# Preplanning Assignments to Enhance Learning When Using the Sim4projects Project Management Simulation Game as a Capstone Learning Experience

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## ABSTRACT

*A key success factor in project management is to first define what needs to be done and then to plan the approach before beginning execution. Unfortunately, unless presimulation planning is built into the curriculum, students may employ less desirable ad-hoc practices when playing a project management simulation game as a capstone activity. This paper describes the Sim4Projects simulation game and the approach used to build project management plan development into the curriculum prior to beginning simulation play. This approach has been used successfully for both a three-semester graduate certificate program in project management which can lead to a MS or MBA with an emphasis in project management, and for a single project management course in a master's degree program in systems engineering and management. Presimulation preparatory assignments require students to prepare a baseline plan based on the given scenario; a staffing management plan, cost forecast and schedule forecast based on their strategy and the available resource pool; and monitoring, control and closeout plans describing how they plan to evaluate performance during and after the simulation.*

## INTRODUCTION

Project management simulations and simulation games have been in use for years in academic programs; however, very little has been reported on their use. Exploring the use of project management pedagogy was highlighted as a potential growth area for ABSEL during the 2016 Annual Conference (Gosenpud, 2016). Exploring and improving project management pedagogy through simulation and experiential learning is not only a growth opportunity for ABSEL, it is also addresses an important need to develop competent project managers:

> In the Persian Gulf and China Sea regions alone – where entire cities are being built, seemingly overnight – a shortage of 6 million skilled project professionals [was] expected by 2013.
> Of the 20 million people participating in projects worldwide, just one million have professionally recognized formal training on how best to execute those projects. (Project Management Institute, 2010)

The Project Management Institute has responded vigorously to this need by sponsoring academic research, an academic network including the PMITeach.org web resource portal, the Global Accreditation Center for Project Management Education Programs, the PMI Education Foundation; publishing the peer-reviewed *Project Management Journal*; and by administering the non-academic Registered Education Providers (R.E.P.) program (Project Management Institute, 2016a). A search of PMITeach.org found project management curriculum guidelines, knowledge modules, foundational course syllabi, mini case studies, activities and course projects; but none of these discussed the use of project management simulations or simulation games (Project Management Institute, 2016b).

A broader search of the academic literature found several articles related to evaluating the use of project management simulation games in academic programs, but little describing the pedagogy of preparing the student to play the game (Al-Jibouri & Mawdesley, 2001; Al-Jibouri, Mawdesley, Scott, & Gribble, 2005; Collofello, 2000; Cook & Olson, 2006; Cooper, 2011; Dantas, Barros, & Werner, 2004; Davidovitch, Parush, & Shtub, 2006; Davidovitch, Shtub, & Parush, 2007; Davidovitch, Parush, & Shtub, 2008; Davidovitch, Parush, & Shtub, 2009; Davidovitch, Parush, & Shtub, 2010; Dillman & Cook, 1969; McCreery, 2003; Pfahl, 2004).

This paper contributes to reducing this literature gap by describing the integration of the Sim4Projects® simulation game as a capstone activity into the curriculum of two executive level graduate degree programs, one being a multi-modal three-semester project management core curriculum of an MS/MBA degree program with an emphasis in project management and the other being a single-semester project management course in a systems engineering and management degree program. Students entering these programs are typically aged in their mid-thirties and have substantial professional work experience, although not necessarily with planning projects or leading project teams. Similar preparatory assignments are used to plan forexecution of the simulated project in both degree programs prior to using the game as a capstone learning experience. Most students report favorable impressions of the overall learning experience and believe it to be an excellent way to experience many of the components of planning and managing the execution of a project.

## SIM4PROJECTS

SimProject (now Sim4Projects) was developed by Dr. Jeffrey Pinto and Dr. Diane Parente of The Pennsylvania State University. It is a platform-independent web-hosted simulation game that is accessed at http://www.sim4projects.com and distributed by SimProfessionals, LLC. Instructors interested in exploring and evaluating Sim4Projects can obtain access codes and additional information by contacting sales@simprofessionals.com (SimProfessionals, 2016).

This simulation was originally selected for use due to its mention in the preface and appendix of a program textbook (Gray & Larson, 2008). SimProject is designed to provide "virtual 'first-hand' experience in managing projects" (SimProfessionals, 2009):

Computer simulations encourage team development, collaboration, global thinking, and a predilection to consider the ramifications of decisions and their effect on the bottom line – in other words, many of the skills that are useful to project managers and team members in business. The purpose of this simulation is to tie together many of the salient challenges of project management in order to give students the deepest possible understanding of the complexities involved in undertaking a project. The goal of the simulation will be to have students manage a project from initiation to completion. Within this framework the student will need to employ and develop skills pertinent to personnel selection and training, motivation, conflict management, and stakeholder management. Students will be required to use planning and scheduling techniques, such as work breakdown structures, PERT/ CPM, scope development, and risk analysis (Pinto & Parente, 2016).

In this simulation, scope and activity sequencing are fixed and players make four types of decisions: resource hiring and release, resource training to improve expected performance, managerial actions to influence resource performance, and assignment of resources to activities (Pinto & Parente, 2013). Students analyze the given information for a common project (given information includes estimated work hours and cost for each task), compete against each other for acquisition of resources from a common resource pool, assign these resources to the simulated project's tasks, and receive feedback on the simulated project team's performance. The simulator provides the students with actual cost and task duration information based on their resource assignments following each simulation work period and ranks their performance in four categories: cost, time, functionality, and stakeholder satisfaction.

Simulation play is divided into preplay for the initial acquisition of resources followed by twelve project work periods. Students decide which resources to bid on based on analysis of the given information which includes a description of the tasks and the following demographic information and metrics for each available resource (Pinto & Parente, 2013):

- Demographic information
  - Resource name
  - Category (Engineer, Junior Marketing Specialist, Junior Product Designer, Marketing Manager, Operations Specialist, Project Manager, Quality Engineer, Senior Product Designer)
  - Age
  - Gender

- Standard pay rates (overtime is not allowed)
  - Metrics
  - Training
  - Skill level
  - Experience
  - Education
  - Reputation
  - Work Ethic
  - Public Relations
  - Flexibility
  - Interpersonal Skill

Resource metric information is given as a percentage between zero and 100. Resource efficiency on tasks is based on the values of these metrics, the resource demographics, and the composition of the simulated project team (Pinto & Parente, 2013). Assigned resources often require more work hours to complete tasks than suggested by the given estimates and students must plan accordingly.

Student teams bid on and obtain their starting resources during one or more preplay rounds. In the event one or more of the student teams does not win their bids and obtain the needed resources, the preplay round is repeated until each team issatisfied they have acquired the resources they need to get started. Once the virtual project teams are staffed with these hires, the student teams enter their decisions for the first work period and, on the instructor's command, the simulation processes the decisions.

