The Use of the Electronic Portfolio in Evaluating and Assessing the Efficacy of Graduate Project Management Education

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Abstract

Colleges and universities are under pressure from a variety of stakeholders to demonstrate evidence-based, authentic assessment results. The purpose of this case study was to describe one private university’s Master of Science in Project Management (MSPM) degree program’s use of the electronic portfolio (ePortfolio) capstone project as a programmatic assessment instrument. The ePortfolio provided a multidimensional assessment tool, showcasing mastery of the National Project Management Standards and Practices through evidence (artifacts) collected during the coursework. Trends identified during the annual review revealed a disparity of program outcome achievements for students in the online program compared with students in the traditional classroom format. These trends were later labeled dependencies. As evidenced by the ePortfolios, the student’s success in the program was too dependent on the delivery mode, campus location, and the professor teaching the class. The dependencies were analyzed and intervention strategies implemented to reduce the effect of the dependency. A master ground-template (electronic course shell) was created for each of the six project management core courses and the capstone course for use in the traditional classroom format. The ground-template serves as a
mechanism to provide consistent information to the professors and students, regardless of location. Through the collaborative inputs from content and design experts, the focus of the ground-template is providing a content-rich resource for the professor. This approach provides a platform for consistency of a curriculum, regardless of delivery mode, campus location, or professor.

**Literature Review**

The literature review provides context for the decision to use ePortfolio as a means of programmatic review for a Master of Science in Project Management program at a private university. The review starts with a brief background of the transition from paper-based portfolios to ePortfolios. The review describes how ePortfolios are being used within undergraduate and graduate education and shows that ePortfolios have gained traction, particularly within programs to show personal development for teacher education and medical training. ePortfolio literature from the higher education field is summarized and the use of ePortfolios as a tool for program evaluation and assessment is described. The review ends with a brief description of the literature criticizing the use of ePortfolios for student-centered learning and recommendations from the literature for implementing a successful ePortfolio program.

**From Paper to Electrons**

The first use of student-developed portfolios dates back to the 1960s (Ehley, 2006). Before that, portfolios were used by artists and designers as a means of collecting and displaying their work (Chatham-Carpenter, Seawel, & Raschig, 2009). Portfolios were very popular, beginning in the 1960s through the early 1990s, because of a widespread belief within the liberal education movement that portfolios provided a
means of authentic assessment. According to F. Leon Paulson and Pearl R. Paulson, pioneers in the use of portfolios for educators:

A portfolio is a purposeful collection of student work that exhibits the student's efforts, progress, and achievements in one or more areas. The collection must include student participation in selecting contents, the criteria for election, the criteria for judging merit, and evidence of student self-reflection. (Paulson, Paulson, & Meyer, 1991, p. 60)

Ehley (2006) provided evidence of extensive use of paper-based portfolios for authentic, reflective, and normative assessments between the 1960s and 1990s. However, Yancey (2009) asserted that paper-based portfolios were used in a limited manner for summative assessment in a single course. Paulson et al. (1991) argued that a portfolio, by definition, featured a student as “a participant in, rather than the object of, assessment” (p. 63).

The popularity of paper-based portfolios waned in the early 1990s due to national education reform toward standards-based assessment (Ehley, 2006). Portfolio use surged in the mid-1990s as programs shifted toward storing documents in electronic format. ePortfolios became very popular among higher education institutions as a “tool to enhance learning, conduct assessment, meet standards, and increase student employability” (Chatham-Carpenter et al., 2009, p. 438). The swing from favor to disfavor back to favor is consistent with Gartner’s hype cycle (O’Leary, 2008). Looked at through hype cycle lens, the portfolio (as a technology or tool) may have been in the trough of disillusionment. The transition to electronic portfolios could be viewed either as
the move to the slope of enlightenment or as a trigger for the ePortfolio hype cycle (see Figure 1).

![Gartner Hype Cycle illustration](image). Each Hype Cycle drills down into the five key phases of a technology's life cycle. Source: (Gartner, 2011)

The 2006–2009 Gartner Hype Cycles for Higher Education showed ePortfolios sliding into the Trough of Disillusionment (Zatrosky, Harris, & Lowendahl, 2006). The 2010–2011 Gartner Hype Cycles depicted ePortfolios on the Slope of Enlightenment, indicating that ePortfolios are being perceived in new and useful ways (Lowendahl, 2011).

**The Role of ePortfolios**

With the advent of electronic portfolios (ePortfolios), student portfolios adopted a greater role in documenting learning within and across courses and experiences, sometimes beyond the bounds of the formal educational environment (Yancey, 2009).
Butler and her colleagues (2006) documented several purposes for the use of portfolios: learning, professional development, normative assessment, summative assessment, and career advancement. Chatham-Carpenter et al. (2009) described four purposes for ePortfolios: facilitating reflective learning, showcasing career skills, showcasing professional standards, and assisting with program review and assessment. ePortfolios are used in so many ways that Barrett (2007) argued that “the term portfolio should always have a modifier or adjective that describes its purpose” (p. 436).

