that achieves an equivalent effect toward satisfying the generic or specific goal associated with model practices. Alternative practices are not necessarily one-for-one replacements for the generic or specific practices.

-- Glossary, CMMI for Development Version 1.2

- **What does this mean?**

- **Under what conditions do alternative practices occur?**

- **How do you judge whether they are acceptable?**

Hefner and O'Toole, "Judging the Suitability of Alternative Practices", 2007

Understanding the Context of the CMMI

- **context** – 1: the parts of a discourse that surround a word or passage and can throw light on its meaning; 2: the interrelated conditions in which something exists of occurs

  -- Merriam-Webster OnLine Dictionary

- **CMMI is a best practice model**
  - It reflects best practices that address development and maintenance activities applied to products and services

- **What is "best" in a given situation (i.e., a development activity) depends on the context**

Hefner and O'Toole, "Judging the Suitability of Alternative Practices", 2007

An Example of Context

- **"You should not talk with your mouth full?"**

- **This is a best practice - a good general rule to be followed**

- **Are there contexts in which the rule doesn't apply? What if:**

  Your toddler is about to touch a hot stove?

  **You're demonstrating
  why talking with your mouth full looks bad?**

  The culture considers talking with your mouth full proper and polite?

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How Does this Apply to CMMI?

The structure of the CMMI is:

- **Goals are appropriate in <u>any</u> context envisioned by the CMMI authors**
  - Hence, they are required;

- **Practices are appropriate in <u>most</u> contexts**
  - Hence, are expected
  - Alternative practices may be appropriate in the other contexts;

- **Subpractices, etc. are appropriate in <u>some</u> contexts**
  - Hence, are treated as informative
  - Because in many contexts they may not be appropriate.

Hefner and O'Toole, "Judging the Suitability of Alternative Practices", 2007

What is the Context Assumed by the CMMI Authors?

- **There is no explicit statement of the assumed context (e.g., large DoD contractor, small commercial company, etc.) for any practice**
  - Each author was probably biased by the types of examples they had seen in their own organization

- **Also, the same context is not assumed for all informative material throughout the model**
  - Different authors, different times = different contexts

- **Hence, the informative material is simply one example of a myriad of ways that <u>might</u> be appropriate for meeting the practices, not the <u>only</u> way, or even a <u>preferred</u> way**

Hefner and O'Toole, "Judging the Suitability of Alternative Practices", 2007

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An Example – Level 4/5

- **At the time CMMI was written, most industry examples were software organizations that repeatedly develop the same type of software**

  - Similar programming languages, similar applications, similar staff, similar project goals

- **Quite a different context than a geographically-distributed US DoD contractor with a wide dispersion of project types implementing a Six Sigma methodology**

- **Result -- Some informative material in QPM assumes projects quantitatively manage the same subprocesses quantitatively managed in OPP**

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The Definitions Provide Clues as to Context

- **project -** a managed set of interrelated resources which delivers one or more products to a customer or end user. A project has a definite beginning (i.e., project startup) and typically operates according to a plan… A project can be composed of projects.

- *How does this definition fit your scope of work?*
    - *Contracts with many different deliverables*
    - *Programs composed of multiple projects*
    - *Maintenance work*
    - *Service projects*

Hefner and O'Toole, "Judging the Suitability of Alternative Practices", 2007

ATLAS #10 – Survey Structure

- **Candidate alternative practices were solicited from the community at large; requested submission of either:**
  - Practices actually implemented; or
  - Ways of describing "alternative practices"

- **77 respondents - 44 unique candidates were submitted**

- **44 candidates consolidated into 11 groups of four**

- **Each group was distributed randomly to the SEI-authorized individuals**

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ATLAS #10 – Question 1

Please select the letter that best represents your view of this candidate alternative practice

A. I strongly agree [that this an acceptable alternative practice]
B. I somewhat agree […]
C. I neither agree nor disagree […]
D. I somewhat disagree […]
E. I strongly disagree […]

- **Each response (A-E) for each candidate alternative practice was quantified as follows:**
  - A or B (I strongly/somewhat agree):   +1 point
  - C (I neither agree nor disagree):   0 points
  - D or E (I somewhat/strongly disagree):   - 1 point

- **A candidate alternative practice's "score" = the average across all respondents. For the 44 candidate alternative practices:**
  - Score Range: +0.59 to -0.85
  - Score Mean: -0.25
  - Score Median: -0.26

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Example#1: SAM SP 1.2 (Score: +0.59)

> **SP 1.2 Select Suppliers**
> *Select suppliers based on an evaluation of their ability to meet the specified requirements and established criteria.*

- Rather than selecting a supplier, our org has the suppliers imposed by our primary customer.

