PROJECT COMPETITOR©
A SIMULATION GAME FOR PROJECT MANAGEMENT WITH 2 MODELS AND 2 MODES

Nikhil Mishra
Tata Interactive
nikhilm@tatainteractive.com

Anish Malhotra
IILM
anish.malhotra.pgpo9@iilm.edu

Kanika Sibal
IILM
kanikasibal@gmail.com

George Otoiu
Aphorme
georgeotoiu@yahoo.com

Karl Heinz Greess
Mercedes
khgreess@aol.com

Kailash Tuli
IILM
kailash.tuli@iilm.edu

Richard Teach
Georgia Institute of Technology
richard.teach@mgt.gatech.edu

ABSTRACT

PROJECT COMPETITOR© is a KISS class simulation game of a project management situation. It has an individual or single team model as well as a competitive one and it can be played as a computer run simulation or in a manual mode. The non-competitive model can be briefed, played and debriefed within a single, 50-minute period and the competitive model takes only slightly more time. The game, as described, simulates a project that needs to be completed within a specific time limit and under a stated budget. This project has three required elements: an analytical component, a technical component and a commercialization component. The simulated project is broken down into four periods in which the player(s) receive(s) feedback and can make needed changes in order to complete the project on time and under budget in only the last 3 time periods. (The designation of a KISS type simulation occurs when the model is to Keep It Simple and Short.)

WHAT IS PROJECT MANAGEMENT

Project Management is the discipline of planning, organizing, and managing resources to bring about the successful completion of specific project goals and objectives.

The primary challenge of project management is to achieve all of the project goals and objectives while adhering to classic project constraints—usually scope, quality, time and budget. The secondary—and more ambitious—challenge is to optimize the allocation and integration of inputs necessary to meet pre-defined objectives. A project is a carefully defined set of

Table 1. Requirements needed to complete the project management task

Total Budget Limit	25,000 Currency units
Standardized Technical Time	1,000 hours
Standardized Analytical Time	1,200 hours
Standardized Commercial Time	1,000 hours
Total standardized time needed	3,200 hours
Actual hours of time possible	6,000 hours
Maximum number of workers	3 during any quarter

(One year has 2,000 hours of work time available per person)

Table 2.
The list of specialist and their talents and costs

Name	Skill sets			Cost/quarter
	Analytical	Technical	Commercialization	
Heinz Beck	103	84	74	2,115
Henry DuPree	118	81	144	2,458
Marie Metz	103	84	74	2,115
Naresh Patel	61	94	73	1,911
Heidi von Holt	50	63	117	1,713
Kailish Citrin	126	53	87	2,015
George Kanoplias	140	131	143	3,216
Vito Vitali	97	122	72	2,285
Amiee Gris	56	101	51	1,648
Suko Kim	108	60	117	1,959

activities that use resources (money, people, materials, energy, space, provisions, communication, motivation, etc.) to achieve the project goals and objectives.

A DESCRIPTION OF THE SINGLE PLAYER, MANUAL GAME

The participant plays the role of a project manager who has received a project that requires 1,000 hours of time of analytical skills, 1,200 hours of time of technical skills and 1,000 hours of commercialization skills time and the project must be completed within a 12 month period of time and cost less that 25,000 currency units, utilizing no more than three specialists at any one time. The project management task's skill needs are shown in Table 1.

What is standardized time?

Workers have various efficiencies, that is, in a fixed period of time two people never get exactly the same amount accomplished. In addition, some people are good at analytical skills, while others are good at people skills and, of course some are good at both. In this simulation each worker has a set of three specific skills that are needed in the project management task, but the worker seldom excels at all three skills, but when the project manager uses a worker he hires the entire worker not just a single skill. Each worker will be able to devote exactly 300 hours of effort toward the project management task, but the amount of standardized hours of time the worker accomplishes is a function of the workers skills levels. If a worker has a skill level for analytical work of 125, it means that the worker accomplishes 125 hours of analytical work with 100 hours of actual working time. Thus if a worker's Skill Scores were:

> Analytical Skill Score ………. 125
> Technical Skill Score ……..… 100
> Commercialization Skill Score .. 85

The worker would accomplish 125 standardized hours of analytical work and 100 standardized hours of technical work and 85 standardized hours of commercialization work in his/her 300 hours of committed actual time working on the project management project.

To complete the project, the project manager has a set of 10 specialists from which to select and each specialist has all 3 of the needed skills (analytical, technical and commercialization), but the specialists' abilities of these skills differ widely. The project manager must commit to using a worker for 300 hours and reimbursing the department from which the borrowed worker is normally employed the specified amount of money solely determined by the worker's home department.