The National Learning Infrastructure Initiative defined an ePortfolio as:

A collection of authentic and diverse evidence, drawn from a larger archive representing what a person or organization has learned over time, on which the person or organization has reflected, and that is designed for presentation to one or more audiences for a particular rhetorical purpose. (The National Learning Infrastructure Initiative as cited in Barrett, 2007, p. 438)

Educational portfolios expanded upon traditional portfolios through learner collection, reflection, and selection of educational artifacts. Unlike traditional portfolios that highlight the best artifacts, educational artifacts were chosen to demonstrate growth and change over time (Barrett, 2007). The focus on student reflection and selection of artifacts was informed by the literature on reflective practice (Schon, 1987), preparing students to adapt prior practice to new situations and to articulate experience and growth. This process extends beyond reflective commentary, encouraging students to exercise higher order thinking to “learn what one has learned” (Wang, 2010). Through development of an ePortfolio structured to demonstrate PMI competencies, learners transition beyond their experiences as students and project themselves as
professionals. The model of reflective practice also initiates a process for future professional development, where critical inquiry draws on insight into personal learning and one’s assumptions about professional practice (Webster-Wright, 2009).

The Benefits of ePortfolio Use

The benefits of ePortfolio use include development of narrative skills to identify strengths, reflection on personal development, and formulation of professional identities (Graves & Epstein, 2011). A majority of students view ePortfolios as a useful learning tool and consider it to be an important assessment component in a course (Yusuf & Tuisawau, 2011). Portfolios help students focus thinking, translate theory to practice, document progress over time, improve communication and organizational skills, recognize a prior knowledge, and identify learning outcomes (Butler et al., 2006).

According to Buckley, Coleman, and Khan (2010), the highest quality studies (quality was based on analysis against Kirkpatrick’s hierarchy) showed that properly implemented ePortfolios improved the integration of theory with practice, encouraged self-awareness and reflection, and supported “students facing difficult emotional situations” (p. 187). Barrett (2007) described the value-added benefits of ePortfolio over paper-based portfolios as archiving, linking and thinking, storytelling, collaborating, and publishing.

Online storage provided excellent accessibility for ePortfolio owners, instructors, colleagues, and employers (McCowan, Harper, & Hauville, 2005). ePortfolio development helped develop the technical skills needed to maintain online professional identities and enhanced professional networking skills (Kryder, 2011). ePortfolios
allowed for the use of multimedia artifacts (Boggan & Harper, 2009). In addition to providing a digital display of professional competencies, ePortfolios enabled program administrators to conduct comprehensive assessments of curriculum and learning outcomes (Wang, 2009). ePortfolios may also be used as a form of data collection for accreditation agencies (Boggan & Harper, 2009). According to multiple authors, the field of educating teachers is the most advanced in terms of the use of ePortfolios (Buckley et al., 2009; Buckley et al., 2010; Butler et al., 2006; Chatham-Carpenter et al., 2009).

**Programmatic Review**

Boggan and Harper (2009) noted that ePortfolios have been used to prepare for accreditation reviews. ePortfolios were identified as an ideal tool to provide a programmatic review for a course or a program (Strivens et al., 2009) and specifically as a programmatic review tool within graduate-level programs (Moore, Tatum, & Sebetan, 2011). As described in the *Chronicle of Higher Education*:

> The tasks of setting institution-wide goals and overseeing faculty practices and curricula "are now more in potential for alignment than they probably have ever been," she said. "And part of that is because we now have the evidence that can be collected and shared in e-portfolios." (Basken, 2008, p. A30)

Walvoord (2010) described three steps of assessment that coincide with accreditation reviews: (1) goals—determining what students should be able to do at the completion of a program; (2) information—developing measures of how well students are achieving the goals; and, (3) action—using the information to improve the student learning.
Criticism of ePortfolios

Although in theory ePortfolios were believed to yield benefits for learning, in practice, ePortfolio use often leads to confusion and frustration (Chau & Cheng, 2010). Deneen and Shroff (2010) explored whether the benefits of ePortfolio use outweighed the costs involved in information and communications technology (ICT) literacy. Their conclusions were affirmative, but included significant cautions regarding technology challenges that may be addressed through time, structure, and diligent effort.

An and Wilder (2010) cautioned that successful implementation of ePortfolio required significant attention to process and work flows. Dietrich and Olson (2010) reported that administrators expressed concerns over the potentially excessive amount of time required to use ePortfolios as assessment tools.

