Project Management Course Design for Workforce Development

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Abstract

With the rising cost of college and the impending enrollment cliff, it is more important than ever that colleges and universities deliver value to the learner in order to compete for students. One way to do this is through a course and curriculum design approach that emphasizes the importance of students' post-graduation outcomes. This author has opted for such an approach, which he calls *workforce development*, defined as educational program design that aligns closely with a student's next steps after graduation. This paper provides an example of a course redesign in an information systems project management course. A series of 11 assignments and activities were developed and are described here. Students are asked to identify project-related career goals, search for a prospective project management job, complete assignments related to project management work as it applies to their goals and project, update their resume, and pass technology and certification tests. Workforce Development can be used throughout the information systems curriculum, and specific suggestions are provided. For this instructor, it requires a more adaptive, nimble approach to content than what normally happens in a textbook-driven course. Future directions include enhancing assignments to further incorporate workplace best practices, a focus on behavioral skills and ethics, and providing for alternative career paths, such as graduate school or entrepreneurship.

Keywords: workforce development, curriculum development, project management, work-based teaching

1. INTRODUCTION

This paper describes a redesign of a graduate-level Information Systems (IS) Project and Change Management course to be better suited for preparing students for post-graduation outcomes. The approach emphasizes career readiness preparation, providing students with skills, experiences, and expertise, relevant to their futures. Career readiness is commonly emphasized by accreditation bodies and curriculum models and standards like NACE (Competencies for a career-ready workforce, 2021). The approach advocated here is intended to be consistent with these well-accepted standards. However, the application of career readiness here specifically focuses on workforce preparation in general, on jobs in particular, and on engaging students to focus on their post-graduation goals. The motivation for the change came from forces, particularly competition for enrollments, that are or soon will be affecting all colleges and universities.

The impending enrollment cliff phenomenon (Drozdowski, 2023) hovers like a dark cloud over colleges. Due mainly to declining birthrates emanating from the economic downturn of 2008, the number of 18-year-olds is expected to decrease by 15% over four years starting in 2025. The question facing universities is "what are we to do if our enrollments drop?" A common answer has been "we don't know, but we need to keep the students we have and get them to graduate." The enrollment cliff plus the rising cost

of college speaks to the importance of making the college experience as valuable as possible.

The career readiness approach developed here is called *workforce development* and is defined as "educational program design that aligns closely with a student's next steps after graduation." It is somewhat inspired by and loosely connected to the work-based learning (WBL) toolkit (https://cte.ed.gov/wbltoolkit/) which provides a three-pronged framework for educators.

The first opportunity for a course redesign was in a summer offering of IS Project and Change Management in a small section of six (which ended up being five). Thus, the summer class was taught using the workforce development concept as it was evolving.

The purpose of this paper is to describe the changes made to transform the course into an exemplary, pilot, workforce development course in an IS degree program. The remainder of the paper describes the 11 assignments and activities used in the project management course, followed by suggestions for using workforce development in other courses. Appendix A contains a detailed example of an assignment. Other assignments are available from the author upon request.

2. WORKFORCE DEVELOPMENT ASSIGNMENTS

The workforce development approach manifested itself mostly in changes to assignments and testing. The assignments begin with the student providing an individual, professional bio, and then follows a thread in which each assignment is linked to the output of the assignments that came before. It became apparent that with each activity, it is crucial to emphasize its importance and relevance to the student's workforce preparation. The key questions to ask are "why is this topic important for workforce development? And how?" Providing importance is consistent with the best practice of assignment transparency.

Topics kept, because of importance, required that assignments and tests be designed in the most authentic way possible. Accomplishing this is a work-in-process. The assignments and testing activities are listed in Table 1 below. In the next sections, each of the course activities is described.

Professional Bio
The bio asks them about themselves and their goals. The key question is *where do you want to be in five years?* It gets the student oriented towards thinking about their career objective.

