A Graduate-Level, Competency-Based Curriculum for Project Management

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ABSTRACT

The new economy that is emerging from the most recent recession demands graduates who are ready to add value to organizations' business strategy as soon as they graduate. This demand has spawned interest in creating educational programs that emphasize a student's competency, rather than knowledge alone. These programs are competency-based education programs, which differ from the traditional style of education. This paper presents a brief discussion of traditional versus competency-based educational programs and the design process and suggested program contents for a graduate-level, competency-based curriculum for a master's degree in project management. Issues related to migrating from the current knowledge-based curriculum to a competency-based curriculum and the new role of faculty in a competency-based program are also discussed.

A GRADUATE-LEVEL, COMPETENCY-BASED CURRICULUM FOR PROJECT MANAGEMENT

The new economy that is emerging from the most recent recession demands graduates who are ready to add value to organizations' business strategy as soon as they graduate. Ahsan, Ho, and Khan (2013), list the following as the top five skills for project managers, across industries and countries, which can add value to an organization's strategy:

- Communication
- Technical skills
- Stakeholder management
- Cost management
- Time management

This market demand has given impetus to the competency-based style of education in which the emphasis is on skills, as compared with the traditional style in which the emphasis is on knowledge.

The major difference between the two styles of education is that, in the traditional style of education, program mission motivates course design, which is primarily focused on the subject matter knowledge. In the competency-based style of education, program mission first drives the

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design of required competencies. To ensure learners meet program competencies, each competency is assessed through multiple assessments. As a final design phase, assessments are then packaged into program courses. In the competency-based style of education, subject matter knowledge has a supporting role, which is introduced in support of competency assessment.

This paper presents the design process and suggested program contents for a graduate-level, competency-based curriculum for a master's degree in project management. Issues in migrating from the current knowledge-based curriculum to the revised competency-based curriculum are also discussed.

BACKGROUND

The basic framework for competency-based education (CBE) has been around more than a decade, and is currently offered by many colleges. In addition, according to the US Department of Education (n.d.), several states have initiatives, plans, or legislation that support CBE:

- "New Hampshire - The state is initiating high school redesign that replaces the time-based system (Carnegie unit) with a competency-based system focused on personalized learning, strong teacher-student relationships, flexible supports, and development of 21st century skills.
- Michigan Seat Time Waiver - Michigan passed legislation in 2010 providing a seat time waiver to districts that want to offer pupils access to online learning options and the opportunity to continue working on a high school diploma or grade progression without actually attending a school facility.
- Ohio's Credit Flexibility Plan – This plan, adopted by the State Board of Education in 2009, allows students to earn high school credit by demonstrating subject area competency, completing classroom instruction, or a combination of the two. Under this plan, subject area competency can be demonstrated by participation in alternative experiences including internships, community service, online learning, educational travel, and independent study."

Accordingly, Inside Higher Ed (2013) reports a number of colleges have been offering CBE programs, including:

- Western Governors University
- Kentucky Community and Technical College System
- Capella University
- College for America

Competency-based education contrasts with time-based education (TBE); in the TBE model the student acquires credit hours by spending a certain amount of time in each course of study. In the CBE model, the focus is on acquiring specific competencies. In its purest form, the CBE model does not have credit hour requirements, grades, or deadlines. The student acquires credit by demonstrating mastery of competencies at his or her own pace, which makes CBE very suitable for online learning and the online style of teaching. Overall, a CBE program will "allow for accelerated learning, boast a lower cost because the learning is accelerated, and employ an innovative approach to curriculum and pedagogy that is typically more flexible than what is offered at a traditional college" (Franklin & Lytle, 2015, p. 8). As an example of reducing costs to the student, a CBE program of study may not require hard-copy textbooks when online educational resources are used instead.

Proponents of CBE claim that seat time, expressed in terms of credit hour, is not a proper measure of learning. Grades are supposed to measure learning, but there is evidence that even this measure is less effective, because of grade inflation (Rojstaczer & Healy, 2012). Another weakness of TBE is that it does not accommodate students who learn faster than others. Furthermore, seat time cannot be easily applied to the online method of education.

The above factors have prompted colleges, such as Capella and College for America, to adopt a variation of CBE, *direct assessment*, in which there is no linkage between competencies and the credit hour standard.

MOTIVATION FOR COMPETENCY-BASED EDUCATION

The economy that emerged from the Great Recession of 2008 demands graduates who are not only knowledgeable, but are skilled to immediately contribute to business value of the organizations where they are employed (O'Halloran & Gordon, 2014). Additional pressure on these new recruits is reflected in Federal student loan default rates (US Department of Education, 2016). The default rates are calculated for both public and private colleges. The average rate through 2012 for all colleges is presented in Table 1.

With the total cost of US student debt exceeding one trillion dollars, and with mounting default rates, colleges are trying to make it easier for their graduates to find jobs, and also to reduce the cost of education. Although CBE does not necessarily decrease the cost of education for all students, it has the promise of reducing the cost for those who can acquire the necessary competencies in a shorter time. Another cost-reducing initiative has been migration to online educational resources (OER) to reduce or eliminate the cost of textbooks for students.