At the completion of decision processing, the student teams access project summary information, statistics and task actuals data from the Sim4Projects website. The project summary information includes: work period finish date, project beginning budget, work period costs, any cost adjustments resulting from the occurrence of unforeseen events, remaining budget and percentage scores for team efficiency, cohesion, composition and longevity. These percentage scores report the team's performance relative to the other student teams as percentiles in four categories: cost, time, functionality and stakeholder satisfaction. Regardless of how well each team is doing, the team with the best performance in each of these four categories is shown with a score of 100% and the team with the worst performance receives a score of 0%. Teams in the middle receive a score indicative of their standing relative to the other teams. For example, all teams could have finished the work period ahead of the baseline schedule; the team finishing the earliest would receive a time score of 100% and the team finishing latest would receive a score of 0% even though they both finished early and regardless of the difference in their finish dates (Pinto & Parente, 2013).

Task performance data provided by activity for each resource are percentages for effectiveness, allocation, and efficiency; hours worked; and cost. Changes in resource metric values indicate the results of training, managerial actions, events and team morale (Pinto & Parente, 2013).

Following analysis of the prior work period results, students adjust their plan as required and submit their four types of decisions (resource bids and releases, training, managerial actions and task assignments) for the next work period.

The reported winner of the simulation game is the team receiving the overall percentile score of 100%. In practice, the instructor evaluates success based on comparison with the project's baseline schedule and budget.

## PEDAGOGY

Launched in 1997, the original curriculum of a master's degree program with an emphasis in project management included a non-computer-based project simulation as a capstone activity at the conclusion of the 21 semester credit hour project management core phase of the program. The project management core phase spans three semesters. The curriculum was designed as 60 four-contact-hour modules aligned to the life cycle of a project mapped into six sequential courses and a parallel independent study course related to earning a professional project management credential. On-campus cohorts attend six modules per month from 8 AM to 5 PM on one consecutive Thursday-Friday-Saturday each month. Online

cohorts attend three-day opening and closing retreats at the beginning and end of the project management core phase of the program and complete one module per week in distance mode between the two retreats. The project simulation game is played during the last three-day session of the project management core phase of the program which, in the case of the online program, is during the on-campus closing retreat. Based on class size, students play this game as project management teams of 3-5 students. These teams are formed during the first course of the project management program (or during the first session of the single course in the systems engineering and management program).

Although continuous improved has changed the sequencing and content of some of the modules, this framework has passed the test of time and a capstone project simulation remains an integral part of the curriculum. The original learning objective for incorporating this simulation was quite broad: "[to] allow students to practice what they have learned and fully integrate the various practices of project management" (Dietz, 2002). While the accreditation world encourages the use of specific measurable outcomes for assessment, the use of broad learning objectives for business simulation games is not unusual (Faria & Wellington, 2004) because "identifying and specifying outcomes of experiential learning is particularly problematic" (Gosenpud, 1990). Accordingly, the stated learning objective for the project simulation modules remains broad: to "demonstrate your ability to work as a team to plan and execute a simulated project" (Szot, 2016b).

The nature of the simulation changed in 2007 from the facilitation-intensive non-computer-based project simulation to an earlier version of the current web-hosted Sim4Projects simulation game. When initially adopted, the previous instructor's approach was to introduce the scenario and the rules of the game at the beginning of the project simulation modules. Students were given several hours to become familiar with the simulation by playing two practice rounds, then another hour to prepare their plans for playing the game. While experiential learning resulted from this approach, a tendency to rely on ad-hoc approaches and a missed opportunity to reinforce prior learning in project planning, monitoring and control was observed. This was remedied by altering the curriculum to add a project simulation planning module to the earlier project planning course and a simulation-related monitoring and control assignment to the project execution and closeout course which sequentially precede the advanced project management and simulation course. These same assignments are included in the single project management course in the systems engineering and management program prior to beginning the simulation.

The project simulation planning module requires students to apply the scheduling, budgeting and resource management concepts that were introduced earlier in the course to an instructor-created project scenario based on the simulation project model. This introduces the students to the rules of the game and requires them to work in teams during class to prepare a baseline schedule and budget based on the given information and to prepare a project staffing plan and revised schedule and budget based on given resource pool information as homework. An example of this assignment and scenario is shown in Appendix A.

The baseline planning assignment requires students to construct a network diagram from a narrative description of the project activities and a baseline schedule and budget from a work breakdown structure dictionary containing estimated work hours and labor rates. Students apply their knowledge of project network diagramming and the critical path method and become acquainted with the scenario of the simulated project. After submitting the baseline plan from this given information, students receive the correct solution for comparison and to use as the starting point for completing part two of the assignment.

In order to further acquaint them with the simulation and the rules of the game, students then perform some initial planning and play a few rounds of the simulation to experience the initial bidding, work period decision entry, and results review processes. This provides them with sample work performance data to assist them with preparing their schedule and budget based on analysis of the resource metrics. Their resulting staffing management plan and revised baseline are presented to the class in a simulated meeting with the sponsor during a later class session.

The monitoring and control assignment asks students to consider what they know and have learned about project monitoring and control and to prepare a presentation describing how they plan to do this during the game. This presentation is delivered to the class in an on-campus session or web-conference prior to the day the simulation game begins. The instructions for this assignment are minimal and require the students to reflect on what they have learned and their practice of project management to complete it:

> Review the "Project Planning Team Assignment" from OPRE6274, the "Sim4Projects Player Quickstart Manual" and the Sim Professionals Video Presentations.
>
> Prepare monitoring & control and closeout plans for evaluating the effectiveness of your team's performance in the OPRE6376 project simulation.
>
> Submit this document with a short PowerPoint presentation describing your approach by Friday 11:59 PM, December 3, 2016.

Review this presentation with the class in less than 10 minutes during the December 4 web conference. (Szot, 2016a) As a result of completing these assignments, students are better prepared to play the game using purposeful rather than ad-hoc project management techniques.

## ASSESSMENT

Assessment of student team performance on the preplanning assignments evolved to using the scoring rubrics shown in Appendix B with supplemental narrative feedback to provide additional guidance before playing the game. These rubrics are provided to the students prior to starting the assignments to reinforce the assignment deliverable requirements. Overall, student teams perform well on the project planning assignment; but, despite instructions to be specific to the team's upcoming management of the simulated project, tend to be too generic in their approach to the monitoring and control assignment. The scoring rubric shown is a recent revision with the first measure highlighting the requirement to be specific to the simulated project.

Since the approach of adding these preplanning assignments occurred when the simulation instructor changed and the new instructor chose to use a different project within the simulation, there is no meaningful data available to quantitatively research the hypothesis that presimulation planning enhances the student experience. To attempt this

research now by true experiment with a control group that doesn't perform the prework would likely not be well-received by the control group students and would also be considered unethical since it is denies them an important learning experience. Qualitative analysis of student reflections is a more reasonable approach. To date, students have not been asked to explicitly reflect on the value of the presimulation planning assignments; however, liking the presimulation planning exercise was one of five themes that emerged when analyzing postsimulation survey responses to the question regarding what they liked about the just completed simulation experience.