Assignment	Description
Professional Bio	Tell me about your background and where you want to be in 5 years
My Job Ad	Find a PM-related job ad that interests you
My Project	Describe a project you would like to manage
Success Project	Find a modern, classic, or ancient project that teaches a success lesson
Waterfall Project Plan	Create a plan for the My Project using AI and predictive methods and tools
Agile Project Plan	Create a plan for the My Project using AI and agile methods and tools
Teaching Talk	Create a professional 5-min presentation on a topic: a course topic, a technology, or your project plan, and present it in class
Technology Demonstration	Bring your laptop and complete an in-person technology assignment on a given tool (or earn a technology badge and provide the certificate)
2-Part Reflection	(1) Assess yourself on PM skill areas using relative scoring metric (2) Write a reflective essay (white paper on usefulness versus drawbacks of using AI in project planning)
My Resume & Cover Letter	Update your resume with knowledge and skills learned and write a cover letter to apply for the My Job Ad position
Certification Test	Take and pass a four-part exam with fact-based and scenario-based questions to become "certified" in PM knowledge

Table 1: List of Workforce-Development Assignments for PM

My Job Ad and My Project
These two assignments are combined into one. On the My Job Ad, they were to find a project

management related job ad from a job search website. They were given job titles, such as project manager, assistant project manager, engagement manager, and Scrum master. They could use job search websites, such as Indeed.com or LinkedIn. The job ad would contain a lot of information, including information about roles and responsibilities, salary, requirements, and information about the hiring firm.

The My Project assignment was up to them. Their task was to identify and briefly describe a project they would like to manage, ideally, if they were in the position of the My Job Ad, and given the future goals stated in their bio.

Success Project
They were given links to websites such as the Project Management Institute (PMI) award-winning projects-of-the-year site. They were required to select a successful project from these or some other source and identify lessons learned from the successful project that might apply to the My Project they were to study.

Waterfall Project Plan
The textbook used in the course had a good section that contrasted project management methodologies in two main approaches: waterfall and agile. The students were assigned to create a project plan for their My Project in each of the two methodologies.

During the first half of the semester, they learned about stakeholders and stakeholder analysis, defining a project's measurable organizational value, the project quadruple constraint, the project charter, scope, scheduling, MS Project Pro, Gantt charts, milestones, and earned value management (EVM). All of these topics except EVM were covered on the Waterfall Project Plan assignment. In addition, they were required to use AI, ChatGPT in particular, to help generate the scope, schedule, and cost estimates for their unique My Project. They then fed the results from ChatGPT into Project Pro to generate a plan. They completed a project charter and stakeholder analysis and wrote a report using a template that was provided.

Agile Project Plan
Following the waterfall assignment, the students then re-created their plans for an an agile approach, using Scrum methods and the Trello software tool. They were again to use ChatGPT. This time they prompted the AI tool to generate user stories, tasks, sprints, and a Scrum team of specialists with estimated hourly rates based on geographic location. They reported this plan and included a screen snapshot from Trello, showing a user story broken out into a Scrum board.

Teaching Talk
Each student was required to make a five-minute, in-class presentation, using a visual aid, on a topic. The topic was either a class topic, a technology demo, or a presentation on their My Project. The importance was to give them practice researching a work-related topic and knowing it well enough to making an effective professional talk in front of people, answering questions, and ultimately reflecting on and stating the importance/relevance of their topic.

Technology Demonstration
As part of the final exam, each student was given an in-person test on the use of two technologies, Project Pro and Trello, each of which was used on prior assignments. The importance of this type of test was to reinforce the work needed for technology mastery, which is valued by industry. A possible extension is to allow them to earn an official badge offered for passing the vendor's own test.

Two-Part Reflection
The two-part reflection required them to assess themselves in four areas: stakeholder management, project planning, leadership and change, and technologies, using a 10-point scale for each but allocating a total of 25 points out of 40 possible. The importance of this relative scoring metric (Shropshire, Landry, & Presley, 2018) is to force them to allocate points unequally so as to more accurately assess their strengths and weaknesses. The second part was to have them write a reflective essay on a topic related to workplace issues. They wrote a brief essay on the benefits and drawbacks of using AI in project management. The importance was their having to reflect on the productivity and ethical issues of using a new technology on the job, on how these decisions impact the firm and people.

