Role of Specification in Simulation Component Reuse

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Objective: To determine the impact of specification on potential for simulation component reuse

Specification: Any form of guidance or direction related to simulation development

Basis: review of formal & informal literature
drew upon half-dozen case studies

2 anonymous, software factories, std sim use
(EADSIM/PAC-3), CMMS

Principal Investigators: Dale Pace & Michael McPherson
Why Strive for Reuse

Purported Reuse Benefits:

• Lower Cost
• More Rapid Development
• Higher Quality (fewer defects)

Observations:

• Effective reuse has major admin implications, and reuse may not result in cheaper, better, faster

• Cost-benefit of reuse is still debated

• Reuse can be inappropriate & may stifle innovation
Reuse Cost

Reliable empirical reuse cost data is scanty:
successes only partially report costs; failures unreported

*Rules of Thumb* (from software reuse):

Cost to reuse -- no modifications (10-25% of development)

*AND 10% will fail to compile!*

Prep of software for reuse increases cost 35-50%

*Ru**le of Three:* Need at least 3 reuses to break even

3 failed tries with asset for reuse; forget
Specification & Reuse

Potentially reusable assets include:

- knowledge/experience, requirements, tools, test data, test plans, designs/architectures, programs/code

More benefit seems to derive from reuse of higher abstraction items and smaller assets are easier to reuse than large ones

Effective reuse can be facilitated by specifications that are:

- clear and comprehensive
- correct
- consistent and coherent

Cannot quantify specification impact on reuse currently
Conclusion

Effective reuse is most likely in quality development environment => first get quality process, then reuse

Beware of misuse potential in reuse

(including accommodating M&S requirements to capabilities of reuse component)

Emphasize higher abstraction assets for reuse

Share experience so that adequate information will be available to