Assessment of learning from the simulation game itself is more complicated than merely reviewing the results from the performance measures that are built into the simulation game. It's very possible that the students in the lowest scoring team learn the most because of the adversity they dealt with and from what they learned about working with each other in stressful situations; therefore, student grade contribution for this experience is not on who won the game but on what they learned from the experience (Anderson & Lawton, 2007; Anderson, Lawton, & Wellington, 2008; Chin, Dukes, & Gamson, 2009; Dukes & Seidner, 1978; Gosenpud, 1990; Taylor & Walford, 1978; Teach & Murff, 2007).

This reflection is discussed during interim reviews with management following the third and sixth simulation work periods and at the conclusion of the game. For the interim presentations, students are instructed to rely on their prior learning and experiences to prepare and deliver a report to management summarizing the status of progress on the current project and their plans for completion. The instructor plays the role of the project sponsor during the presentation and then leads a debriefing of what the students did well and what they might do differently in the future. At the conclusion of the simulation game, students prepare and deliver a three-part presentation based on provided guidelines for the final status report, project audit report and reflections on the learning experience. An example of these guidelines is provided in Appendix C. This reflection includes a discussion of what happened versus what they planned to have happen in the presimulation planning assignment.

## CONCLUSION

Based on their prior completion of the preparatory assignments, students arrive to class on game day ready to enter their initial resource bids in the preplay round. Student feedback confirms that completing the planning assignments prior to starting the simulation game enhanced their learning. As a result of this planning, students started with a better understanding of the rules of the game, were better prepared to interpret the results, and made better decisions both before and during the simulation.

The approach to learning in this capstone experience is student-defined multidimensional reflective learning. Although the students share a common experience, each takes away his or her own personalized conclusions from the experience. The instructor encourages individual self-reflection throughout the program and enhances it with the reflection of the other students during the debrief discussions. While debrief can be a guided discussion using preplanned questions immediately following the activity, the approach used is to require a predebrief discussion refection and preparation period for the student teams to review what happened during the simulation game and to reflect on the results and what they learned from the experience prior to discussing it with the rest of the class (Hertel & Millis, 2002; Heyman, 1975; Lederman, 1984; Lederman, 1992; Thatcher, 1990; Thiagarajan, 1992). The richest discussions occur during the final debrief when students respond to the question, "What did you learn about project management from participating in the simulation?" Emergent themes are (1) resource management is critical – it's important to start with appropriate and capable resources and to have them hired when needed, (2) teamwork is important when planning for and playing the game and (3) it's important to start with a plan, monitor and compare results against the plan, and adapt as needed.

This paper described the Sim4Projects simulation game and the approach used to build project management plan development into the curriculum prior to beginning simulation play. Students confirmed the value of these presimulation assignments during their reflection presentations and in the postsimulation survey. Opportunities for further study include explicitly surveying students on the contribution of these presimulation assignments to their overall learning experience and, considering the overall simulation game experience, on further exploring what they think they learned from playing the game. As Teach and Murff (2009) observed, "Much more research needs to be conducted in the 'what is learned by playing business games' genre and more specifically the link between the complexity of a task and learning." This is certainly true in the case of playing project management simulation games where very little has been written. From the perspective of a project management educator, further examples of how experiential learning is used and assessed in project management curricula would be a welcome addition to the body of knowledge.

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# APPENDIX A
# Project Simulation Planning Assignment

## BACKGROUND INFORMATION

UTDPM Plastics is a 10-year old plastics manufacturing company located in North Central Texas. They specialize in developing parts for industrial use using injection molding and extrusion technologies. Their specific specialty lies in the area of developing made-to-order parts for the automotive after-market, although their product catalog includes products used within many industries, both marketed directly to consumers and those sold to manufacturers and retailers.

UTDPM Plastics is a privately owned company with next fiscal year projected revenues of $30 million. In recent years, the company has begun to broaden its capabilities by developing in-house design and engineering expertise. This approach has allowed the company to expand its business opportunities by developing products for other firms that lack specific knowledge of plastics engineering and/or manufacturing. The impetus to expand in-house engineering capabilities at UTDPM has been identified by upper management as a necessary means for continuing to enhance business opportunities and generating revenue in this highly competitive marketplace.

The goal of UTDPM is to continue to develop in-house engineering and new product development to a level that will provide a sustainable competitive advantage for the firm over competitors in both the local and national markets. This includes the objective to re-engineer existing products and develop new products in a cost-effective manner while meeting customer needs. UTDPM also seeks to use exclusivity agreements and patents to protect its revenue generation for these products. And, recognizing the value of project management procedures, UTDPM committed three years ago to improving their new product development execution through superior project management.

You have been hired to replace the experienced project leadership team that led the move to superior project management. Unfortunately for UTDPM, they decided to cash in on their experience and explore opportunities at a competing firm. Your new management is concerned that this competing firm may capture a large share of UTDPM's target market if the product launch they were planning before their departure is delayed or over-budget. Here's what you know about the project they were planning:

### Project Objective Statement

Demonstrate UTDPM's new product development prowess by capitalizing on a new commercial market opportunity with product launch 260 work-days or less after initiation at a cost not to exceed $380,000.

### Milestones

The project is divided into 12 work periods, each ending with an associated milestone. Some milestones describe multiple rather than unique events, but management has instructed you to stay with these milestones as they represent phase boundaries requiring an approval to proceed. This means the start of non-critical path sequential tasks may be delayed or become critical because of a phase boundary.

### WBS and WBS Dictionary

The departed team identified 58 project tasks and grouped them into 9 functional work packages including a project management work package containing 12 tasks (one for each work period):

1. Market Assessment
2. Procurement
3. Supplier Quality
4. Design
5. Engineering
6. Engineering Quality
7. Manufacturing
8. Commercialization
9. Project Management

This structure is similar to past projects and management has approved this structure as part of the scope baseline for this project. You will not be able to add, delete or edit the description of these tasks. Your preference is to refer to these "tasks" as "activities" to be *PMBOK® Guide* compliant, but you realize that "task" is part of the corporate culture and management has signaled that you shouldn't diddle with culture until you've proven yourself. Since some milestones are related to the completion of several tasks, you decide to group all the milestones together in the WBS under a tenth summary task called "Milestones" (you hesitate to call this a work package because no work is performed here). You note that each milestone will have at least two predecessors: a project management task and a task that is probably on the critical path.

### Other Task Information

The departed project management team also estimated durations for each task based on historical information and expert input. You have been instructed to go with these estimates as you don't have a better source of information nor time to go looking. You note that the duration estimating assumption was effort-driven based on one resource per task working full time. For a worker of normal competence, eight hours of planned work effort will be completed in one day.

The prior team also mapped each task into one of the twelve periods (you'd rather call them "phases" but keep this thought to yourself after the feedback on "tasks" vs. "activities"). Since the milestones are being treated as phase boundaries, you also make a note to make sure you there is a predecessor link to the prior milestone if needed to keep the task starts in the proper period. This seems to be as far as the prior project management team progressed as you've been unable to find any other work product related to developing a project schedule.