My Resume and Cover Letter
The students were asked to take their current resume and tailor it for the My Job they had selected. They had to update it to include what they learned in the class. The cover letter was supposed to include a narrative of their suitability for the job, given their current knowledge, experience and skill.

Certification Test
Branding the traditional final exam as a "certification test" serves to remind students that proctored written tests are part of certifying one's professional knowledge to potential employers.

The challenge is to write questions that are more certification-like, that is, related as much or more to professional practice than academic testing usually does. There are sample questions available for certifications such as the Project Management Professional (PMP). Such test items should include those on fundamental vocabulary, applied problem-solving, and workplace scenarios. Like certification tests often do, the test was broken out into four topical sections: stakeholder management, planning methodologies, leadership and change management, and technologies. Scores on each section were reported as well as the total score.

3. OBSERVATIONS

The results are summarized here as observations on what was seen as surprising, valuable, or a lesson learned.

The Professional Bio was the easiest assignment, while the Waterfall Project Plan was the most difficult. In fact, the first few assignments, which were Professional Bio, My Project, My Job Ad, and Success Project, could all be done as one. The overarching objective is to get students thinking about themselves and their future, and how the course ties in. A lesson learned is to do just that: combine the assignments into a single assignment making the thread among them clear from the outset for a fast start.

In the past, the project management course relied a lot on running cases in the textbook. Although the instructor liked this content and understood its value, it was becoming evident that students did not understand them well enough, nor seemed particularly engaged. They had trouble recalling key facts across successive weeks, for example. To make way for the new assignments, the running case assignments were scrapped or incorporated into lecture and discussion.

Instead of the textbook cases, the students were developing their own running cases, through the MyProject and related planning assignments. The most interesting aspect of these assignments was the use of ChatGPT to generate content towards their individual project plans. Students needed to learn that ChatGPT is not a search prompt on a web browser, but a more conversational tool. The students quickly got the hang of it. A point of emphasis was not to make up data, such as the salaries of the project team, but to use the generative AI tool by being as specific as possible as to the position, experience level desired, region, etc., to generate specific results needed for their My Project. (A lesson learned was to specify to them when *not* to use AI/ChatGPT on assignments). See Appendix A for an example assignment that includes suggested prompts and guidance on the use of ChatGPT.

The workforce development approach required an adjustment in technology skill offerings. In the past, Microsoft Project Pro and Office tools were the only ones used in the course. Textbooks typically provide useful tutorials and assignments in these commonplace technologies. However, a recent Wall Street journal article on current technology skills (Captain, 2023), based its results on a survey of LinkedIn jobs, provides a different reality. The article was interesting because it created a picture of a workplace with new technology everywhere. The tools identified were not just the Office tools and not just for the technical jobs, but for all jobs. It called for not just familiarity but depth. Among the technologies were several in the project management category, which thus matched this author's course.

What we learned was that most of these tools, although not free, could be used for free on a temporary (e.g., 30-day) basis. In the case of Trello, students were willing to voluntarily learn it and use it to create a Scrum board for their agile plan, rather than the alternative of drawing it in a presentation software tool. We also learned that for the software projects they selected, all of them seemed suitable for a waterfall or an agile approach. However, that might become an issue based on a particular project's match with one or the other approach. In that case we would have to adapt by modifying the project definition where it is a misfit with the approach.

One of the results of the teaching talk assignment was realizing the importance of what students were learning. We ended up challenging the student speakers, and the instructor himself, to answer the "why" question for each topic. Why is this topic important (in a practical workforce development sense)? For example, for Kanban or Scrum board, the importance was that "it focuses the team on completing work." It was specific, not vague, focusing on a benefit of the concept. Kanban/Scrum boards are a tool that visually shows the status of work as tasks move from the "to-do" status to "doing" and then to "testing" and then to "done." A common problem is projects failing to finish, or coming in very late. Kanban, as a solution, helps focus the team on getting tasks done by visualizing the status all the way through. The effort to define importance was done for as many topics as possible, and students

were encouraged to do it themselves in the teaching talks and during exam study.