Criteria for Success

The literature has numerous research and case studies offering advice for successful implementations of ePortfolio. The recommendations are provided in diverse areas such as stakeholder management, faculty and student engagement, program organization, mentoring and training, and information and communication technology (ICT) literacy.

According to Barrett (2007), the teacher’s role is critical to success. High-performing teachers (as judged by student engagement) effectively used reflection, metacognition, and other learning strategies to provide excellent feedback. Comprehensive ICT strategies, ICT skills, support systems, and collaborators were also
indicative of high levels of student engagement. Deneen and Shroff (2010) pointed to the need for ICT literacy and a well-designed program structure to contribute to successful ePortfolio implementation.

Shouhong (2009) proposed a model for improving reflective learning. The model was developed using inquiry as the primary means of directing the student through the portfolio process, thereby enabling high-quality reflective learning. Tindall-Ford, Waters, and Johnson (2010) described several requirements: thorough preparation of staff and students; ePortfolio assignments planned from the ground-up, not implemented as an overlay on existing assignments; the need for key stakeholders to agree on the criteria and function of the ePortfolio system; the use of recommended training and ongoing support; a positive and supportive culture; and availability of the ePortfolio to the students after graduating.

Dietrich and Olson (2010) stressed the importance of early agreement on the purpose of assessment and the need to promote cooperation among administrators, faculty, consultants, and program reviewers. According to Hallam and Creagh (2010), open dialogue and collaboration between stakeholders are critical. Granberg (2010) advised that it is necessary to overcome the tension between using ePortfolios for summative assessment versus for ongoing reflection and learning. Buckley et al. (2009) suggested that an ePortfolio program have the following features: reasonable time demands; support to develop reflective skills; portfolios designed to reflect training requirements; specific aims and objectives; alignment with course outcomes; clear guidelines on requirements, word count, and time commitments; and that the program be delivered with plenty of time to enhance reflective skills

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Colbert, Ownby, and Butler (2008) suggested that learners and faculty should be trained explicitly on process, purpose, structure, and content; mentoring should be considered, if necessary; and, evaluation rubrics should be used if the program intended to use summative assessment. An and Wilder (2010) described a preference for implementing ePortfolios using a bottom-up rather than a top-down approach. They also advised of the need for plenty of administrative support for faculty and students, systematic technical support, and shared faculty vision. Ehley (2006) recommended that the program be designed to ensure regular engagement with the ePortfolio and adequate ICT and process training for both students and faculty.

Case Study

Background

This paper describes the evolution of one private university's Master of Science in Project Management (MSPM) degree. As of fall 2011, the university had 16,619 students enrolled in undergraduate- and graduate-level programs. There are 130 satellite campuses in the United States, Europe, Middle East, and Asia. The classes are administered in five modalities: traditional classroom format (referred to here as ground courses), pure online format, video conferencing between campus classrooms, video conferencing between home computers, and a blended format merging online and classroom instruction.

The MSPM program accepted its first students in the fall of 2007. The program is administered in two modalities: online or on the ground. The ground course format is offered at ten of the university's 130 satellite campuses. Since its inception, the MSPM has graduated 124 students and another 38 students have completed the capstone and
are awaiting graduation. Its current declared student body is 384.

The MSPM's curriculum recognizes Project Management Institute (PMI) as the certification body and the global authority for the project management industry. There are six sequential project management core courses, five general management courses, and a capstone course (see Appendix 1 for MSPM program objectives and course learning outcomes). The curriculum and each of the core courses were developed by certified Project Management Professionals (PMPs). All of the professors who teach the classes have doctorates and are PMP credential holders.

MSPM courses were designed through a partnership between course developers (academically qualified with earned doctorates and professionally certified PMP credential holders) and instructional designers. Based on backward design and A Guide to the Project Management Body of Knowledge (PMBOK Guide), Table 3-1, Project Management Process Groups and Knowledge Areas Mapping, learning outcomes were developed to drive the assessments and activities. Online courses are fully asynchronous and are generated from templates that are highly structured with mandatory activities and assessments. Traditional ground courses meet synchronously during which the professor is provided with a course outline detailing the specific learning outcomes.

The MSPM culminates in a unique capstone: an ePortfolio. During the capstone course, students build an ePortfolio to showcase their mastery of the national project management standards and practices using evidence collected during the coursework. The students use A Guide to the Project Management Body of Knowledge (PMBOK Guide), Table 3-1, Project Management Process Groups and Knowledge Areas
Mapping (now referred to as the PMBOK® Guide Matrix), to shape the architecture of the ePortfolio (Figure 2).

Figure 2: Sample exemplar portfolio showing classification by Project Management Process Groups and Knowledge Areas.