The specialists are each described on a separate card (about the size of a playing card). This card has the name of the specialist at the top, followed by the identified skill levels of the specialist for all three skills and the quarterly cost for the specialists in currency units. Exhibit 1 displays an example of one of these specialist's identity cards. The skill score number is the number of hours that specific worker can allocate to the project management task. The project manager must remember that the people he/she uses for the project management task are currently employed by the firm and are, in essence, on loan to the project from their regular department.

Exhibit 1. A specialist card

Heinz Beck

	Skill Score
Analytical Skills	103
Technical Skills	84
Commercialization Skills	74

Cost to project per quarter   2,115 currency units

Table 2 displays the contents of all 10 cards. These 10 cards are shuffled and three cards are given to the game player. These three cards represent the project manager's initial team.

Note that if the game is played anywhere in the world, the names given above may be changed to fit whatever culture might be best for the location of the game exercise.

The project manager then records the information on the record sheet as shown in Exhibit 2. Sums the four columns on the line called *resources consumed*, then subtracts these values from the values recorded on the *project needs* line and records the differences on the *remaining needs* line. The project manager then decides if he/she needs to replace a specialist with another selection. Note that only one specialist may be replaced per decision round.

The simulation is over after playing a total of four rounds. To be successful, the player needs to fulfill all three skill needs within the standardized hours' constraints and be at or under the projected budget.

THE COMPETITIVE MODEL

This project management simulation can be modified slightly in order to make the game a competition between two project managers. (The development team recommends that the competition be limits to only two teams).   When direct competition is undertaken, the set of 10 possible workers remains constant, but two sets of 3 workers with identical shill levels and per person costs are used to start the game. These three additional workers are shown in Table 3.

The competition mode requires the use of one moderator for each set of two competitive project managers.   The project managers review the set of 10 potential workers and if each selects the same person from the list, the project manages bid for the services of that person. The moderator notes the winning bid and the losing project manager then must select his/her second choice from the list; he same record sheet as show in Exhibit 3.

If the first three values in the *remaining needs* line on Exhibit 2 are all zero or negative, the project manager has completed the project. If, in addition, the budget value on this line is zero or positive the project has been **successfully** completed.

THE COMPUTER ASSISTED VERSION OF THIS SIMULATION GAME

The computer driven game has more features than the hand game, but the problem and its solution remains exactly the same. The differences include the feature that the game is never the same when it is played more than once. This is handled simply by the use of a functional approach to setting the skill levels of each potential worker and making the salary a function of the skills. This model then adds a controlled random number to each value generated. In addition, the model selects the names of the worker pool from a list that may be altered to better fit the country or society in which the game is being used. Thus the computer model is more flexible and easier to alter than the hand game...

In addition to the changeable inputs, the computer model automated the accounting process and generated a substitute to the financial report shown in Exhibit 3. Another difference is the display of progress. This computer driven model produces a set of four graphs that display the progress of the project being managed. There are graphs of how well the three critical needs of the projects, Analytical. Technical and Commercialization, are being met as well as a graph of the planned budget and how close the project is to meeting the budget goals. One of these graphs is shown in Exhibit 3. Which is a graph displaying the technical needs of the project over time and how will the project is progressing.

Tables are used to display the workers being used and each person's performance.   The dismissle of a worker is accomplished by clicking on a person's line in the *current employees* table and the addition of a new person to the project management team is accomplished by clicking on the persons line in the *avaliable workers* table.

Table 3. Three additional workers data values for the competitive version

Workers Name	Skill sets			lowest Cost/quarter
	Analytical	Technical	Commercialization	
Clayton Silverio	86	89	118	2,021
Elnora Chesnut	109	74	97	2,155
Lorrie Hoaglin	62	136	67	1,981

Exhibit 2. The record sheet

The project needs: Worker's Name	Analytical 1,000	Technical 1,2000	Commercialization 1,000	Budget 25,000
1st Quarter results:				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
	========	========	=========	===========
Resources consumed	_____	_____	_____	_____
	========	========	=========	===========
Remaining needs	_____	_____	_____	_____
2nd Quarter results:				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
	========	========	=========	===========
Resources consumed	_____	_____	_____	_____
	========	========	=========	===========
Remaining needs	_____	_____	_____	_____
3rd Quarter results:				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
	========	========	=========	===========
Resources consumed	_____	_____	_____	_____
	========	========	=========	===========
Remaining needs	_____	_____	_____	_____
4th Quarter results:				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
	========	========	=========	===========
Resources consumed	_____	_____	_____	_____
	========	========	=========	===========
Remaining needs	_____	_____	_____	_____