The best teaching talks were those that gave practical examples or had material beyond the textbook that informed. One student talked about the so-called *Bermuda Plan* of letting the rest of the team go on vacation while the core players finished the project, as a remedy to Brooks' Law of "adding people to a late project makes it later." Students polled at the mid-point of the semester agreed that examples and useful applications of the concept were most desired as improvements in future talks.

A lesson learned is that students did not understand the relative scoring metric, nor were effective at self-reflection. Improved guidance in this assignment is needed, and the use of an ePortfolio learning tool might be leveraged to help. Such a tool prompts the student for self-reflection on their learning experiences, which they document in the tool accessed in the course management system. Potentially, the student reflections can be made available through the software to be viewed by prospective employers.

One student got the spirit of workforce development. She found a change management certification (www.prosci.com) and mentioned it in her cover letter. A lesson learned would be to supplement lecture on change management concepts and strategies with the self-help and practical orientation of a certification. This student truly understood the assignment from the workforce point of view.

4. WORKFORCE DEVELOPMENT ACROSS THE IS CURRICUM

This section offers guidance into the use of workforce development strategies across the curriculum. Early in the curriculum, the students are new to the major and so the focus should be on exploring career options by using guest speakers, career exploration research, and looking ahead at elective choices. A possible exercise is a portfolio-based values affirmation activity where students will explain the importance of their self-identified values, and use these to explore career options in the major. Freshman seminar courses or the introduction to IS course are good places for these activities. In a data management course, the student can be given the professional bio exercise to report a their favorite recreational activity; then, in a subsequent spreadsheet assignment, students can create a worksheet for that activity. Students typically will give a list of books read, movies streamed, workouts completed, or video games played. A simple database can be constructed to expand their recreational activity sheet into a more three-table database. In an information security course, ChatGPT can be used to develop threat scenarios and defense recommendations. For example, "create a threat tree for a ransomware attack" could be a prompt. In the IS strategy and policy course, ChatGPT can be used to provide examples of Porter's competitive forces model. Competitive strategies and uses of IS within the student's specific industry of choice can be generated with ChatGPT prompts, and the teacher can use this approach to generate additional class examples. In the systems analysis and design course, student teams can conduct a virtual team meeting in Zoom, for example, with students running the meeting themselves and learning a series of features and best practices that can become the basis for a badge. In the capstone course, resume updates, mock interviews, and guest speakers are commonplace best practices, and students can reflect on what they have learned using the ePortfolio tool.

5. CONCLUSIONS

Shifting to the workplace development initiative enabled the instructor to make the course more learner-centered. Students were made to think about and select their own job, project, and success project. Another benefit is that the linkage between assignments, with the output of one becoming an input into the next, was logical, efficient and reinforced prior learning. For example, the use of AI made researching their unique projects easier, as well as providing practice with a trending tool. It was not difficult to decide which assignments to give up. They were mainly assignments on the textbook running case. Some of these were kept as in-class examples for discussion.

The approach had some challenges. One was that software tools used on assignments relied on temporary licenses with capabilities and free cost uncertain moving forward into future semesters. Another is that over time, as the selected software tools change according to industry demand, frequent changes to the course may be required. The workforce development approach requires instructors to be nimbler and more adaptive with content. For larger class sizes, the one-on-one technology tests could become cumbersome.

Future Directions

Suggested future directions revolve around

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further developing activities to support specific workforce skills and behaviors and supporting alternative career paths. The work-based learning (WBL) toolkit provides guidance such as using industry partners to define workplace specific guidance. Another suggestion is getting students to pursue specific industry-based technology badges as a substitute for the technology tests where appropriate. This would help with the complexity of technological testing. More behavioral skills should be developed such as mock job interviews and role-playing activities that simulate workplace scenarios, including the application of ethical principles.