Fortunately you bumped into the former leader of the departed project management planning team at a local PMI® chapter meeting and, not wanting to burn any bridges, she sends you her notes to help you complete your planning effort. You look these over and decide that, combined with the WBS information you received from your new boss, you have enough information to prepare a baseline schedule and budget.

***Notes from the former project manager***

- With the following exceptions, tasks within each work package are performed in sequence
  - "Identify vendors" and "Develop and Issue RFQ" can start in parallel
  - "Train sales team" and "Advertising campaign" and "Show functional model at trade show" can start in parallel (if there are no other dependencies)
  - "Assess RFQ responses and select vendors" starts after "Qualify supplier" completes and Milestone 10
- The project begins with "Market Assessment." Its completion is designated as Milestone 1 and is followed by the start of "Design" and "Commercialization" in Period 2
- "Engineering" follows "Design"
- The other work package starts are a bit more complicated:
  - "Procurement" and "Engineering Quality" can start after the completion of "Release pre-production specifications" and Milestone 5
  - "Supplier Quality" can begin after the completion of "Issue sample (production equivalent)"
  - "Manufacturing" can start in Period 8 after the completion of "Perform supplier process capability" and "Build functional model"
- "Issue sample (production equivalent)" requires the completion of both "Identify vendors" and "Develop and Issue RFQ." Its work needs to be performed during Period 7.
- "Perform supplier process capability" is a predecessor of
  - "Approve sample parts"
  - "Design validation activities"
  - "Test prototype"
  - "Process engineering plan"
  - "Show functional model at trade show"
  - "Milestone 7"
- Starting "Identify testing requirements" also needs the completion of "Develop marketing program"
- "Release pre-production specifications" is a predecessor of
  - "Identify vendors"
  - "Develop and issue RFQ"
  - "Issue sample"
  - "Build functional model"
  - "Evaluate design specifications"
  - "Develop testing protocol for prototype"
  - "Milestone 5"
- "Build functional model" is a predecessor of
  - "Design validation activities"
  - "Test prototype"
  - "Process engineering plan"
  - "Show functional model at trade show"
  - Milestone 6
- "Design Transfer activities" also needs the completion of "Evaluate results of tests and identify weaknesses"
- "Product release meetings" also needs the completion of "Design transfer activities"
- "Develop production plan" also needs the completion of "Validation design review" and "Evaluate results of tests and identify weaknesses"
- "Develop production control plan" also needs the completion of "Qualify supplier"
- "Contracting for deliveries" also needs the completion of "Assess RFQ responses and select vendors"
- "Production pilot test" also needs the completion of "Product release meetings"
- The following depend on the completion of "Develop marketing program"
  - "Identify testing requirements"
  - "Train sales team"
  - "Advertising campaign"
  - "Show functional model at trade show"
  - "Milestone 2"
- "Product launch" requires the completion of
  - "Production release"
  - "Train sales team"
  - "Advertising campaign"
  - "Show functional model at trade show"

With this information, the table of milestones, and the estimated durations, you are confident you can quickly validate the desired schedule. You recall the need to make sure all tasks are scheduled in the proper time period. This may require adding a milestone as a predecessor to some tasks.

**Resource Pool**

Management provided a list of available resources and advised these are procured through a bidding process just before initiation of the execution phase. You have some concern about this but realize you need to get over it as this is life in the fast lane.

Since each person you add to the team is charged against your project budget, your goal should be to fully utilize any resource you hire. There is no overtime. Each resource's personal characteristics and the nature of the task determine whether they can complete the task with the estimated amount of effort. Training and managerial actions are available to influence their characteristics.

You are aware that the cultural background of resources for project teams impacts cohesion and team performance. A diverse group is more effective than one with minimal diversity; however, a group that is too diverse may be dysfunctional.

Company policy is no more than two resources may be assigned to any task and you have been informed that there are no exceptions to this policy.

Resources may be hired before the project begins and bids may be made for additional resources during each work period. For example, if you successfully bid on a resource prior to executing Period 1, they will be available for assignment to tasks in Period 2. A released resource is immediately removed from the team and not available for assignment in that period and not available for rehire until two periods later (assuming they haven't been hired by another project team in the interim).

**Training**

Management also provided information on available training in case your planned resources need development. This is a good thing as some of the resources look like they may need some development and, due to the bidding process, there is no guarantee you can hire the best resources available.

**Managerial Actions**

A list of managerial actions available during execution is also provided. You remember from your OB courses that doing some of these things may be a good idea when leading people. These may be applied in an attempt to motivate, punish, or develop the team.

**Your Assignment**

Using the given information, post on eLearning before **11:59 PM, Saturday, September 17, 2016**

1. Baseline project schedule using the critical path method and determine the size of the project completion buffer in work-days. Set the project start date to January 20, 2017.
2. Baseline budget by month using this schedule and the estimates provided by the departed project management team. Calculate the size of the management reserve/ projected overrun.
3. Project staffing plan based on your analysis of the resource requirements and the available resources. This plan shall identify resources by name, the hourly rate you intend to pay them, the activities you plan to assign them to, and when you plan to hire/release them.
4. Resource driven schedule and cash flow forecast assuming you obtain all your desired resources at the planned bid rates.
   a. Be sure to adjust work and durations as appropriate; resources may be less efficient than the assumptions used for the baseline.
   b. Analyze variances versus the baseline schedule and budget. Identify any needed gap-closing actions. Progressively elaborate as needed. Finishing early and under-budget is a good thing, late and/or over-budget is not!
5. Prepare a summary presentation suitable for reviewing the baseline and your forecast with management. Be prepared to explain all variances as the prior project management team had an outstanding reputation with management and your team is relatively unproven.

**Deliverables**

1. MS Project file
   a. Set baseline in MS Project with CPM schedule and budget from (1) and (2) above.
   b. Active plan reflects resource assignments and associated changes from (3) and (4) above. Do not change the baseline to reflect this new plan.
2. Staffing Plan (MS Office or PDF document) showing hiring, training, release, etc. plan by milestone work period. Initial staffing for Time Period 1 occurs during Time Period 0. List plans for Time Periods 0 – 11
3. Cash flow forecast for your plan by month (item 4 above)
4. MS PowerPoint file with summary presentation for management (item 5 above)

**PERIOD-ENDING MILESTONES (PHASE BOUNDARIES)**

All are also preceded by the project management activity for the prior period. All but Milestone 12 are followed by the project management activity for the next period. No work on succeeding tasks may commence until all work preceding the milestone is completed and approved. You may assume approval is automatic and consumes no time or budget.

