Simio
Forward Thinking

Tips for Successful Practice of Simulation

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Before we start – tell me about you...

▶ New to simulation?

▶ More than 10 years out of school?

▶ Manufacturing?

▶ Services?

▶ Military?

▶ Academic?

A little about me...

▶ ## 30 years in simulation

- Formed/led simulation group
- Consulting, training, development
- Simulation product manager
- Co-author of 2 leading textbooks
- Teach at University of Pittsburgh
- VP Operations at Simio
- Simulation evangelist

Being Successful

▶Work Hard

▶Work Smart

▶Be Very Lucky

Success in Simulation

▶ Define your Objectives

▶ Understand the System

▶ Develop Functional Specification

▶ Manage the Project

▶ Handle Input Data

▶ Build and Verify the Model

▶ Validate the results

▶ Experiment, Analyze, and Present

Define Your Objectives

► What is a Stakeholder?

Define Your Objectives

▶ What is a Stakeholder?

▶ Who Are Your Stakeholders?

Define Your Objectives

▶ What is a Stakeholder?

▶ Who Are Your Stakeholders?

▶ How Do Your Stakeholders Define Success?

Understand the System

▶ Do your homework

▶ Know the important questions to ask

▶ Walk through

▶ Ask, ask, ask again

▶ Understand, not solve (yet)

▶ Identify what you don't know

Create a Functional Specification

"If you don't know where you are going, how will you know when you get there?"

Functional Specification Topics

▶ Objectives

▶ Level of detail

▶ Data requirements

▶ Assumptions and Control Logic

Functional Specification Topics

▶ Analysis and Reports

▶ Animations

▶ Due Date and Agility

Functional Specification Value

Do I really need a FS?

Is a FS worth the time?

What about a prototype?

Manage the project

▶ Is your project "late" before it is started?

▶ Manage the project, don't let it manage you.

Manage the project

▶How agile is agile enough?

▶When necessary… "Just say no."

Collect Input Data

▶Enough data?

▶Know your data

▶Use model to identify data needs

▶Plan and communicate

Build and verify the model

▶ **Building The Model**

Build and verify the model

▶ Building The Model

▶ How Do You Verify A Model

▶ How Do You Isolate A Problem When You Find It?
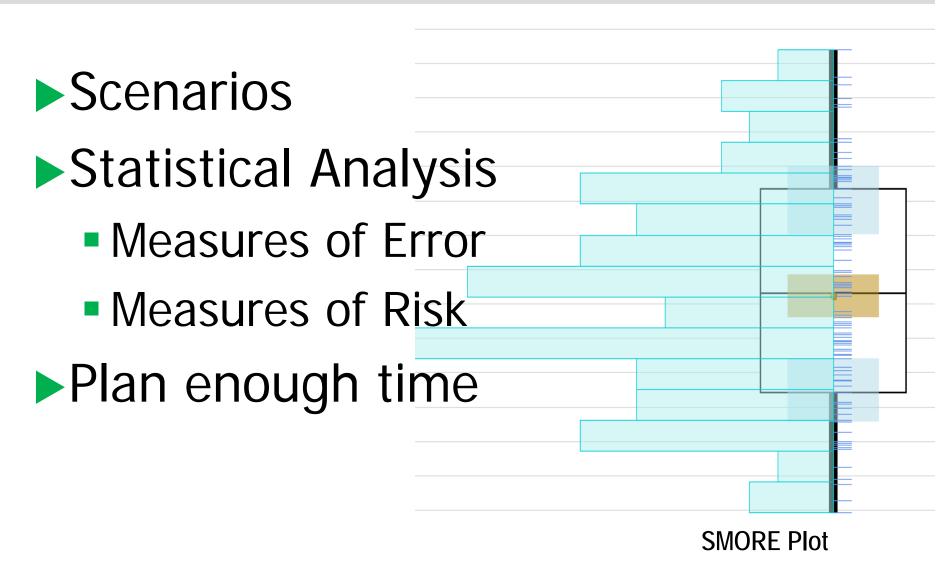
Build and verify the model

▶Building The Model

▶How Do You Verify A Model

▶How Do You Isolate A Problem When You Find It?

▶Help From A Good Listener

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▶ How Do You Know When You Are Done?

Validate the Results

▶ Why Validate?

▶ Existing system

  ▪ Stochastic

  ▪ Deterministic

▶ Stakeholders

Experiment & Analyze

▶ Scenarios

▶ Statistical Analysis

  ▪ Measures of Error

  ▪ Measures of Risk

▶ Plan enough time

SMORE Plot

Present the Results

▶ Remember your motivation

▶ Stakeholder needs, interests

▶ Present:

  ▪ Conclusions, not details

  ▪ Information, not data

  ▪ Reasons to trust you

Bills of Rights

Simulation Stakeholder Bill of Rights

The people who request, pay for, consume, or are affected by a simulation project and its results are often referred to as its stakeholders. For any simulation project the stakeholders should have reasonable expectations from the people actually doing the work. Here are some basic stakeholder rights that should be assured.