By using the PMBOK® Guide Matrix, the students visualize subject matter organization and the industry's life cycle. This matrix creates a map tying the course work learning outcomes to real work industry applications. Throughout the six MSPM core courses, students are provided with assignments, which lead them to using established methods, processes, and practices of the profession. The transition from instructor-led activities and tests to student-centered projects represents a 'real world' application of the project management tools and techniques. As the students progress through the coursework, they are encouraged to organize and classify the coursework based on the PMBOK® Guide Matrix. This reflective approach encourages the student
to not only focus on the current course topic, but to consider how the current topic relates to the previous topics and to anticipate how it may integrate with the subsequent material. In this way, the student takes an active role in the learning process.

The MSPM has two full-time faculty members dedicated to program administration (a MSPM Program Chair and an Assistant Program Chair) and teaching. Approximately 80% of the classes are taught by adjunct professors. The faculty certification process requires an earned doctorate and a current PMP® credential.

**Methodology: Program Review**

During calendar year 2011, the MSPM Program administration set out to assess Program Objective 1 (PO1): 'Use accepted practices to plan projects.' This approach was used to review a sample of twenty ePortfolios, seeking a representation of online students’ work as well as a representation of the different campuses hosting the ground course format. The program administration planned to assess PO1 by verifying that each student completed at least one project plan. The project plan would be reviewed for content consistent with the *PMBOK® Guide* Matrix, Project Planning Process. What was discovered led to the examination of over sixty completed ePortfolios as trends emerged.

**Trends**

*Online students versus traditional classroom students.*

While reviewing completed project plans, it became obvious that the students who graduated from the online curriculum had far better artifacts in their ePortfolios than students who completed the instruction in the ground course format. The online
students consistently included more robust project plans. Examples of robust project plans included comprehensive scopes of work, complex schedules, detailed budgets, and thorough human resource plans. Although the ground students produced project plans with a similar table of contents, the difference in the level of detail was evident. This observation led the program administration to broaden the scope of assessment in content and sample size. Not only was the artifact quality better in the online students' work, but some of the online students used multiple artifacts as evidence to support the PMBOK® Guide Matrix. Within the sample of online students' work, there were varying degrees of mastery demonstrated. In general, the online students produced better results when compared with the ground students. Given the same textbooks and course learning objectives, why would the online students produce better quality and quantity of artifacts when compared with the ground course students?

**Campus location versus campus location.**

The program evaluation's scope increased and that approach continued when evaluating ePortfolios from the ground students. The evaluators reviewed 40 ground students' ePortfolios to get a sense of the accomplishments. The results were categorized as follows: exceptional, acceptable, or weak. The categorization was based on expert judgment, considering professional presentation of the material, the ePortfolio creator's words to guide the reader, and the quality and quantity of artifacts presented. A noticeable trend emerged and pointed to specific campus locations. Most of the ePortfolios that were categorized as exceptional came from two of the ten campus locations. The ePortfolios categorized as acceptable or weak represented the
other eight campuses equally. This discovery led to questions about academic advising of the students. Were some campuses advising students better than other campuses?

**Professor versus professor.**

Another trend was the evaluator’s ability to identify specific adjunct professor instruction based on student artifacts. It appeared as if overarching program goals were integrated with varying degrees of success within each adjunct professor’s classroom. Consequently, assignments directly reflected a professor’s teaching style and content. This observation led to the question of whether student results were too dependent on the professor teaching the course.

**Conclusions of the program review.**

As a result of the comprehensive programmatic review, the following conclusions were made:

1. Based on the differences between online and ground students’ artifacts, consistent structure appears to be the most important predictor of higher-quality artifacts. Although there were many variables, the most prevalent was structure. The online students produced better ePortfolios because they were given assignments that required them to prepare quality artifacts.

2. Ground students were more successful when exposed to higher quality academic advising on campus.

3. The students’ experiences were too dependent on the professor teaching each class.
These three conclusions were later labeled as *dependencies*. As evidenced by the ePortfolios, the student's success in the program was too dependent on the delivery mode, campus location, and the professor teaching the class. The next step in the process was to develop a series of 'interventions' to significantly reduce the dependencies, providing a more consistent curriculum regardless of delivery mode, campus location, or professor.

The philosophy was that all students should have the same opportunity for success through the program regardless of delivery mode, campus location, or professor. What do the online students get that the ground students do not? The simplest answer is: structure. The online classes are delivered asynchronously and a course management system provides weekly content delivered in modules. Different professors teach the different sections of the same course and the students have a consistent structure. The question becomes: How do we duplicate the success in the ground courses? To address the question about academic advising: How do we provide the same academic advising detail regardless of campus? How do we capitalize on an adjunct's experience in the classroom and eliminate poorly designed assignments? After hours of debate, the 'ground-template' concept emerged. This is a template of content delivered to the ground courses' professors and students and is a repository for information.

