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Keywords: Project Management, Curriculum, Hands-on experience

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An IS Project Management Course Project

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Abstract

Information Systems curricula should provide project management (PM) theory, current practice, and hands-on experience. The schedule usually does not allow time in Analysis and Design courses for development oriented project management instruction other than a short introduction. Similarly, networking courses usually don't put project management into the syllabus even though network people need this skill in the field. One solution is to offer a separate one-semester "Introduction to IS Project Management" course. The problem is scheduling the course itself. This course usually can't come before it is needed in development oriented courses, which come early in the curriculum. One solution to this scheduling problem is to offer some cursory introduction to and use of PM in the development course(s) and leave the full presentation to a later general PM course not directed specifically at development. When presenting that latter PM course, usually at the junior/senior level, the hands-on component becomes an issue. Should the course's hands-on project be a mini development project, a networking project, or something else? Having a simultaneous parallel nontrivial hands-on project activity is not only distracting but draining of time and effort that should be going to the PM content. This paper presents one solution to this problem: a hands-on PM course where the course itself becomes the hands-on nontrivial project. The students cover the concepts of IS development using the text(s) but learn general project management theory and current practice. They experience the processes of PM by applying them to their own activities in the course itself, without the distraction of yet another different simultaneous activity (such as a mini development hands-on project).

Keywords: Project Management, Curriculum, Hands-on experience

1. IS PROJECT MANAGEMENT

Information Systems (IS) projects exist not only as full development projects, but also as development related sub projects such as requirements generation activities, analysis studies, design projects, implementation projects (including outsourcing), testing and deployment processes, etc. IS folk often get involved in equipment deployment or upgrade projects, network installation projects, even customer training projects. Projects are ubiquitous; so familiarity with project management theory and practice are important IS skills. It also helps to have done at least one real full project using the theory (the what) and information on practice (the how) in a controlled classroom setting before one has to tackle a real project in an industrial setting.

PM is well recognized as an essential part of the Masters program in Information Systems, see the MSIS program (Gorgone et al, 2006), and the undergraduate curriculum (Gorgone et al, 2002). This technique is aimed and tested in a PM course for undergraduates at the junior/senior level. The concept of the project presented here should also work on the MSIS level.

2. PROJECT MANAGEMENT IN THE IS CURRICULUM

Information Systems curricula should provide project management theory, current practice, and hands-on experience. The schedule usually does not allow time in Analysis and Design courses for development oriented project management instruc-

tion other than a short introduction (Hoffer, et al. 2004). Similarly, networking courses usually don't put project management into the syllabus even though network people need this skill in the field. One solution is to offer a separate one-semester "Introduction to IS Project Management" course. The problem is scheduling the course itself. It often can't come before it is needed in development oriented courses, because they come early in the curriculum. One solution to this scheduling problem is to offer some cursory introduction to and use of PM in the development course(s) and leave the full presentation to a later general PM course not directed specifically at development.

When presenting that latter PM course, usually at the junior/senior level, the hands-on component becomes an issue. Should the course's hands-on project be a mini development project, a networking project, or something else? Having a simultaneous parallel nontrivial hands-on project activity is not only distracting but draining of time and effort that should be going to the PM content. This paper presents one solution to this problem: a hands-on PM course where the PM course itself becomes the hands-on nontrivial student project. Students learn general project management theory and current practice by reading the text(s). They experience the processes of PM by applying them to their own activities in the course itself, without the distraction of yet another different simultaneous activity (e.g., a mini development hands-on project). A tacit hope is that students also come away with better general course organizing skills.

3. THE SUGGESTED PM COURSE

The Book

The course should follow a standard IS oriented PM text. I have recently used (Schwalbe 2006), which covers the theory and the practice of project management with an eye on application to Information Systems Development. It provides an outline view of the Waterfall, Prototyping, and, Agile approaches to development. The book includes an extensive appendix tutorial on Microsoft Project Manager (MSPM). It also aims at preparing the student for PM Certification (PMI 2006).