| Preceding Tasks | Milestone | Succeeding Tasks |
|---|---|---|
| Business Evaluation | 1 | Design and Development Plan<br>Develop Preliminary Marketing Plan |
| Design specs.<br>Develop marketing program | 2 | Identify testing requirements<br>Train sales team<br>Advertising campaign |
| Risk Analysis<br>Train sales team<br>Advertising campaign | 3 | Design labeling |
| Initial engineering specs. | 4 | Design verification activities |
| Release pre-production specifications | 5 | Identify vendors<br>Develop and issue RFQ<br>Build functional model<br>Evaluate design specifications |

| Preceding Tasks | Milestone | Succeeding Tasks |
|---|---|---|
| Identify vendors<br>Develop and issue RFQ<br>Build functional model<br>Evaluate design specifications | 6 | Issue sample (production equivalent) Develop testing protocol for prototype |
| Perform supplier process capability Develop testing protocol for prototype | 7 | Approve sample parts<br>Design validation activities<br>Test prototype<br>Process engineering plan<br>Show functional model at trade show |
| Approve sample parts<br>Design validation activities<br>Test prototype<br>Process engineering plan<br>Show functional model at trade show | 8 | Validation design review<br>Evaluate results of tests and identify weaknesses |
| Approve model design<br>Evaluate results of tests and identify weaknesses | 9 | Qualify supplier<br>Design transfer activities<br>Develop production plan |
| Qualify supplier<br>Product release meetings<br>Develop production plan | 10 | Assess RFQ responses and select vendors<br>Develop production control plan |
| Contracting for deliveries | 11 | Submit production purchase order |
| Product launch | 12 | Celebrate!!! |

**WBS DICTIONARY**

| Work Package | Task Name | Task Description | Phase (Work Period) | Est. Work (hours) | Est. Labor Rate |
|---|---|---|---|---|---|
| **1** | **Market Assessment** | | | | |
| 1 | Evaluate market | Conduct full market research study to identify market segments, pricing, and final confirmation of product features | 1 | 96 | $50 |
| 1 | Develop Business opportunity | Identify key customers and gaining preliminary commitments or contracts in order to secure a baseline contract to justify continuation of the project | 1 | 112 | $90 |
| 1 | Customer preference study | Interviewing and conducting focus groups and surveys to identify most desirable product characteristics | 1 | 168 | $50 |
| 1 | Business evaluation (NPV, etc.) | Project screening used to identify costs, including revenue streams and net cash flows, for the viability assessment | 1 | 32 | $125 |
| **2** | **Procurement** | | | | |
| 2 | Identify vendors | Create a viable vendor pool for all material And service requirements, including performance criteria such as delivery, material or service quality, and pricing | 6 | 56 | $50 |
| 2 | Develop and issue RFQ | Identify all purchased materials and service requirements and develop requests for quotation for each requirement. Issue RFQ | 6 | 48 | $50 |
| 2 | Issue sample (production equivalent) | Issue purchase order for sample quantities to be used in first run production plan | 7 | 40 | $75 |
| 2 | Assess RFQ responses and select vendors | Evaluate all supplier responses to RFQ and notify those selected | 11 | 80 | $50 |

| Work Package | Task Name | Task Description | Phase (Work Period) | Est. Work (hours) | Est. Labor Rate |
|---|---|---|---|---|---|
| **3** | **Supplier Quality** | | | | |
| 3 | Perform supplier process capability | Assessment by quality control and procurement of suppliers' capability with respect to product characteristics, delivery, timeliness, and pricing | 7 | 112 | $50 |
| 3 | Approve sample parts | Quality control and manufacturing test and approve production equivalent sample orders for raw materials and parts | 8 | 64 | $75 |
| 3 | Qualify Supplier | Using results from sample parts assessment, formally notify suppliers, plant representatives and procurement of all suppliers qualified to bid for contracts for materials and services | 10 | 80 | $50 |
| **4** | **Design** | | | | |
| 4 | Design and development plan | High level structural design of the product, including plans and schedules for product completion | 2 | 48 | $50 |
| 4 | Design specs. | Detailed technical drawings and schematics for the product, including all equipment needs to create the final product | 2 | 176 | $50 |
| 4 | Identify testing requirements | Detail critical product specifications, acceptable tolerances and product liability limits | 3 | 80 | $50 |
| 4 | Risk analysis | Identify significant product usage risk and adherence to product standards. Include an assessment of acceptable levels of product tolerance. | 3 | 80 | $125 |
| 4 | Design labeling | Developing design labeling and packaging for the finished product | 4 | 40 | $50 |
| 4 | Approve design | Final assessment of product design characteristics matched to preliminary customer specifications | 4 | 32 | $50 |
| **5** | **Engineering** | | | | |
| 5 | Initial engr. specs. | Converting product design specifications into engineering templates | 4 | 40 | $50 |
| 5 | Design verification activities | Validate the consistency of product functionality, product design and engineering plans | 5 | 56 | $75 |
| 5 | Verification design review | Formal review with engineering, design, and marketing to finalize product design | 5 | 32 | $50 |
| 5 | Release pre-production specifications | Formal approval and sign-off on preliminary product specifications for review and comment | 5 | 80 | $50 |
| 5 | Build functional model | Develop product prototype | 6 | 144 | $75 |
| 5 | Design validation activities | Develop protocol for verification of product design | 8 | 40 | $50 |
| 5 | Validation design review | Perform desk check (structured walk through) of product design | 9 | 32 | $125 |
| 5 | Approve model design | Evaluate results from design review and secure final approval from engineering, design and manufacturing | 9 | 32 | $75 |
| 5 | Design transfer activities | Develop the process to support the transfer the product to manufacturing | 10 | 56 | $75 |

| Work Package | Task Name | Task Description | Phase (Work Period) | Est. Work (hours) | Est. Labor Rate |
|---|---|---|---|---|---|
| **6** | **Engineering Quality** | | | | |
| 6 | Evaluate design specifications | Conduct quality assessment, including quality engineering, on product designs. Create upper and lower control limits for product component manufacturing | 6 | 80 | $50 |
| 6 | Develop testing protocol for prototype | Identify specific testing protocol for each product specification, document for repeatability and benchmarking | 7 | 64 | $50 |
| 6 | Test prototype | Perform tests to valid all product characteristics and identify significant deviations from upper and lower control limit boundaries | 8 | 80 | $50 |
| 6 | Evaluate results of tests and identify weaknesses | Evaluate results of prototype tests from a Product quality perspective , identify characteristics outside of control limits, and implement plan for correction | 9 | 48 | $50 |
| 6 | Product release meetings | Gain required sign-off approval from representatives from engineering, manufacturing, design, and quality control | 10 | 24 | $125 |
| **7** | **Manufacturing** | | | | |
| 7 | Process engineering plan | Convert engineering and design specifications to an operations plan for plant work flow and design for manufacturing | 8 | 120 | $50 |
| 7 | Develop production plan | Identify the specific machine and manpower resources needed to produce the requirements for the product | 10 | 48 | $50 |
| 7 | Develop production control plan | Develop the schedule for raw materials, shipping, and packaging against the sales forecast and requirements plan | 11 | 68 | $50 |
| 7 | Approve production parts | Assess and approve first-run production of product components | 11 | 40 | $50 |
| 7 | Contracting for deliveries | Specify exact terms for schedules and Quantities of manufacturing supplies, including quantity release schedule | 11 | 64 | $50 |
| 7 | Submit production purchase order | Issue detailed production requirements for production pilot test | 12 | 16 | $50 |
| 7 | Production pilot test | Test production run within normal plant operations, staffing, and resource requirements for operational stability | 12 | 40 | $50 |
| 7 | Debugging production system | Identify and correct any significant deviations from process operations and product outcomes | 12 | 32 | $50 |
| 7 | Production release | Issue formal sign-off from manufacturing to accept product into the production system | 12 | 24 | $50 |