**Program improvements as a result of reviewing the ePortfolios**

In a simple description, a ground-template is an electronic course shell. Using the university's course management system, a master ground-template (electronic course shell) was created for each of the six project management core courses and the
capstone course. They are a mechanism to provide consistent information to the professors and students, regardless of location. Once complete, the master ground-template would be provided to each instructor teaching that particular MSPM course prior to the start of the term.

A team consisting of the MSPM program administration, course monitors, and instructional designers met for a week to develop the master ground-templates. With the collaborative inputs from these content and design experts, the focus of the ground-template development became developing a content-rich resource for the professor. This is a considerable departure from the online course structure, which is designed and populated with resources for the student. Although there is some information available to the student, the goal is to provide instructors with high-quality resources and suggestions of proven academic value that respect the academic freedom of the individual professor. The purpose of the ground-templates is to provide curriculum consistency regardless of campus location or assigned professor.

**Intervention strategies to eliminate dependencies**

**Intervention Strategy #1 — Mandatory Assignments**

The assessment team concluded that the online structure led to successful development of artifacts for the ePortfolio. Mandatory assignments were created and embedded into each of the six project management courses' ground-templates to translate that success into the traditional classroom. If the lack of structured assignments created a dependency, providing structured assignments with proven academic value presented the students with opportunities to create quality artifacts.
This intervention strategy provided a building block for consistency of curriculum regardless of delivery mode, campus location, or professor.

**Intervention Strategy #2 — Instructor Resources**

In addition to providing mandatory assignments, the ground-templates provide a suggested course administration format to include lesson plans, other suggested assignments, case studies, activities, and instructor resources. The program administrators recognized that some instructors might be concerned with a loss of academic freedom because of this detailed structure. The loss of academic freedom is mitigated, because the structure provided allows the professor to use his or her experience to build on the content instead of new course development. This intervention strategy provided a building block for consistency of curriculum regardless of delivery mode, campus location, or professor.

**Intervention Strategy #3 — Videos**

When reviewing the conclusions at a high level, program administrators identified communication as a chronic challenge. To ensure professors and students would receive a consistent message throughout the program, a series of informational videos were created and embedded into the ground-templates. This intervention strategy provides another building block for consistency of curriculum regardless of delivery mode, campus location, or professor.

A ground-template overview video (designed for the professor) communicates the purpose and intent of the ground-templates. In this video, the programmatic review process was explained and the findings identified. This provides the instructor with the
logic behind creating the ground-template and sets expectations for course administration, lessening the dependency on the professor.

The program orientation video is not a new addition. It was created when the MSPM was initially launched and was required for new students, but the message was not being received. This program orientation video that was given added emphasis by placing it into the ground-template to be viewed every term. The dependency on academic advisors will be reduced by reminding the students about the structure and flow of the program every term.

The ePortfolio overview video provides the students with a preview of the capstone deliverable. This video serves multiple purposes. The intended audience is the student, but because the instructor will also view it, the instructor will get a better understanding of the capstone. The video is a demonstration of an ePortfolio, which focuses on what it looks like, its purpose and intent, and sets the stage to tie course outcomes to the capstone early in the student's academic journey. This video lessens the dependency on delivery mode, campus location, or professor.

Each course has its specific orientation video. The course monitor created the video, which provides an overview of the course content and also sets expectations for course deliverables. This video serves multiple purposes. The intended audience is the student; but, because the instructor will also view it, the instructor will get a better understanding of the course goals and a reminder of how that course fits into the capstone. The video ends with a reminder to the student to retain all of the artifacts for the capstone. This video lessens the dependency on delivery mode, campus location, or professor.
**Intervention Strategy #4 — ePortfolio Resources**

Although this strategy cannot be tied directly to one of the three original conclusions, based on the improvements made to the courses, an ePortfolio Resources section was created. In this section, students are provided with two exemplar ePortfolios that were created by previous graduates of the program. These examples provide not only an illustration of what a completed ePortfolio looks like, but the new students will see examples of exceptional artifacts created by actual students while they participated in the program. In addition, detailed instructions on how to create the ePortfolio structure are available in this resource section.

**Intervention strategies improve online courses**

Although the programmatic review results generated intervention strategies for use in the ground-templates, some of the intervention strategies added value for the online classes. The course orientation videos and the ePortfolio overview video were added into the online courses to add emphasis about the program capstone. Additionally, the ePortfolio resources section was embedded into every online course. The online students can see a completed ePortfolio and review examples of exceptional artifacts created by actual students while they participated in the program.