Bootstrapping & The "Other" Book

Since the course project is the course, we have a bootstrapping problem: how do we start doing PM before we have studied PM? Our text (Shwalbe, 2006) and others like it, do not allow this. The technique suggested here is to have the students focus on learning the MSPM tool while beginning the book's early chapters. Simultaneously, they quickly skim (lightly read) a short introduction to the entire process. I use the little inexpensive book by (Lewis 2006).

The Lewis book presents a brief overview of PM in general. It is not oriented to IS/IT. It is a quick read and complete enough to bootstrap the course. I also provide a detailed tasks list as part of the syllabus (Appendix 1) and some detailed forward-looking tasking specifically for the bootstrap (Appendix 2).

The Student Activities

The PM course's project requires the students to schedule their own individual activities and plan their semester effectively. They use Microsoft Project Manager and follow a milestone requirements document provided by the customer (the instructor) (Appendix 1). The resources are their own time as a text reader, a quiz taker, an exam taker, a project planner, and if it is an online course, as an online discussant. The only non-real (artificial) aspect is the allocation of costs.

These various roles are assigned an artificial cost associated with each activity – or a fixed rate for simplicity. Resource loading is real, but cost estimating is artificial. The students have to allocate their real time to the various tasks to meet real deadlines (the instructor's fixed milestones). Both the Gantt chart (with tracking) and the critical path are real.

Although PM is a team activity, this course was taught on-line and did not lend itself to a team approach. The students were located across the US.

The General Schedule

The hands-on project begins with a transcription of my syllabus into MSPM as a Work Breakdown Structure (WBS). This is essentially an outlining exercise. MSPM has an outlining interface for inputting this data.

Once the transcription of the syllabus (Appendix 2) into a Work Breakdown Structure in MSPM is done, the bootstrapping process is over. Thereafter the student can follow the main text and iteratively improve their plan by improving the WBS with better timing estimates, actual times for tasks completed, and applying resource leveling to plan out their own work schedule.

The concept of a baseline plan, and using the baseline as a tool for monitoring a project, comes later in the course. Before reaching that section, the students should be actually doing that monitoring process for themselves and applying it to their own time expenditures.

Course assignments are of three types. One is simple paced reading-assignments as in any course, to help the students plan their time. The second is a requirement for periodic updates of their personal course plan in the form of an updated WBS. This appears as a .mpp file with both a Gantt chart and a Critical Path diagram, which can be monitored for progress. The grading rubric for the WBS is provided in Appendix 3.

The third type of assignment are writings of four different types. The first writing is the group of ancillary documents of project planning such as the initial charge to the team, (the "charter"), the mission statement, the vision, risk assessments, reviews, detailed earned value analyses, etc. It is not possible to do all of these, but we discuss them and do some of them.

The second type of writing consists of short essays on topics like security, ethics, and personal evaluations of the risks in doing this project.

The third type of writing is the more or less formal retrospective or "what has been learned" and reflections on the course.

The fourth type of writing is the on-going Project Manager's Notebook. The requirement statement for this assignment is in Appendix 4. I independently recommend but don't require some of the more professional notebooks (AMPAD 2007) and (SNCO 2007).

The most recent version of this course was conducted entirely on-line with seniors. A significant proportion of the class (about 1 in 3) had a problem putting their head around

the recursive nature of a project course whose project was the planning of the project management course they were taking (for themselves or anyone else taking it). It is hard in an on-line environment to get across subtle distinctions or to really get insight into subtle problems that students have. They also had difficulty realizing that the class project was REAL, that is, that it SHOULD be applied in real time to their own activities in the class.

4. RETROSPECTIVE

The course is needed and desired. It is difficult for some students because it comprises new and foreign material which requires using a real tool in real time. In addition, the reading is dry at times (lists of things to be done) or concerns soft issues such as choosing and motivating project members, relating to stakeholders, etc. The amount of reading is large but not outlandish. The entire subject is far outside the experience of almost all of the undergraduate students. However, they all believe that they can be a project manager.

The concept of stakeholder is an abstraction for folks who have not worked in industry. Most of this online class was working full-time so they did not have a problem with this idea.

