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Teaching Effectiveness and Efficiency in Project Management: A SIMPROJECT Approach

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Teaching Effectiveness and Efficiency in Project Management: A SIMPROJECT Approach

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ABSTRACT

SIMPROJECT™ is a useful simulation tool structured to follow the project lifecycle aiding students in understanding how projects are managed. In practice, students learn to conceptualize, plan, execute, and terminate projects during the entire project life cycle. In reality, students lack an appreciation of the importance of planning and how to evaluate project information. While, SIMPROJECT™ provides much of the information required to conceptualize the simulated project, a series of systematic exercises was developed to augment the planning needed to execute and finally terminate projects within the context of the simulation. This workshop provides a series of 7 pre-emptive exercises prior to starting a simulation and Excel worksheets helpful to students in understanding the effectiveness and efficiency measures needed to develop a successful project plan. Results suggest that students leave the course with a better understanding of the importance of planning, evaluating their plan, and monitoring their plan as SIMPROJECT is executed.

Keywords

SIMPROJECT™, Effectiveness, Efficiency, Project Management, Simulations

INTRODUCTION

SIMPROJECT™ (<http://www.mhhe.com/simproject>) is a server based application that allows students to log in anywhere and execute project decisions making this application particularly valuable for distance educators. Instructors currently have a choice of three simulations: Residential Construction, New Product Development, and IT Communication. Each simulation provides each student a project context, Work Breakdown Structure (WBS), project Gantt chart, list of resources (people), and resource descriptions. This information is divided into 12 project periods with associated milestones. Each period may have between 4 to 7 tasks that must be accomplished. Students are then told to assign one or two resources to each task consistent with the project Gantt chart. Which resources a student assigns to a particular task directly effects the time, cost, functionality, and stakeholder value for each period. At the end of each period, students are provided summary percentage scores that measure their performance against other students or teams of students. The exercises that follow require students

to develop effectiveness and efficiency measures that build a project plan that requires students to determine ahead of the start of the simulation, which resources will be assigned to which task, and the estimated cost and time of each project period.

The proceeding paragraph is a brief overview of SIMPROJECT™ and is not intended to replace the instructor and player's manuals. SIMPROJECT™ is a complex simulation with nuances and subtleties that require both instructor and student study. It is hoped that those who are not familiar with SIMPROJECT™ will find enough information to appreciate the potential of the simulation in the classroom or online environment and that those who teach with SIMPROJECT™ see the potential to extend the usefulness of the simulation.

Students are shown a series of 7 exercises that lead them progressively through the development of a project plan. That they are building a project plan does not become evident until later exercises as the building blocks of a project plan systematically become unveiled. A concluding 8th exercise compares the starting plan with the executed plan.

PROJECT EFFECTIVENESS

SIMPROJECT™ defines “effectiveness” as meaning that the best resource category was assigned to a particular task. To a student this means that a resource category is a job description.

EXERCISE 1

Students are asked to create a table using MS Excel similar to Table 1. Table 1 lists task name by simulation period, with estimated task times, in the vertical column (We have only shown 1 simulation periods rather than 12 periods to save space). As an example from SIMPROJECT™, across the top, are placed the resource categories for the New Product Development simulation. The first step is to place a number one at the intersection of task name and resource category for each task, category intersection. The prime idea is for each student to place the number one (1) at the intersection where the resource category best matches the task. The number one signifies the primary resource category that would be assigned to a particular task.

TASK NAME	PERIOD	Project Manager	MIS Manager	Senior Systems Analyst	Hardware Analyst	Junior Systems Analyst	Network Design Consultant	Office Engineer	Programmer	Systems Software Engineer
Define organizational objective	1 8 Hours			1		2				
Develop a plan for collecting information	1 12 Hours			1		2				
Identify and hire project team	1 24 Hours	1	2							

members										
Implement the data gathering plan	1 40 Hours			1		2				
Interpret and report findings	1 12 Hours			1		2				
Project Management Period 1	1 72 Hours	1	2							

Table 1: Resource Category by Task Name

EXERCISE 2

The first step of exercise 2 is to replicate Table 1 and rename it Table 2. In Table 2, students are asked to replace the number 1 with 100%. The prime idea is that if you can assign the correct resource category to the proper task then that resource will be 100% effective. Ultimately, effectiveness will be a probability. This probability will be used to correct the estimated time it will take for a task to be completed. The next step is sometimes more difficult for students.

PROJECT EFFICIENCY

SIMPROJECT™ defines efficiency as a reflection of the personal attributes of individual resources. It is also a team concept that reflects the capability of the team to act effectively, with a minimum of wasted time, energy, or money. Students may become confused trying to differentiate between effectiveness and efficiency.

Exercise 3

As part of the simulation set up, SIMPROJECT™ generates a list of resources by resource category. The number of resources listed is dependent upon the simulation difficulty the instructor selects (easy, medium or hard) and the number of teams or students registered for the simulation. We have found that, if possible, to keep the number of students or teams around ten. Each of the computer generated resources also includes nine scored attributes on a scale of 0 to 100.

In exercise 3, students will evaluate the efficiency of each resource within each resource category as shown in Table 3. As shown in Table 4, the resource names for Hardware Analyst are listed vertically. Across the top are the individual scored attributes for each resource as defined in Table 3. Hardware analyst will serve as an example for the other resource categories. Students are expected to create a table similar to Table 4 and a graphical analysis similar to Figure 1.