Table 1

US Department of Education reported student loan default rates through 2012.

Year	Rate
2007	6.7%
2008	7.0%
2009	8.9%
2010	9.1%
2011	10.0%
2012	11.8%

An impediment to CBE has been Federal student financial aid, which is based on credit hours, not competencies. In March 2013, the US Department of Education issued a letter, providing guidance for institutions that seek financial aid based Direct Assessment CBE Programs. Following issuance of the letter, the Department authorized Southern New Hampshire's College for America to implement the Direct Assessment method of CBE. Similarly, Capella University received U.S. Department of Education approval to "offer and provide federal student financial aid support to students in competency-based direct assessment programs at the bachelor's and master's level" (Gilligen, 2014, p. 2). As the cost of education continues to increase more colleges and universities, private and public, will likely explore competency-based education as an alternative to their traditional, credit based programs (Ordenez, 2014).

ADULT STUDENT PROFILE IN PROJECT MANAGEMENT

This paper is based on our experience in designing a new master's degree program in project management at University of Maryland University College (UMUC), a component university of the University System of Maryland. Since this is a new degree program, there are no existing students in the program to assess their profile. However, a specialization in project management (PMAN) has been offered by The Graduate School since 2004 in two degree programs: Master of Science in Management and Master of Science in Information Technology. The profile of these students, as shown in Figure 1 through Figure 5, is a good proxy for the profile of future incoming students.
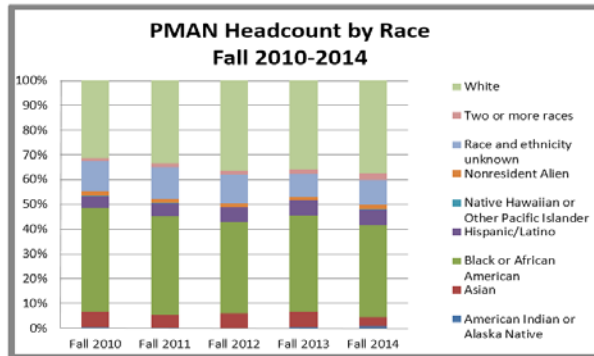

Figure 1. PMAN Headcount by Race Fall 2010 - 2014
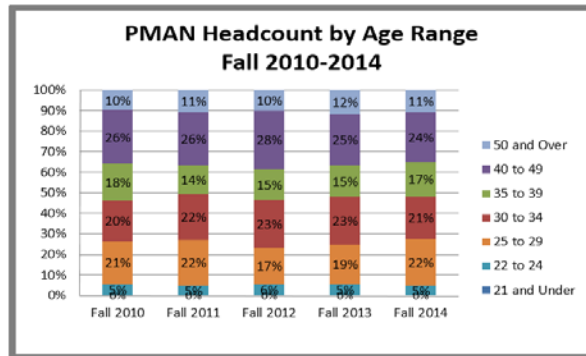
Figure 2. PMAN Headcount by Age Fall 2010 - 2014
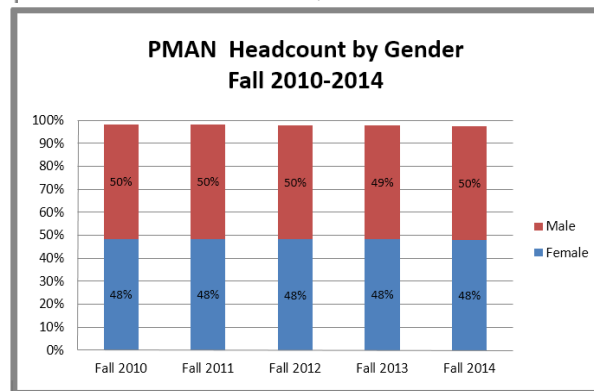
Figure 3. PMAN Headcount by Gender Fall 2010 - 2014
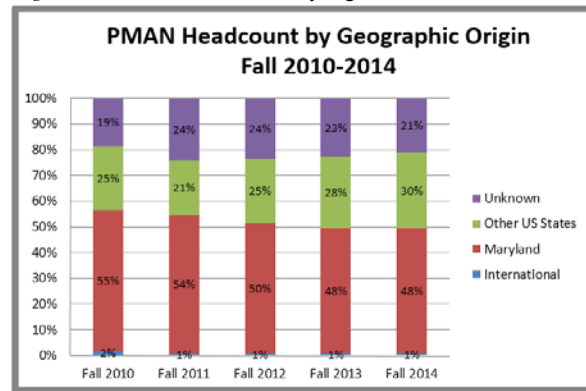
Figure 4. PMAN Headcount by Geographic Origin Fall 2010 - 2014
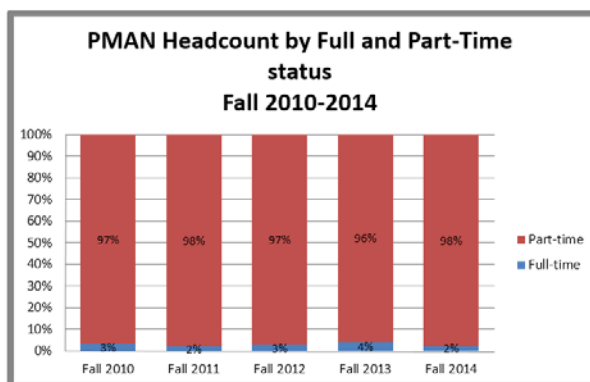
Figure 5. PMAN Headcount by Full or Part-Time Status Fall 2010 - 2014