| Work Package | Task Name | Task Description | Phase (Work Period) | Est. Work (hours) | Est. Labor Rate |
|---|---|---|---|---|---|
| **8** | **Commercialization** | | | | |
| 8 | Develop preliminary marketing plan | Develop timetable, responsibilities and costs for creating and implementing the marketing program | 2 | 40 | $90 |
| 8 | Develop marketing program | Creating a plan to identify customers by segment, promotional programs, pricing structures, and distribution channels | 2 | 120 | $90 |
| 8 | Train sales team | Specific product training for sales personnel with the purpose of having them knowledgeable regarding the product during conversations with potential customers | 3 | 176 | $50 |
| 8 | Advertising campaign | Develop detailed advertising plan, including media schemes, scripts, and public relations activities (trade shows and trade journal promotion) | 3 | 224 | $50 |
| 8 | Show functional model at trade show | Design display and coordinate delivery and presentation of prototype at selected trade shows | 8 | 24 | $90 |
| 8 | Product launch | Plan for and implement the formal announcement of the new product | 12 | 24 | $125 |
| **9** | **Project Management** | | | | |
| 9 | Project Management | Overseeing all project tasks for the period, developing status reports and project updates, and maintaining project team staffing and commitment | 1 | 200 | $125 |
| 9 | Project Management | Overseeing all project tasks for the period, developing status reports and project updates, and maintaining project team staffing and commitment | 2 | 112 | $125 |
| 9 | Project Management | Overseeing all project tasks for the period, developing status reports and project updates, and maintaining project team staffing and commitment | 3 | 112 | $125 |
| 9 | Project Management | Overseeing all project tasks for the period, developing status reports and project updates, and maintaining project team staffing and commitment | 4 | 104 | $125 |
| 9 | Project Management | Overseeing all project tasks for the period, developing status reports and project updates, and maintaining project team staffing and commitment | 5 | 120 | $125 |
| 9 | Project Management | Overseeing all project tasks for the period, developing status reports and project updates, and maintaining project team staffing and commitment | 6 | 72 | $125 |
| 9 | Project Management | Overseeing all project tasks for the period, developing status reports and project updates, and maintaining project team staffing and commitment | 7 | 88 | $125 |
| 9 | Project Management | Overseeing all project tasks for the period, developing status reports and project updates, and maintaining project team staffing and commitment | 8 | 24 | $125 |

| Work Package | Task Name | Task Description | Phase (Work Period) | Est. Work (hours) | Est. Labor Rate |
|---|---|---|---|---|---|
| 9 | Project Management | Overseeing all project tasks for the period, developing status reports and project updates, and maintaining project team staffing and commitment | 9 | 32 | $125 |
| 9 | Project Management | Overseeing all project tasks for the period, developing status reports and project updates, and maintaining project team staffing and commitment | 10 | 40 | $125 |
| 9 | Project Management | Overseeing all project tasks for the period, developing status reports and project updates, and maintaining project team staffing and commitment | 11 | 104 | $125 |
| 9 | Project Management | Overseeing all project tasks for the period, developing status reports and project updates, and maintaining project team staffing and commitment | 12 | 80 | $125 |

Training and managerial action budget of $25,000 is allocated at $3,125 per period for periods 1-8

**RESOURCE CATEGORIES**

| | |
|---|---|
| **Engineer** | Plans and oversees layout of production facilities. Conducts studies in operations to maximize work flow and spatial utilization. Ensures facility efficiency and workplace safety. Has knowledge of commonly-used concepts, practices, and procedures within a particular field. |
| **Junior Marketing Specialist** | Coordinates and assists with the marketing activities of a product. Familiar with standard concepts, practices, and procedures within a particular field. Relies on limited experience and judgment to plan and accomplish goals. A certain degree of creativity and latitude is required. |
| **Junior Product Designer** | Provides expert consultation in one or more areas for the design, development and implementation of technical products and systems. Responsible for product development. |
| **Marketing Manager** | Directs and oversees an organization's marketing policies, objectives, and initiatives. Reviews changes to the marketplace and industry and adjusts marketing plan accordingly. Familiar with a variety of the field's concepts, practices, and procedures. Relies on extensive experience and judgment to plan and accomplish goals. Performs a variety of tasks. Leads and directs the work of others. A wide degree of creativity and latitude is expected. |
| **Operations Specialist** | Manages and directs the production department. Ensures efficient delivery of products and services to clients. Familiar with a variety of the field's concepts, practices, and procedures. |
| **Project Manager** | Responsible for the coordination and completion of projects. Oversees all aspects of projects. Sets deadlines, assigns responsibilities, and monitors and summarizes progress of project. |
| **Quality Engineer** | Performs inspections and sets quality assurance testing models for analysis of raw materials, materials in process, and finished products. Has knowledge of commonly-used concepts, practices, and procedures within a particular field. |
| **Senior Product Designer** | Provides expert consultation in one or more areas for the design, development and implementation of technical products and systems. Recognized as technical leader and resource. Recommends alterations and enhancements to improve quality of products and/or procedures. Responsible for all internal activities and product development. |

**RESOURCE INFORMATION AND METRICS**

**Standard Rate** is the rate paid on their last project. Resources may reject your bid if it is below what they think they should be paid.
**Training** is the amount of previous instruction in related skills. You may send resources for additional training if you think it would enhance their ability to perform work effectively.
**Skill** is degree of expertise. Skill levels can be enhanced through additional training.
**Experience** relates to the length of time the individual has worked in their field. More experienced people tend to be more efficient and (at least initially) adapt faster to working on project teams.
**Education** relates to the level and relevance of education completed.
**Work Ethic** is the set of principles that individuals have about performing the job. A stronger work ethic means that the project team member is disposed to work more diligently.
**Reputation** is the general belief about an individual's character. It may also be described as the state of being well thought of. The better the individual's reputation, the easier it is to hire other team members, retain top management support, and keep stakeholders happy.
**Public Relations** skills include employee communications, media relations, advertising, and community relations. They are the ability of a person to present an appropriate "face" to external stakeholders.
**Flexibility** is a measure of the adaptability of a person to a change in circumstance and the ability to handle changes. **Interpersonal Skills** are goal-directed behaviors conducted in a face-to-face environment. They enable a person to relate to and interact with others.