There is not enough room here for writing samples but they filled the spectrum from pro forma to insightful. Only two students maintained notebooks that were real and useful. This is true of other development courses - IS students don't know how to keep useful notes. They don't like to write.

The other deliverable, the .mpp, was a disappointment. Most students did the minimum WBS and clearly did not use it for their own schedule. On the other hand, they clearly learned how to put in a basic project and update it.

5. CONCLUSIONS

Using the scheduling of a student taking a PM-course as the project in the PM course is perfectly reasonable and useful, even efficient. The main impediment is the evangelical effort needed to get the students to believe and accept the idea that THEY are responsible for planning their OWN effort and schedule in the real course, and that that

PROCESS is what they will be graded on. Their tendency is to see the project as only an abstraction that does not really relate to their lives.

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APPENDIX 1: BOOTSTRAP HANDS-ON PLAN AND ASSIGNMENTS

Course Project (Using Microsoft Project Manager (MSPM) 2003).

You will run a project. The project is you taking this class.

- The readings, assignments, quizzes, and exams are the tasks.
- The schedule (baseline schedule) is found on the assignment sheet.
- You are the resource - but think of yourself as separate resources:
 1. the reader
 2. the project manager
 3. the MS Project jockey
 4. the quiz and exam taker
 5. the researcher who may have to look up topics
 6. there may have to be an artist who will draw diagrams in Visio
 7. there may be an author who might have to write short papers
 8. there definitely will also be a documentarian (see the NOTEBOOK item)
[Appendix 4 here].
 9. Also, your machine is a resource that might have to be shared.

These resources will have to be scheduled such that the total time per day and week is reasonable for you personally.

Consider all people resources to have the same hourly pay of \$40. Later, if you have time, you might experiment with more realistic pricing of resources. This will give you a feel for the sensitivity of the budget to skills mix and resource allocations.

The baseline schedule has a number of fixed milestones:

- The exams are fixed.
- The start and end of the course is fixed.
- Quizzes, when announced, will be fixed (subject to the vagaries of Blackboard).

Otherwise, everything else floats.

Your use of MSPM will be judged by your hand-ins and how well you modify the plan to match your actual experience in this class. The object is NOT for you to become a world-class MSPM jockey, but that you become familiar with its basic uses.

Bootstrapping the project.

It would be nice if you already knew PM so that you could easily setup the project on your own, but clearly, PM should not be a prerequisite for this PM course. Presumably, you don't yet know PM, so to allow an easy boot up take a look at the diagrams below and my instructions on setting up the project. Also quickly skim over the little Lewis book in the first week or so. The object is not to learn all of PM from this little book, but to get a quick overview of what you will have to do.

The outline below follows a book by the same author as our little book Lewis, James P. (2006) "Project Planning, Scheduling, & Control", 3rd Ed. McGraw-Hill (2001). ISBN 0-07-136050-6. This one contains much more than an introductory outline. It contains 549 pages of very accessible wisdom best appreciated only after having "lived a little" (done at least one project).

I can strongly recommend reading this book after taking the course. You will then be in a much better position to understand his commentary and aphorisms based on his years of experience.

I Project Definition I did this for you, but you might have to elaborate on it in an assigned report/essay.

Concept, Problem Statement, Mission & Vision.

II Planning To be done BY YOU later.

Examine alternatives, evaluate, develop implementation plan.

III Implementation To be done BY YOU later.

MSPM To be done by you now and later [See 6 below].

Plan review

IV Execution & Control To be done BY YOU later.

V Closedown & Learn To be done BY YOU later.

Project Review (Reflections & Retrospective, file all artifacts)

Close out

6. (from III above)

- **Develop the WBS (Work Breakdown Structure) now.**
 - **Task list**
 - **Which resource does what task (see resource list above)**
 - **Task time length**
 - **Task non-person resource needed?**
 - **Costs [a little later] of task depends on time & rate**
- **Network Diagram: To be done by MSPM.**
- **Critical Path To be done by MSPM.**
- **Resource Allocation To be done by BY YOU & MSPM later**
- **Gantt Chart To be done by MSPM**
- **Baseline Costs/EVA To be done by BY YOU & MSPM later**
- **PCTS & SWOT* Review To be done by BY YOU & MSPM later**
- **RISK Analysis To be done by BY YOU & MSPM later**

* **P, C, T, S** are **P**erformance (quality), **C**ost (labor), **T**ime (schedule), and **S**cope (tasks).