- The ability of the supplier to meet the requirements is analyzed, and the results of this analysis are presented to the customer. If there are concerns about the supplier's ability to meet the specified requirements, risks are documented and shared with the customer, or managed internally by the org.

- Experience logs are maintained for each supplier to influence the customer's supplier selection in the future.

- The direct artifacts for this candidate alternative practice are the notification from the customer that we must use the designated supplier, the analysis report, and associated risks, and the experience logs maintained for each supplier.

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How Do We Determine Whether This is an Acceptable Alternative Practice?

alternative practice - A practice that is a substitute for one or more generic or specific practices contained in CMMI models that achieves an equivalent effect toward satisfying the generic or specific goal associated with model practices.

SP 1.2 Select Suppliers
Select suppliers based on an evaluation of their ability to meet the specified requirements and established criteria.

SG 1 Establish Supplier Agreements
Agreements with the suppliers are established and maintained.

- **What effect are we trying to achieve?**

- **What would an equivalent effect?**

Hefner and O'Toole, "Judging the Suitability of Alternative Practices", 2007

Is the Informative Material Helpful in Judging Acceptability?

Criteria should be established to address factors that are important to the project.

Examples of factors include the following:

• Geographical location of the supplier

• Supplier's performance records on similar work

• Engineering capabilities

• Staff and facilities available to perform the work

• Prior experience in similar applications

Typical Work Products

1. Market studies

2. List of candidate suppliers

3. Preferred supplier list

4. Trade study or other record of evaluation criteria, advantages and disadvantages of candidate suppliers, and rationale for selection of suppliers

5. Solicitation materials and requirements

Subpractices

1. Establish and document criteria for evaluating potential suppliers.

2. Identify potential suppliers and distribute solicitation material and requirements to them.

A proactive manner of performing this activity is to conduct market research to identify potential sources of candidate products to be acquired, including candidates from suppliers of custom-made products and vendors of COTS products.

3. Evaluate proposals according to evaluation criteria.

4. Evaluate risks associated with each proposed supplier..

5. Evaluate proposed suppliers' ability to perform the work.

Examples of methods to evaluate the proposed supplier's ability to perform the work include the following:

• Evaluation of prior experience in similar applications

• Evaluation of prior performance on similar work

• Evaluation of management capabilities

• Capability evaluations

• Evaluation of staff available to perform the work

• Evaluation of available facilities and resources

• Evaluation of the project's ability to work with the proposed supplier

• Evaluation of the impact of candidate COTS products on the project's plan and commitments

When COTS products are being evaluated consider the following:

• Cost of the COTS products

• Cost and effort to incorporate the COTS products into the project

• Security requirements

• Benefits and impacts that may result from future product releases

Future releases of the COTS product may provide additional features that support planned or anticipated enhancements for the project, but may result in the supplier discontinuing support of its current release.

6. Select the supplier.

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So How Prevalent are Alternative Practices?

- **Only 5 of the 44 submitted candidates had more authorized individuals supporting the assertion that they were true alternative practices than refuting it**
  - That is, only 5 candidate alternative practices had a score > 0.