Exhibit 3. A graph of the progress of the technical aspects of the project management task
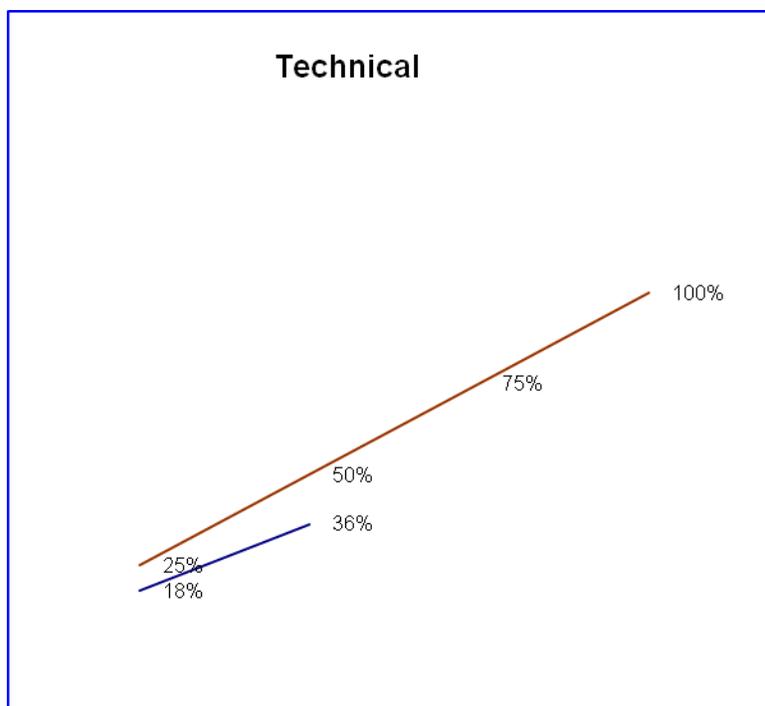
THE COMPETITIVE COMPUTER MODEL.

The competive compuer model in the competitive mode uses two networked computers and generates the three initial workes with idential profiles. At the end of the first period (quarter) it allows the project managers to select the worker from the list that they desire and if both players select the same worker, it informs the playrs f this fact and asks each to submit a bid. After the bids are placed, the computers displays the highest bid and identifies the player that made the hightest bid and asks the losing bidder to he/she wants to up the bid. If the player says yes, the computer then displays the higher bid and the process repeats until the low bidder indicates that he/she decides not to put in a new bid. Whren this, no more bidding condition occures, the player then selects another worker from the list.

The computer model allows the game administrater to made the game more difficult by lowering the maximum budget of the project.

PROJECT COMPETITOR

Nikhil Mishra
Tata Interactive

Anish Malhotra
IILM

Kanika Sibal
IILM

Kailash Tuli
IILM

George Otoiu
Aphorme

Karl Heinz Greess
Mercedes

Richard Teach
Georgia Institute of Technology
richard.teach@mgt.gatech.edu

PROJECT COMPETITOR$^©$ is a non-competitive model can be briefed, played and debriefed within a single, 50-minute period. The game, simulates a project that needs to be completed within one year and under a stated budget. This project has three required elements: an analytical component, a technical component and a commercialization component. The simulated project is broken down into four periods in which the player(s) receive(s) feedback and can make needed changes in order to complete the project on time and under budget in only the last 3 time periods.

The participant plays the role of a project manager who has received a project that requires 1,000 hours of time of analytical skills, 1,200 hours of time of technical skills and 1,000 hours of commercialization skills time and the project must be completed within a 12 month period of time and cost less that 25,000 currency units, utilizing no more than three specialists at any one time.

Workers have various efficiencies, that is, in a fixed period of time two people never get exactly the same amount accomplished. In addition, some people are good at analytical skills, while others are good at people skills and, of course some are good at both. In this simulation each worker has a set of three specific skills that are needed in the project management task, but the worker seldom excels at all three skills, but when the project manager uses a worker he hires the entire worker not just a single skill. Each worker will be able to devote exactly 300 hours of effort toward the project management task, but the amount of standardized hours of time the worker accomplishes is a function of the workers skills levels. If a worker has a skill level for analytical work of 125, it means that the worker accomplishes 125 hours of analytical work with 100 hours of actual working time.

To complete the project, the project manager has a set of 10 specialists from which to select and each specialist has all 3 of the needed skills (analytical, technical and commercialization), but the specialists' abilities of these skills differ widely. The project manager must commit to using a worker for 300 hours and reimbursing the department from which the borrowed worker is normally employed the specified amount of money solely determined by the worker's home department.

The game, as being played is never the same when it is played more than once. The computer model automated the accounting process and generates a financial report. The game produces a set of four graphs that display the progress of the project being managed. There are graphs of how well the three critical needs of the projects, Analytical. Technical and Commercialization, are being met as well as a graph of the planned budget and how close the project is to meeting the budget goals.