* **S, W, O, T** are **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats [done pre risk analysis].

APPENDIX 2: THE INITIAL PM COURSE SCHEDULE WITH DELIVERABLES

Wk	Content & Assignments (12)	Readings
1	Intro to course, PM, Management, & Project Assignment #1 Download & install MS PM2003	Reading: Ch 1. & Lewis Do the MSPM tutorial.
2	Systems, organizations, IS project Life Cycle Assignment #2 Put in this schedule as a task list in MSPM with dates and dependencies.	Reading Ch 2&3 (to pg. 80) email .mpp by mid wk 3. Read Appendix A
3	9 knowledge areas & Case study. Assignment #3 Put in your estimates of how much time you will need for each task.	Reading Ch 3 & 4 (to 119) email .mpp by mid wk 4. Read Appendix A
4	Case study & <u>Integration</u> -Strategic Planning Assignment #3 Put in your estimates of how much cost there will be, and save a baseline.	Reading Ch 4. & Lewis email .mpp by mid wk 5. Read Appendix A
5	<u>Scope</u> Management Assignment #4 Go back and fix up your tasking.	Reading Ch 5. Quiz on 1 & 2. email .mpp by mid wk 6.
6	<u>Time</u> Management Assignment #5 Go back and update your schedule.	Reading Ch 6. Quiz on 3 & 4. email .mpp by mid wk 7.
7	<i>Midterm (everything to end Ch. 6). Catch up</i>	Catch up
8	<u>Cost</u> Management Assignment #6 Go back and update your costs.	Reading Ch 7. & Lewis email .mpp by mid wk 9.
9	<u>Quality</u> Management Assignment #7 Do a QA on your project and report - honestly. Problems & Fix-Suggestions	Reading Ch 8. email write-up by mid wk 10. Quiz on 7
10	HR Management Assignment #8 Write a short essay on your personal PM problems. Discuss possible social and ethical conflicts in PM.	Reading Ch 9. email write-up by mid wk 11. Quiz on 8
12	<u>Communications</u> Management Assignment #9 Write a short essay on the good and bad of communicating in this online environment. What differences would exist if you were in an international company?	Reading Ch 10. email write-up by mid wk 12. Quiz on 9
13	<u>Risk</u> Management (its late to consider this) Assignment #10 Write a short essay on the risks, if any, you have found in this process.	Reading Ch 11. email write-up by mid wk 13. Quiz on 10
14	<u>Procurement</u> Management (not relevant) Assignment #11 Update your project. Send final .mpp to me by email. Title it with your name. #12 Write a short retrospective on this course.	Reading Ch 12. mail .mpp & write-up by mid wk 14
14	<i>Final Exam to end of Ch 12.</i>	NOTEBOOKS in by final.

APPENDIX 3: GRADING RUBRIC FOR THE WORK BREAKDOWN STRUCTURE (WBS)