1 Partnership – The modeler will do more than provide information on request. The modeler will assume some ownership of helping stakeholders determine the right problems and identify and evaluate proposed solutions.

2 Functional Specification – A specification will be created at the beginning of the project to help define clear project objectives, deadlines, data, responsibilities, reporting needs, and other project aspects. This specification will be used as a guide throughout the project, especially when tradeoffs must be considered.

3 Prototype – All but the simplest projects will have a prototype to help stakeholders and the modeler communicate and visualize the project scope, approach, and outcomes. The prototype is often done as part of the functional specification.

4 Level of Detail – The model will be created at an appropriate level of detail to address the stated objectives. Too much or too little detail could lead to an incomplete, misunderstood, or even useless model.

5 Phased Approach – The project will be divided into phases and the interim results should be shared with stakeholders. This allows problems in approach, detail, data, timeliness, or other areas to be discovered and addressed early and reduces the chance of an unfortunate surprise at the end of a project.

6 Timeliness – If a decision-making date has been clearly identified, usable results will be provided by that date. If project completion has been delayed, regardless of reason or fault, the model will be re-scoped so that the existing work can provide value and contribute to effective decision-making.

7 Agility – Modeling is a discovery process and often new directions will evolve over the course of the project. While observing the limitations of level of detail, timeliness, and other aspects of the functional specification, a modeler will attempt to adjust project direction appropriately to meet evolving needs.

8 Validated and Verified – The modeler will certify that the model conforms to the design in the functional specification and that the model appropriately represents the actual operation. If there is inadequate time for accuracy, there is inadequate time for the modeling effort.

9 Animation – Every model deserves at least simple animation to aid in verification and communication with stakeholders.

10 Clear Accurate Results – The project results will be summarized and expressed in a form and terminology useful to stakeholders. Since simulation results are an estimate, proper analysis will be done so that the stakeholders are informed of the accuracy of the results.

11 Documentation – The model will be adequately documented both internally and externally to support both immediate objectives and long term model viability.

12 Integrity – The results and recommendations are based only on facts and analysis and are not influenced by politics, effort, or other inappropriate factors.

Note: This is the companion piece to Simulationist Bill of Rights, which outlines reasonable expectations a modeler should have in a simulation project. To read that and more, visit our website.

Simulationist Bill of Rights

The companion *Simulation Stakeholder Bill of Rights* proposed some reasonable expectations that a consumer of a simulation project might have. But this is not a one-way street. The modeler or simulationist should have some reasonable expectations as well.

1 Clear Objectives – A simulationist can help stakeholders discover and refine their objectives, but clearly the stakeholders must agree on project objectives. The primary objectives must remain solid throughout the project.

2 Stakeholder Participation – Adequate access and cooperation must be provided by the people who know the system both in the early phases and throughout the project. Stakeholders will need to be involved periodically to assess progress and resolve outstanding issues.

3 Timely Data – The functional specification should describe what data will be required, when it will be delivered and by whom. Late, missing, or poor quality data can have a dramatic impact on a project.

4 Management Support – The simulationist's manager should support the project as needed not only in issues like tools and training discussed below, but also in shielding the simulationist from energy sapping politics and bureaucracy.

5 Cost of Agility – If stakeholders ask for project changes, they should be flexible in other aspects such as delivery date, level of detail, scope, or project cost.

6 Timely Review/Feedback – Interim updates should be reviewed promptly and thoughtfully by the appropriate people so that meaningful feedback can be provided and any necessary course corrections can be immediately made.

7 Reasonable Expectations – Stakeholders must recognize the limitations of the technology and project constraints and not have unrealistic expectations. A project based on the assumption of long work hours is a project that has been poorly managed.

8 "Don't shoot the messenger" – The modeler should not be criticized if the results promote an unexpected or undesirable conclusion.

9 Proper Tools – A simulationist should be provided the right hardware and software appropriate to the project. While "the best and latest" is not always required, a simulationist should not have to waste time on outdated or inappropriate software and inefficient hardware.

10 Training and Support – A simulationist should not be expected to "plunge ahead" into unfamiliar software and applications without training. Proper training and support should be provided.

11 Integrity – A simulationist should be free from coercion. If a stakeholder "knows" the right answer before the project starts, then there is no point to starting the project. If not, then the objectivity of the analysis should be respected with no coercion to change the model to produce the desired results.

12 Respect – A good simulationist may sometimes make the job look easy, but don't take them for granted. A project often "looks" easy only because the simulationist did everything right, a feat that in itself is very difficult. And sometimes a project looks easy only because others have not seen the nights and weekends involved.

Simulation Stakeholder Bill of Rights

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Stakeholder Bill of Rights (cont.)

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Summary

Success is not easy,
but its not just luck either.

It is possible to have consistently successful projects and consistently happy stakeholders.

Want the PowerPoint? Have ideas??

Leave me a business card or contact
me at dsturrock@simio.com

Connect with me:
LinkedIn.com/in/sturrock

Article in Dec 2011 IE Magazine

Success in Simulation Blog

www.simio.com/blogs

Thanks ... and Good Luck!