Currently, jobs are the focus of post-graduation next steps. When used in an undergraduate class, consider substituting graduate school admission as a substitute for job application, and modify assignments accordingly. Students opting for an entrepreneurial career can be supported, too.

6. REFERENCES

Captain, Sean. (2023). "The technology skills every employee should have today." *The Wall Street Journal*. Retrieved March 20, 2023 from https://www.wsj.com/articles/technology-skills-employees-should-have-fdc6c0ba

"Competencies for a career-ready workforce". (2021). National Association of Colleges and Employers (NACE). Retrieved August 30, 2023 from https://www.naceweb.org/uploadedfiles/files/2021/resources/nace-career-readiness-competencies-revised-apr-2021.pdf.

Drozdowski, Mark J. (2023). "Looming enrollment cliff poses serious threat to colleges." BestColleges. Retrieved August 30, 2023 from https://www.bestcolleges.com/news/analysis/looming-enrollment-cliff-poses-serious-threat-to-colleges/#:~:text=So%20if%20you%20graph%20demographic,will%20lose%20approximately%20576%2C000%20students.

Shropshire, J., Landry, J., & Presley, S. (2018). Development of a Metric for Assessing Full-Stack Developers' Expertise.

APPENDIX A
Guidelines for Agile Planning Assignment

Purpose:

Skills: The purpose of this assignment is to gain practice doing project planning for an agile (i.e. Scrum) methodology. Skills to be learned include:

- Creating a product backlog and small project team including agile roles
- Defining a series of agile sprints to complete the product backlog
- Estimating the schedule and budget for the project
- Tracking a sprint using a Scrum board tool

Knowledge: To prepare for this activity, you need to…

- Have successfully completed the predictive planning assignment
- Have knowledge of the agile methodology concepts, principles and tools, including Scrum

Tasks:

Develop a plan for the project you developed in the earlier assignments. You are to create a plan in six (6) parts: 1-Product Backlog, 2-Sprint Plan, 3-Agile Project Team, 4-Schedule & Budget Analysis, 5-Scrum Board, 6-Report.

Parts 1 - 4

It is highly recommended that you use ChatGPT to generate workable plans for the agile version of your project. Use prompts such as these and refine the results as needed.

- "Create an agile project plan for the <your specific> project with backlog and sprints"
- "Create agile project roles for the project team with a development team of no more than five"
- "Estimate hourly pay rates for each member of the project team"
- "Create a schedule and budget estimate from the agile plan"

You may, for example, prompt ChatGPT to estimate the amount of time each team member will contribute to each sprint in order to get a good budget estimate. If ChatGPT omits a role, such as Product Owner, follow up with a command such as "Describe the qualifications for the role of Product Owner for the project and estimate hourly pay rate and hours per week."

Part 5 - Scrum Board

Track activities by moving them into the various swimlanes as you might expect would happen at the midway point of a sprint. Use ChatGPT, if you like, to estimate the progress at one-week into the first (2-week) sprint with a command such as "estimate the status of activities at the one-week point in the first sprint, using a Scrum board". Then draw the Scrum board with the following swim lanes: To-Do, Doing, Testing, and Done, or whatever ChatGPT gives you. You are encouraged to use a tool, such as Trello, to create the Scrum board. You may, however, use an even simpler tool, such as a table in MS-Word or MS-Powerpoint. Use actual data from your sprint plan to generate the Scrum board.

Part 6 - Report

Write a report using the agile report template; this report summarizes your plan and explains how you came up with your estimates.

Turn in as an attachment, your report, named **agile_plan<YourProjectName>.doc** or **.docx**.

Criteria for Success:

A well-written report that contains the following:

- a complete product backlog with user stories and features & tasks (20%)
- a complete sprint plan to complete the product backlog with details (20%)
- a project team with all key roles and no more than five (5) members of the dev team (20%)
- accurate schedule and budget estimates (20%)
- a complete and accurate Scrum Board (20%)

Common mistakes:

- *Procrastination: waiting too late to start the project*
- *Leaving out key roles on the project team*
- *Miscalculation of costs*
- *An incomplete report*