**Conclusions**

The ePortfolio is an extremely powerful programmatic assessment instrument because it contains student-created artifacts for examination. In this case study, the MSPM graduates’ ePortfolios from the online program were compared with the graduates of the results of the MSPM ground program. Trends emerged that were later
labeled dependencies. As evidenced by the ePortfolios, the student's success in the program was too dependent on the delivery mode, campus location, and the professor teaching the class. The dependencies were analyzed and intervention strategies were implemented to reduce the dependency. The results of the program review culminated with implementing intervention strategies to create a venue where all students will have the same opportunity for success through the program regardless of delivery mode, campus location, or professor.

References


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Appendix 1: MSPM Program Outcomes and Course Learning Outcomes

Master of Science in Project Management Program Outcomes: (PO#)

1. Understand the context of project management
2. Use accepted practices to plan projects
3. Use accepted practices to execute projects
4. Use accepted practices to control projects
5. Use accepted practices to properly close projects
6. Understand and practice project management ethics
7. Understand and use project team building skills
8. Apply and interpret fundamentals of quantitative and financial analysis
9. Demonstrate knowledge and understanding of the complex organizational nature of projects including multi-national and multi-cultural structures
10. Utilize accepted practices in the establishment and control of quality
11. Use critical thinking skills to connect all aspects of project management with strategic planning and goal setting

PMGT 501 LEARNING OUTCOMES:

Upon successful completion of this course, the student will be able to:

1. Understand and evaluate the role of professional organization and professional standards in the area of project management.
2. Define project and differentiate project from an ongoing process.
3. Demonstrate an understanding of the process model of initiation-planning-execution control-closure and the integration of the nine Knowledge Areas
(PMI’s *PMBOK® Guide*) with the process model, apply that understanding to real and simulated projects and, evaluate its usefulness in managing projects.

4. Demonstrate knowledge of the nine Knowledge Areas of Scope, Time, Cost, Quality, Communications, Risk, Resources, Procurement, and Project Integration, emphasizing the inputs, tools and skills, and outputs involved with each skill area. (*PMBOK® Guide*)

5. Utilize current project management software to develop and execute planning, control and closure of technical projects (actual or simulated) in the students’ areas of technical expertise and assess its value in managing projects.

6. Demonstrate construction of a comprehensive, integrated project plan, including the following:
   a. Scope statement
   b. Scope change plan
   c. Work breakdown structure (WBS)
   d. Appropriate work packages
   e. Project sequence using PERT and CPM methodologies
   f. Project schedule with early start (ES), early finish (ET), late start (LS), and late finish (LF) dates
   g. Project cost baseline
   h. Project budget projection using ES/LS, and EF/LF times
   i. Project cash flow plan
   j. Project communication plan
   k. Project internal resource and external resource plans
   l. Project risk assessment and risk management plan
   m. Project resource plan
   n. Project closure

7. Demonstrate knowledge and use of appropriate control mechanisms, such as Earned Value Analysis (EVA), cost and time variances, quality assessment techniques, and risk assessment techniques.

8. Analyze conflicts of cost, time, schedule, quality, and personnel and recommend appropriate strategies for resolution

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9. Demonstrate an increase in computing, speaking, and writing skills in this course, as mutually agreed upon by the student and instructor.

PMGT 502 LEARNING OUTCOMES:

Upon successful completion of this course, the student will be able to:

1. Demonstrate an understanding of the nature of effective communication; including the importance, characteristics, and process of effective communications in the management of projects.

2. Discuss the issues relating to the implementation and effectiveness of knowledge management systems, and explain strategies for archiving project information upon completion such as lessons learned and ensuring their retrieval for future projects.

3. Analyze how companies use communications concepts such as teamwork, persuasion, and negotiation to gain a competitive advantage in managing projects.

4. Discuss corporate communications strategies for managing internal processes such as managing activities and establishing guidelines for company communications such as disseminating information, standardizing procedures, controlling documents, and networking.

5. Explain the role of managerial communications in project execution. Use the systems approach as a problem-solving framework to propose communications solutions to business problems, incorporating problem-solving, the research process, and decision-making into strategies that can be effectively communicated.

6. Demonstrate an understanding of how electronic communications, conferencing, and work management enhance the collaboration and communication of teams and work groups involved in projects.

7. Describe relationships among the components and functions of managerial project communications: people, data, processes, and technology; and analyze real world case studies that provide background and present important problems in the areas of managing projects—people, data, and resources—through communication.

8. Analyze the communications styles of oneself and others, and discuss the implications for project managers that personality and communication styles play. Describe how influence and change are advanced through communication.

9. Compare and contrast real-world case studies that provide important background in the areas of managing communication resources from a project perspective.
10. Demonstrate an increase in critical thinking, business writing, and speaking skills as mutually agreed upon by the student and instructor.

**PMGT 611 LEARNING OUTCOMES:**

Upon successful completion of this course, the student will be able to:

1. Compare and contrast the different forms in which projects may be organized (functional, weak matrix, strong matrix, projectized, mixed, etc.) and analyze the appropriate use of each.