| First Name | Last Name | Category | Age | Gender | Standard Rate ($/hr) | Training | Skill Level | Experience | Education | Reputation | Work Ethic | Public Relations | Flexibility | Interpersonal Skills |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chiasa | Shimizu | Engineer | 21 | F | 41 | 57 | 69 | 49 | 49 | 49 | 61 | 49 | 32 | 49 |
| Clinton | Zollinger | Engineer | 25 | M | 48 | 67 | 82 | 58 | 58 | 58 | 72 | 58 | 38 | 58 |
| Hugh | Snider | Engineer | 27 | M | 51 | 71 | 86 | 61 | 61 | 61 | 76 | 61 | 40 | 61 |
| Jeanette | Michelson | Engineer | 27 | F | 51 | 72 | 87 | 62 | 62 | 62 | 77 | 62 | 41 | 62 |
| Maximo | Delgado | Engineer | 26 | M | 50 | 70 | 85 | 60 | 60 | 60 | 75 | 60 | 40 | 60 |
| Zhenzhen | Hèsheli | Engineer | 21 | F | 41 | 58 | 70 | 49 | 49 | 49 | 62 | 49 | 33 | 49 |
| Charles | Szymkowski | Junior Marketing Specialist | 25 | M | 50 | 50 | 70 | 50 | 55 | 40 | 60 | 60 | 60 | 60 |
| Clayton | Radomski | Junior Marketing Specialist | 20 | M | 41 | 41 | 58 | 41 | 46 | 33 | 50 | 50 | 50 | 50 |
| Darren | Humphries | Junior Marketing Specialist | 20 | M | 40 | 40 | 56 | 40 | 44 | 32 | 48 | 48 | 48 | 48 |
| Felix | Körtig | Junior Marketing Specialist | 23 | M | 46 | 46 | 65 | 46 | 51 | 37 | 55 | 55 | 55 | 55 |
| Fulberto | Astor | Junior Marketing Specialist | 26 | M | 53 | 53 | 75 | 53 | 58 | 42 | 64 | 64 | 64 | 64 |
| Lance | Morelle | Junior Marketing Specialist | 21 | M | 43 | 43 | 61 | 43 | 48 | 34 | 52 | 52 | 52 | 52 |
| Lonnie | Phifer | Junior Marketing Specialist | 28 | M | 56 | 56 | 79 | 56 | 62 | 45 | 68 | 68 | 68 | 68 |
| Ludivina | Castanon | Junior Marketing Specialist | 23 | F | 46 | 46 | 65 | 46 | 51 | 37 | 56 | 56 | 56 | 56 |
| Mathew | Magley | Junior Marketing Specialist | 23 | M | 47 | 47 | 67 | 47 | 52 | 38 | 57 | 57 | 57 | 57 |
| Miyo | Murakami | Junior Marketing Specialist | 27 | F | 54 | 54 | 76 | 54 | 59 | 43 | 65 | 65 | 65 | 65 |
| Nelson | Gaston | Junior Marketing Specialist | 23 | M | 47 | 47 | 66 | 47 | 52 | 37 | 56 | 56 | 56 | 56 |
| Yingtai | Dongguo | Junior Marketing Specialist | 22 | F | 44 | 44 | 62 | 44 | 48 | 35 | 53 | 53 | 53 | 53 |
| Alfonso | Castro | Junior Product Designer | 29 | M | 58 | 47 | 70 | 47 | 58 | 58 | 70 | 47 | 47 | 58 |
| Beaulah | Selsor | Junior Product Designer | 20 | F | 40 | 32 | 48 | 32 | 40 | 40 | 48 | 32 | 32 | 40 |

| First Name | Last Name | Category | Age | Gender | Standard Rate ($/hr) | Training | Skill Level | Experience | Education | Reputation | Work Ethic | Public Relations | Flexibility | Interpersonal Skills |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gapser | Alonso | Junior Product Designer | 21 | M | 43 | 34 | 52 | 34 | 43 | 43 | 52 | 34 | 34 | 43 |
| Gary | Lees | Junior Product Designer | 29 | M | 59 | 47 | 71 | 47 | 59 | 59 | 71 | 47 | 47 | 59 |
| Gerfried | Kaiser | Junior Product Designer | 20 | M | 41 | 33 | 49 | 33 | 41 | 41 | 49 | 33 | 33 | 41 |
| Hugh | Loos | Junior Product Designer | 21 | M | 42 | 34 | 51 | 34 | 42 | 42 | 51 | 34 | 34 | 42 |
| Mike | Carder | Junior Product Designer | 26 | M | 52 | 42 | 63 | 42 | 52 | 52 | 63 | 42 | 42 | 52 |
| Mikie | Takahashi | Junior Product Designer | 24 | F | 49 | 39 | 59 | 39 | 49 | 49 | 59 | 39 | 39 | 49 |
| Pura | Deane | Junior Product Designer | 21 | F | 42 | 33 | 50 | 33 | 42 | 42 | 50 | 33 | 33 | 42 |
| Yan | Liú | Junior Product Designer | 21 | F | 43 | 34 | 51 | 34 | 43 | 43 | 51 | 34 | 34 | 43 |
| Yoshi | Takeuchi | Junior Product Designer | 28 | M | 56 | 45 | 67 | 45 | 56 | 56 | 67 | 45 | 45 | 56 |
| Yoshiaki | Fuuchou | Junior Product Designer | 28 | M | 56 | 45 | 68 | 45 | 56 | 56 | 68 | 45 | 45 | 56 |
| Frodina | Weber | Marketing Manager | 33 | F | 100 | 83 | 94 | 89 | 83 | 94 | 94 | 78 | 89 | 83 |
| Jamie | Stanger | Marketing Manager | 25 | M | 77 | 64 | 73 | 68 | 64 | 73 | 73 | 60 | 68 | 64 |
| Madelene | Weber | Marketing Manager | 26 | F | 80 | 67 | 76 | 71 | 67 | 76 | 76 | 62 | 71 | 67 |
| Mathew | Malbrough | Marketing Manager | 31 | M | 94 | 78 | 89 | 84 | 78 | 89 | 89 | 73 | 84 | 78 |
| Ronald | Zollinger | Marketing Manager | 33 | M | 99 | 83 | 94 | 88 | 83 | 94 | 94 | 77 | 88 | 83 |
| Toi | Gavette | Marketing Manager | 29 | F | 89 | 74 | 84 | 79 | 74 | 84 | 84 | 69 | 79 | 74 |
| Genesis | Craft | Operations Specialist | 22 | F | 41 | 66 | 66 | 58 | 41 | 53 | 66 | 53 | 49 | 62 |
| Hilmer | Werner | Operations Specialist | 23 | F | 42 | 68 | 68 | 59 | 42 | 55 | 68 | 55 | 51 | 64 |
| Hong | Tong | Operations Specialist | 26 | F | 47 | 76 | 76 | 66 | 47 | 62 | 76 | 62 | 57 | 71 |
| Max | Stubbs | Operations Specialist | 31 | M | 56 | 90 | 90 | 78 | 56 | 73 | 90 | 73 | 67 | 84 |
| Medgar | Hoffmann | Operations Specialist | 28 | M | 52 | 83 | 83 | 73 | 52 | 68 | 83 | 68 | 62 | 78 |
| Neil | Nitz | Operations Specialist | 23 | M | 41 | 67 | 67 | 58 | 41 | 54 | 67 | 54 | 50 | 62 |
| Christian | Oby | Project Manager | 46 | M | 143 | 80 | 100 | 100 | 69 | 94 | 94 | 92 | 100 | 97 |
| Despina | Menard | Project Manager | 36 | F | 114 | 64 | 82 | 82 | 54 | 74 | 74 | 73 | 82 | 77 |
| Gan | Sikòu | Project Manager | 47 | M | 148 | 82 | 100 | 100 | 71 | 96 | 96 | 94 | 100 | 100 |
| Juan | Herrera | Project Manager | 42 | M | 131 | 73 | 94 | 94 | 63 | 85 | 85 | 84 | 94 | 89 |
| Nelson | Kinnard | Project Manager | 43 | M | 134 | 75 | 97 | 97 | 64 | 87 | 87 | 86 | 97 | 91 |
| Wuzhou | Mùróng | Project Manager | 41 | M | 128 | 72 | 92 | 92 | 61 | 83 | 83 | 82 | 92 | 87 |
| Frodina | Fuchs | Quality Engineer | 34 | F | 85 | 96 | 100 | 96 | 68 | 100 | 96 | 34 | 22 | 56 |
| Jiang | Yuèzhèng | Quality Engineer | 24 | M | 62 | 70 | 74 | 70 | 49 | 74 | 70 | 24 | 16 | 41 |
| Lance | Staten | Quality Engineer | 24 | M | 62 | 70 | 74 | 70 | 49 | 74 | 70 | 24 | 16 | 41 |
| Mathew | Kempton | Quality Engineer | 26 | M | 65 | 74 | 78 | 74 | 52 | 78 | 74 | 26 | 17 | 43 |
| Sean | Zollinger | Quality Engineer | 29 | M | 73 | 83 | 88 | 83 | 59 | 88 | 83 | 29 | 19 | 49 |
| Ximen | Barandiarán | Quality Engineer | 33 | M | 83 | 94 | 100 | 94 | 66 | 100 | 94 | 33 | 22 | 55 |
| Au | Hayashi | Senior Product Designer | 28 | F | 77 | 82 | 82 | 67 | 61 | 67 | 72 | 51 | 61 | 61 |
| Brandon | Bednarz | Senior Product Designer | 26 | M | 71 | 76 | 76 | 61 | 57 | 61 | 66 | 47 | 57 | 57 |
| George | Eakin | Senior Product Designer | 27 | M | 74 | 79 | 79 | 64 | 59 | 64 | 69 | 49 | 59 | 59 |
| Jiro | Ota | Senior Product Designer | 32 | M | 88 | 94 | 94 | 77 | 71 | 77 | 83 | 59 | 71 | 71 |