Quality-Scale	Excellent	Good	Just OK	Poor	Fail	
Point-Scale	5	4	3	2	1	
<u>Requirements Interpretation</u>	Exceeds All	Exceeds Some, Meets All	Meets All	Meets Most, Fails Some.	Fails Most or All	SCORE (5-1)
<u>Task List</u> (SCOPE)	Is complete and detailed. Includes all meta-tasks.	Is complete and detailed. Missing some meta-tasks.	Is complete. Missing some detail & some meta-tasks.	Incomplete.	Most Tasks missing or poorly done.	
<u>Schedule</u> (TIME)	Reasonable, good milestones, & meets deadline.	Reasonable, misses some milestones, but meets deadline.	Reasonable, misses some milestones, & misses deadline.	Not Reasonable, misses milestones, & misses deadline.	Missing most or poor.	
<u>Resource Loading</u> Choices of who does what for how long - with Resource Leveling	Reasonable & Complete. Reasonable allocation. Uses Resource Leveling.	Mostly reasonable choices, complete & reasonable allocation. Leveling	Partly reasonable choices, complete & allocation done. Some Leveling	Some allocation missing or unreasonable or incomplete or no leveling	Missing or poor. No leveling.	
<u>(COST)</u> Choices of hourly rates and fixed costs if needed	Reasonable Complete Rates & Costs Choices	Mostly reasonable & complete costs & rates.	Partly reasonable & complete costs & rates	Many missing, unreasonable, or incomplete	Mostly Missing or poor choices.	
<u>Critical Path & Gantt Chart</u> [Inherent in MSPM w/ Tracking Gantt]	Both laid out well. Complete	Both laid out well. Some missing data	Both Exist.	One or both partly Missing.	One or both missing.	
In on time	In on time.	Slightly late.	In late.	Very Late.	Not in.	
GRADE MAX 30, MIN 6	A if ≥ 26 30 - 26	B if ≥ 21 25 - 21	C if ≥ 16 20 - 16	D if ≥ 11 15 - 11	F if ≤ 10 10 - 6	Total Points
0 - 100	100 - 90	89 - 80	79 - 70	69 - 60	59 - 0	

APPENDIX 4: THE PROJECT MANAGER'S NOTEBOOK REQUIREMENT

Buy a Bound (NO METAL SPIRALS) Quadrille Notebook [~\$1.75]

One with a left margin line is best.

This is THE ONLY PLACE ON EARTH THAT YOU WRITE, DIAGRAM, OR DOODLE ABOUT YOUR *Project*. This is not usually a class notebook (although in this class, by virtue of the weirdness that the class IS the project, your notebook will be both a project notebook AND a class notebook!). It is not a personal diary. It is like a diary but without the personal information, but with time spent details and activity details. Decision points are highlighted. It is not used for ANYTHING else.

IT WILL BE GRADED. The grading rubric for the Project Manager's Notebook is very simple. How much was it used to document in detail the activities and progress of the PROJECT and the MANGER'S interactions.

I recommend that every page should be sequentially numbered. Each new topic or activity starts with a line across the page and a date in the left margin with a short descriptive name in the margin. Some people put in a date and topic centered in-line below the page-width divider line. You can make margin notes to keep track of the structure of the notes, e.g., I use circles for TO-DO items and I cross them out when they get done. Some people put in a running topic index / table of contents in the last few pages of the notebook.

Project meeting notes also go in here, as do phone numbers and IDs of project colleagues (if any). No page-width line is put in until the start of the next topic. Interpolated sections from other topics are marked by a vertical mark in the margin and the name of the topic. Remember: paper is cheap.

You can add in small listings, or other documents from outside sources, using adhesive tape (staples tear pages). There should be no other paper you use to write on! The modern problem is tracking electronic assignments and decisions in the paper notebook. Some institutions maintain a purely electronic notebook. It is not practical for a student to depend on one. One student used a tablet PC, which went down during an open-notes final exam.

Only IMPORTANT email (decision agreements) are pasted in.

Put your name, course #, course title, project name, and semester dates on the front outside. Put your address, phone number and email ID on the inside front cover so that when you lose it, the finder can contact you for pickup. Near your info, put a polite request to the finder to return your notebook - it can help.

If you have a patentable idea, document it in great detail, with tutorial comments and immediately get (or leave space for eventually getting) two colleagues to read and UNDERSTAND the idea. Then have them write, sign, and date the statement that they have read the idea and have understood it. Their date may be different from your writing data. That is OK. This is why the book must be bound, every page numbered, and every item dated - so that there can be no question about the idea pages being inserted at a later date. You too can win a patent-law suit for billions of dollars [lasers] based solely on this kind of documentation of a good idea.

YOU WILL HAND IN THE Project Manager's NOTEBOOK at the end of the course for grading. It will be returned.

Many students have a problem with this activity because they have forgotten how to take notes and how to write. This activity will be good practice. The real reasons for the project manager's notebook are many and varied, among which are meeting legal requirements for documenting decisions, archiving problems encountered and solved, and merely as an extra somatic memory for you to keep track of your to-dos and your scheduling progress.