2. Describe the structures of organizations (functional, geographic, product line, project, etc.) and the criteria used for selection.

3. Demonstrate the importance of matching project organization, sponsor organization, and geographic and cultural issues to the potential for success of projects.

4. Discuss criteria used in selecting the form of organization for a project and use these criteria in recommending project organization.

5. Describe and evaluate project staffing processes.

6. Describe the organization of Project Offices (or Project Management Offices) and evaluate the strengths, weaknesses, functionality, and obstacles to establishment in various organizational settings.

7. Examine the conflict environment inherent in managing projects and the applicable conflict resolution means to accomplishing project goals.

8. Predict the knowledge and skills requirements necessary for success for project managers ten years hence.

**PMGT 612 LEARNING OUTCOMES:**

Upon successful completion of this course, the student will be able to:

1. Define the context of international projects.

2. Reinforce the skills and knowledge gained in PMGT 501: Fundamentals of Project Management, specifically in a culturally diverse international environment.

3. Extend knowledge gained in PMGT 501 concerning risk, metrics, and quality management.

4. Determine considerations that are applicable to pursuing projects across cultures, corporations, and international boundaries.

5. Describe how to do business with cultures encountered both in social and business environments.

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6. Determine how to organize project staff, taking into consideration the cultural environment.

7. Identify the difficulties and risks of international projects, specifically relating to legal issues, labor issues, and currency issues.

8. Describe how to staff the project in an international setting, taking into consideration the local culture, customer participation, incentive plan, and in-country housekeeping and control.

9. Define ethnocentrism and examine its significance as an obstacle to understanding.

10. Describe communication across cultures in language and nonverbal dimensions.

11. Identify the nature of and how to cope with culture shock.

12. Contrast cultures using value systems.

13. Identify where to locate relevant cultural information.

**PMGT 613 LEARNING OUTCOMES:**

Upon successful completion of this course, the student will be able to:

1. Demonstrate knowledge of Project Risk Management as presented in Chapter 11 of Project Management Institute’s *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*.

2. Demonstrate knowledge of commonly used quantitative decision methods, particularly, decision tables, decision trees, risk curves, CPM and PERT scheduling, AHP and MFEP, and Monte Carlo simulations.

3. Examine and evaluate the strengths and weaknesses of project risk planning methodologies.

4. Identify, categorize, analyze, and evaluate project risks.

5. Assess project risks and risk events using qualitative and quantitative analyses and employ probability and impact measures to evaluate risks to the project.

6. Apply simulation methodologies in assessing schedule, budget, and quality risks.

7. Evaluate various project metrics and the use of reserves as tools for managing risk in projects.

8. Integrate change management and control, quality management, project progress metrics, and risk plan monitoring and updating into a cogent agency for project risk management.
9. Evaluate the effects of continuous plan validation, project reviews and audits, and thoroughness of archiving on the success of current projects and future projects.

10. Integrate knowledge of Eli Goldratt’s theory of constraints with more traditional project management as exemplified in critical path related methodologies.

11. Use access to professional journals and periodicals to enhance knowledge and maintain currency.

12. Conduct a thorough analysis of risks and risk management in a complex, failed project.

**PMGT 614 LEARNING OUTCOMES:**

Upon successful completion of this course, the student will be able to:

1. Evaluate the importance of leadership skills in managing projects and differentiate leadership from management, (evaluation) and identify different leadership styles appropriate to differing project management situations (analysis). Apply the concept and sources of power in a project management environment and differentiate among power, authority, responsibility, and accountability.

2. Explain what is meant by “integrated planning” in a project management planning process.

3. Apply appropriate criteria to decide when a project should be terminated.

4. Use project management techniques such as fast tracking, crashing, and resource leveling in the control of projects.

5. Evaluate the usefulness of project graphics such as network diagrams, Gantt charts, milestone charts, gate charts, cumulative cost and time curves, and graphical status reporting using pie and bar charts, for controlling various aspects of a project. Use these graphics appropriately.

6. Describe classification systems for estimating project cost and time and determine the strengths and weakness of each of the categories as they apply to specific types of projects. Determine and apply estimating strategy to the planning processes.

7. Use the concepts of cost variance and earned value analysis in project control.

8. Evaluate methodologies for trade-off analysis in planning and control and demonstrate why trade-offs are always necessary in project management.

9. Use a general concept of quality management that includes quality policy, quality objectives, quality assurance, quality control, and quality audits in a comprehensive quality plan for a project.
10. Demonstrate knowledge of emerging concepts in project management, such as Project Portfolio Management and the Project Management Maturity Model.