| First Name | Last Name | Category | Age | Gender | Standard Rate ($/hr) | Training | Skill Level | Experience | Education | Reputation | Work Ethic | Public Relations | Flexibility | Interpersonal Skills |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lianne | Stimson | Senior Product Designer | 22 | F | 62 | 66 | 66 | 54 | 50 | 54 | 58 | 41 | 50 | 50 |
| Yori | Yoshi | Senior Product Designer | 27 | M | 75 | 80 | 80 | 65 | 60 | 65 | 70 | 50 | 60 | 60 |

**TRAINING**

| Training Name | Description | Cost per resource | Duration | Maximum Seats |
|---|---|---|---|---|
| Benchmarking | Students will identify project management processes and develop strategies for obtaining information on best practices and implementing these strategies in their organizations. | $800 | 4 days | 3 |
| Financial Skills Refresher | Use of NPV and IRR for project selection and portfolio management Successful completion of this course will enable students to be conversant in project selection criteria and to prepare cost-benefit analysis. | $600 | 3 days | 5 |
| Interpersonal Skills | Students will learn effective leadership techniques, group behavior and decision making. They will also practice persuasive communications, conflict resolution, and influence tactics. | $600 | 3 days | 7 |
| Introduction to Planning | Elements in effective scope management, scheduling, resource management, and risk assessment. | $1,000 | 5 days | 4 |
| Market Research Tools | An introduction into focus group administration, business-to-business survey methods, and data collection and analysis. | $400 | 2 days | 2 |
| Negotiation Techniques | Basic skills and practice of effective negotiation. | $600 | 3 days | 5 |
| Principles of Quality | Introduction of Deming's Principles of Total Quality Management, statistical process control, and Taguchi quality cycles. | $600 | 3 days | 5 |
| Process Engineering | Intermediate level course to learn best practices of organizational process design and improvement. Kaizen principles will be discussed. | $600 | 3 days | 2 |
| Project Evaluation | Intermediate level course in project tracking and control techniques. | $1,000 | 5 days | 5 |
| Project Management 101 | Basic project management, covering a survey of the major relevant skills and knowledge to manage or perform effectively on projects. | $1,000 | 5 days | 5 |

## APPENDIX B
## SCORING RUBRICS

### Project Simulation Planning Assignment Scoring Rubric

| | Missing | Needs Improvement | Proficient |
|---|---|---|---|
| Baseline schedule and budget based on given task information | 0% | 17% | 20% |
| Human resource plan assigns appropriate skill types to activities and identifies the hire and release time periods | 0% | 17% | 20% |
| Schedule and cost forecast is based on human resource plan and considers resource characteristics and activity loading | 0% | 17% | 20% |
| Forecast satisfies given constraints | 0% | 17% | 20% |
| Summary presentation discusses staffing approach and forecast | 0% | 17% | 20% |

### Project Simulation Monitoring and Control Assignment Scoring Rubric

| | Missing | Needs Improvement | Proficient |
|---|---|---|---|
| Approach is specific to the simulated project (not generic and unrelated to what will be done while playing the game) | 0% | 17% | 20% |
| Monitoring metrics are identified | 0% | 17% | 20% |
| Performance goals are stated for each metric | 0% | 17% | 20% |
| Management team responsibilities are delineated and reasonable | 0% | 17% | 20% |
| Describes how team will evaluate their success in managing the simulated project | 0% | 17% | 20% |

## APPENDIX C
## FINAL PRESENTATION GUIDELINES

**FINAL STATUS REPORT**

- Baseline Completion Date (17 May 2017) vs. Actual Completion Date
- Baseline Budget ($406,700) vs. Actual Cost
- Variance Explanations

**PROJECT AUDIT REPORT**

- Original strategy – what was your original approach?
- How did you divide responsibilities on your team?
- What worked?
- What didn't work?
- What would you do differently the next time?
- Some things to consider
  - Were the right people and talents hired?
  - Did you establish appropriate planning and control systems?
  - Did the project conform to plan? Why or why not?
- What lessons did you learn that you would pass on to future project teams?

**THE SIMULATION**

- What did you learn about project management from participating in the SimProject simulation?
- What did you like about the simulation experience?
- What did you not like about the simulation experience?
- What changes do you recommend be made to the SimProject computer simulation?
- Excluding changes to the computer simulation itself, what changes do you think could be made to the overall simulation experience to better prepare you to manage projects?
- Elaborate on any other thoughts you have about learning project management with a computer-based simulation game