- **Given that 5 did pass a relatively simple litmus test, it may be concluded that "alternative practices" are REAL, and NOT merely conceptual!**

- **However, given that all 44 were submitted as viable candidates, it appears that "alternative practices" are not interpreted consistently across the population of authorized individuals**

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ATLAS #10 – Question 2

If you selected either D or E above (i.e., the candidate is unacceptable), please indicate your rationale:

A. The candidate is not sufficiently different from the model practice to be considered an "alternative"

B. Although an "alternative," it does not appear to support goal satisfaction as well as the practice as written

C. It is not acceptable because it eliminates the practice without providing a viable alternative

D. Other

- **Although most respondents that found a candidate alternative practice unacceptable did provide a response to Item #2, the choice (A – D) did not always align with the supporting comments**

- **Bottom line: Little useful insight was gleaned from analyzing the responses to Item #2**

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ATLAS #10 – Question 3

Regardless of its alternative practice candidacy, assuming that there are ample direct artifacts supporting consistent practice implementation on all projects as indicated, please provide your "gut-feel-characterization" for <practice> (considering the organization and projects as described).

_____ (FI, LI, PI, NI)

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ATLAS #10 – Question 3 Responses

Some candidate alternative practices experienced significantly more variation than others

Candidate	FI	LI	PI	NI
4	3	2	2	1
10	2	3	3	0
12	6	1	4	0
13	5	2	4	0
14	2	2	1	2
19	2	1	1	3
24	3	2	3	3
27	5	1	3	3
28	7	1	4	1
32	2	2	1	2
34	4	1	5	0
25	4	2	4	1
26	6	1	2	3
44	9	1	4	2

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Moving Forward

- **In the final analysis, alternative practices are rare**
  - The context assumed by the authors (and reviewers) is very broad, (e.g., small/big projects, small/big organizations, defense/ commercial, different business goals)
  - Many purported "alternative practices" are better described as "alternative implementations"
  - Some purported "alternative practice" can be an attempt to avoid changing an existing process

- **In identifying legitimate alternative practices, look for differences in the assumed context**
  - Definitions of "project", "organization", "customer"
  - Verbs which are not possible actions in your context, e.g., "select"

- **Even "experts" disagree about the acceptability of an alternative practice (or the adequacy of its implementation)**
  - Discuss all alternative practices with your Lead Appraiser <u>before</u> the appraisal

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Example#2: PMC SP 1.7 (Score: +0.38)

> **SP 1.7 Conduct Milestone Reviews**
> *Review the accomplishments and results of the project at selected project milestones.*

- Our org does not develop "traditional" projects but does maintenance work using time-boxing. Our management conducts monthly meetings with our customers to measure progress, assess risks and determine whether the features to be included in the next release are satisfactory or not.

- This is not a milestone meeting as it is not event-driven. Because of the large number of minor enhancement projects, it was decided that this was a better approach than trying to have "real" milestone meetings on every enhancement. There are typically 5-6 such monthly meetings per release.

- The direct artifacts for this candidate alternative practice are the minutes from the customer meetings as well as the documented issues and action items resulting from them.

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Example#3: CM SP 1.2 (Score: +0.25)

> **SP 1.2 Establish a Configuration Management System**
> *Establish and maintain a configuration management and change management system for controlling work products.*

- **We only have one customer for whom we develop and support software products. Our org is contractually required to use our customer's CM and change management control (CMC) systems. We have no need to establish and maintain a CM or CMC system of our own, and rely solely on our customer's systems to protect our configuration items and change requests.**

- **The direct artifacts for this candidate alternative practice are the customer's CM and CMC systems – and a demo of how we maintain our configuration items and change information using these systems.**

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Example#4: VAL (Score: +0.25)

- **Our government customers require the system to be validated prior to acceptance. However, they require this to be done under their control using their validation environment, procedures, and users.**

- **Since we can't deem Validation to be "not applicable" and still be rated ML3, we have decided instead to treat this as an alternative practice.**

- **The direct artifacts for this alternative practice are the customer contract dictating how validation is to be performed, and the customer-run validation test results.**
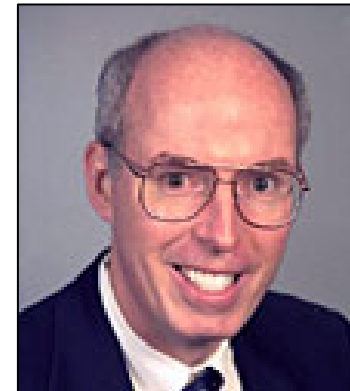
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