11. Be prepared to undertake a Project Management Capstone Project.

**LEARNING OUTCOMES MGMT 524**

Upon course completion, students will be able to:

1. Use probability theory to solve problems, including Bayes’ Theorem and its use in establishing posterior probabilities.

2. Understand the differences among decision-making under certainty, uncertainty, and risk. Apply probability theory to making decisions under risk. Calculate revised probability estimates using Bayesian analysis.

3. Compare moving averages, exponential smoothing, and trend time series models and evaluate the best use for specific forecast data. Use regression modeling to develop appropriate forecasting models.

4. Apply the specific concepts of inventory control models (e.g., EOQ, ABC Analysis, MRP, and JIT and ERP) and sensitivity analysis, to aviation/aerospace problems.

5. Apply the basic assumptions of linear programming and the properties of linear programming to formulate and solve problems concerning maximization (such as profits) and minimization (such as costs) objectives. Apply the specific concepts employed in transportation and assignment problems as applied to aviation/aerospace examples.

6. Apply the specific quantitative techniques of queuing theory, simulation, and game theory to typical aviation/aerospace problems.

7. Calculate future states or conditions using Markov analysis.

8. Apply the concepts of project management (e.g., PERT and the critical path method) and Network Models (e.g., minimal-spanning tree, maximal-flow, and shortest-route) to typical aviation/aerospace problems.

**LEARNING OUTCOMES 532:**

Upon completion of this course, the student will be able to:

1. Analyze and comprehend the principles of Quality Management and continuous Improvement.

2. Analyze the processes necessary to implement Quality Management in an organization.

3. Evaluate the impact of Quality Management culture in an organization.

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4. Assess strategies and techniques to improve quality and productivity.

5. Analyze the theory, approaches, and techniques for designing for quality and improvement-oriented measurement systems.

6. Assess the impact of supplier involvement on the organization

7. Debate the need for teamwork in quality management.

8. Evaluate the necessity for training in an organization.

**LEARNING OUTCOMES 533:**

1. Upon successful completion of this course, the student will be able to:

2. Identify legal and ethical influences on managerial decision-making.

3. Discuss the court system, the legal process, and how legal sources affect regulation.

4. Discuss the concept of liability and distinguish between criminal and civil liability.

5. Explain the agreement process and the formation of contracts.

6. Describe an agency and other types of business formations such as partnerships and corporations.

7. Discuss major federal laws regulating fair and equal rights in employment.

8. Explain key labor relations issues such as unions and diversity, sexual harassment, equal employment opportunity, and grievance procedures.

9. Discuss systems of ethical decision-making and the power of ethical management.

10. Describe the regulatory constraints on managerial decision-making related to occupational and environmental safety and homeland security.

**LEARNING OUTCOMES 633:**

Upon course completion, the student will be able to:

1. Relate the role of managerial accounting to making informed financial decisions and explain cost terms.

2. Evaluate and apply relevant costs.

3. Evaluate financial statement data in making financial decisions.

4. Compute and evaluate the correct break-even in units of output and in sales dollars as they apply to single product or multi-product organizations.
5. Apply contribution margin analysis to estimated sales levels and compute the resulting profits.

6. Classify the structure, contents, and then assemble a cash or flexible budget.

7. Evaluate a standard costing system.

8. Choose and evaluate relevant financial information, which will be applied in the capital expenditure decision-making process and include Net Present Value.

9. Evaluate and calculate the margin of safety and degree of operating leverage.

10. Correctly compute and provide a valid analysis of select corporate financial ratios, which should include, at a minimum, the current ratio, debt ratio, earnings per share, and return on assets.

11. Evaluate and calculate net income using absorption and variable costing.

12. Understand and apply appropriate procedures to determine mixed costs.

13. Explain the use of Activity Based Costing.

14. Demonstrate appropriate and effective research skills and be able to communicate the results (written/oral) in this course.

**LEARNING OUTCOMES 672:**

Upon completion of this course, the student will be able to:

1. Know the concepts of strategic management and leadership and their importance in business.

2. Define the concept of competitive advantage as applied to the business environment and reflected in business strategy.

3. Describe the external business environment and know how to assess it.

4. Identify the internal context of strategy and how a firm measures and leverages its internal resources, capabilities, and value chain.

5. Comprehend various generic business strategies and the drivers of strategic and competitive positioning.

6. Identify business strategies for dynamic contexts.

7. Comprehend the rationale for corporate strategy and how corporate strategy creates competitive advantage.
8. Comprehend global corporate strategy as a strategic option.

9. Understand strategies designed to leverage business alliances and mergers and acquisitions.

10. Comprehend how organizational structure, systems, and processes interface with corporate strategy.

11. Understand the role of corporate culture in business strategy, to include the importance of learning organizations.

12. Understand the strategic importance of corporate governance and the relationship between solid, principled corporate leadership and enduring success.