STC	Standard Cost per hour is the hourly wage of an individual resource.	SKL	Skill (SKL) is the degree of expertise.	REP	Reputation (REP) is the general belief about an individual's character.	FLX	Flexibility (FLX) is a measure of the adaptability of a person to a change in circumstance and the ability to handle changes.
OTC	Overtime Cost per hour from upper salary range found in the cover letter.	EXP	Experience (EXP) is the length of time that an individual has worked in a specific area. More experienced personal tend to be more efficient and adapt faster to working on project teams.	WKE	Work Ethic (WKE) is the set of principles that individuals have about performing their job.	IPS	Interpersonal Skills (IPS) are goal-directed behaviors conducted in a face-to-face environment. They are those characteristics of a person to relate and interact with others.
TRN	Training (TRN) is the amount of instruction in specific skills.	EDU	Education (EDU) is a specified level of education that will refer to both the level and type of education completed.	PBR	Public Relations (PBR) skills include employee communications, media relations, advertising, and community relations. They are the ability of a person to present an appropriate "face" to the external stake holders.		

Table 3: Resource Attribute Criteria

Resource Name	STR	TRN	SKL	EXP	EDU	REP	WKE	PBR	FLX	IPS	Summary Score
Angel Domínguez	\$63	82	87	86	64	75	76	61	73	90	694
Cheng-Yong Qian	\$68	68	64	83	60	93	83	66	68	76	661
Darryl Stanger	\$56	69	88	73	56	71	88	59	74	66	644
Erik Malbrough	\$56	79	69	74	57	95	79	77	96	68	694
Guy Lawhorn	\$62	69	86	77	59	82	85	71	76	86	691
Javier Crist	\$58	80	90	73	68	83	89	58	95	76	712
Kameko Mizugame	\$66	75	60	78	68	100	89	82	85	82	719
Kurt Olmos	\$59	83	73	77	61	99	83	80	67	71	694
Nelson Bleakley	\$59	77	74	72	80	69	70	56	68	85	651
Tom Heflin	\$52	74	64	68	81	89	73	72	90	63	674
Average	\$60	76	76	76	65	86	82	68	79	76	683
Std Dev	4.89	5.54	11.37	5.34	8.95	11.36	6.77	9.57	11.34	9.25	25.11

Table 4: Efficiency Analysis for Hardware Analyst

Exercise 4

The purpose of exercise four is to develop a project plan that will predict the time and cost to complete each task. Students are required to use the efficiency and effectiveness estimates developed in previous exercises to create an estimator that adjusts the estimated task time for each task provided by SIMPROJECT to a more accurate task time.

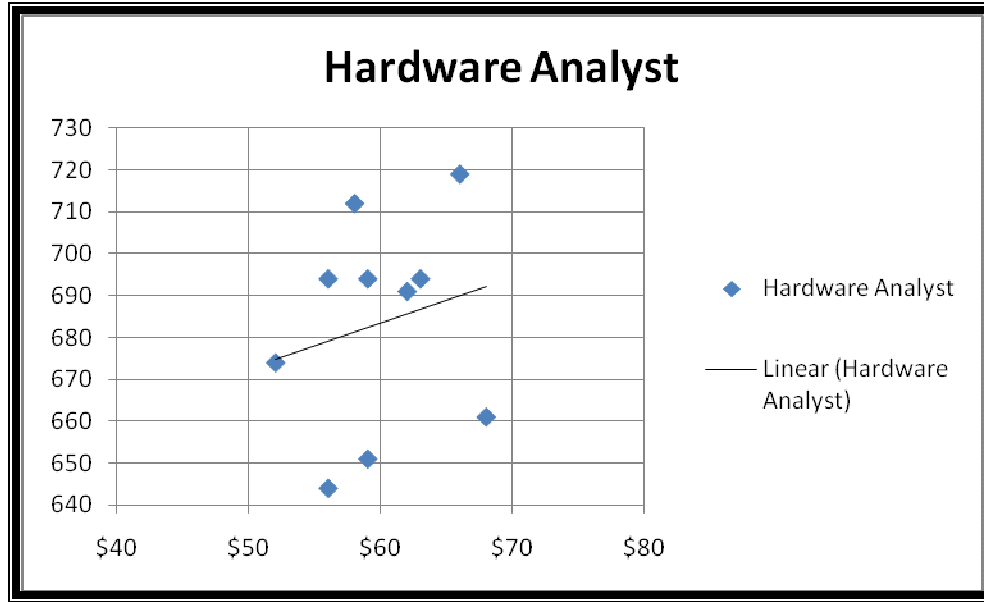


Figure 1: Efficiency Analysis of the Hardware Analyst Category

Exercise 4

The purpose of exercise four is to develop an MS Excel Spreadsheet that will predict the time and cost to complete each task.

Exercise 5

This exercise requires the students to take the corrected tasks times and update the Work Breakdown Structure (WBS) found in MS Project. Each simulation in SIMPROJECT comes with a MS Project plan and associated Gantt chart. As part of this exercise, students learn or review the basic functions found in MS Project.

Exercise 6

In a previous exercise, students calculated estimated task times and task costs. In this exercise they are asked to structure an MS Excel spreadsheet that does the same calculations but structures the results so that each student is able to see individual period costs and the total estimated cost for the simulation.

Exercise 7

Students in this exercise take the results from exercise 6 and enter the results back into MS project. The object is to develop a lowest cost, shortest time, and a regular plan to execute in SIMPROJECT. Students must work back and forth from structured MS Excel and MS project documents to arrive at the best result. Students execute their plan at this point.

Exercise 8

This exercise creates an MS Excel spreadsheet and scatter plot that allows students to track and plot their base plan versus the revised plan that evolves as they participate in the simulation.

This concludes the workshop.