These figures illustrate that the PMAN Program attracts an exceptionally diverse student body in age, ethnic background, and socio-economic circumstances. About 98 percent of the students attend the Program on a part-time basis, as a substantial number of students are employed. Adult students who are already working are suitable candidates for the CBE model. Competencies that they acquire through the CBE model will help them transition to new careers or enhance their existing careers.

Since the students have a diverse background, it is critical to place all students on the same footing when they start their program of study. This consideration is reflected in the design of the CBE curriculum; the first course of the curriculum is focused on essentials of their graduate study, such as communication, critical thinking, quantitative reasoning, and leadership. Once the students have a common foundation, they will proceed to specific subject areas, i.e., project management.

INSTITUTIONAL CURRICULUM REQUIREMENTS

In 2014 UMUC decided to migrate its graduate programs to the CBE model. Later in 2015, the decision was extended to all undergraduate programs. In The Graduate School, a common structure was put into place for all master's degree programs, in that each program curriculum consisted of 36 credits, distributed over six courses. The academic year would consist of 4 semesters, each 11-weeks long, with a first course common across all master's degree programs, which focuses on the essentials of a graduate-level program.

Furthermore, a common process was put into place for designing all master's degree programs. In traditional program design, program curriculum is first distributed among several courses. The content for each course is then designed. In the CBE model, the competencies are designed first. Competency design is followed by the design of assessments, which are mapped to competencies in a matrix fashion. The purpose of mapping is to ensure that students exercise each competency multiple times during the course of their study. Assessing student competency multiple times during the course of their program ensures the student is proficient in that competency.

Once competencies are finalized, they are then allocated to program courses. This process ensures that:

- The student masters a set of cohesive competencies.
- Mastery is achieved by repeating the exercise of competencies.
- The collection of all competencies are in support of overall program goals.

The next step in the process is to identify a list of topics for each competency. The student has to learn these topics in order to be ready to perform the assessments mapped to that competency. Once the learning topics are identified, reading resources, software tools, and other material which cover the topic can be identified.

As a final step, model classes for each course is designed. These model classes eventually map to individual semester classes to be used by the faculty for each course.

PROJECT MANAGEMENT CURRICULUM REQUIREMENTS

A project management curriculum must meet current and future requirements of the project management profession. Professional project managers must be proficient in the managerial aspects of project management, the industry in which they manage projects, and the policies and procedures of the specific organization where they are employed. The managerial aspects of project management include performance, knowledge, and behavioral competencies, as described in detail in the Project Manager Competency Development Framework (PMCDF) (PMI, 2007).

Performance competencies include the ability to initiate, organize, track, and bring projects to completion in a manner that satisfies the business needs of the client.

Knowledge competencies cover the underlying information, in support of performance competencies. They include managing project scope, cost, schedule, quality, risk, as well as managing stakeholders, vendors, and human resources who support the project.

Behavioral competencies include ability to lead, manage, communicate, and operate with professional integrity.

A careful study of the competencies described in PMI's PMCDF revealed that the competencies have a substantial overlap with examination requirements for the following PMI credentials:

- Certified Associate in Project Management (CAPM)®
- Project Management Professional (PMP)®
- PMI Risk Management Professional (PMI-RMP)®
- PMI Scheduling Professional (PMI-SP)®

In total, the competencies provide a foundation for the student to prepare for the professional credentialing examinations in the field of project management, and also to grow in a variety of roles. The competencies support the following program goals, which have a broad range of application:

- Lead and work in teams
- Persuade and influence others
- Delegate tasks
- Communicate clearly
- Perform quantitative analysis
- Solve problems and make decisions
- Learn how to apply technology to solve problems
- Plan, organize, and prioritize

Although the curriculum cannot provide the foundation for every industry and enterprise, the curriculum, through a capstone course, can meet the needs of specific students. This capstone course can also address specializations in project management, such as program management, portfolio management, agile project management, etc.

PROJECT MANAGEMENT CURRICULUM

The PMCDF (PMI, 2007) defines competency as "a cluster of related knowledge, attitudes, skills, and other personal characteristics that affects a major part of one's job… correlates with performance on the job, can be measured against well-accepted standards, and can be improved by means of training and development" (p. 73). In other words, competencies are characteristics that graduating students should demonstrate to indicate that they are prepared to perform and function independently in professional practice. This section outlines the process and steps used for developing a framework for a competency-based PMAN program.

As noted by Marrelli, Tondora, and Hoge (2005), the competencies could be organized in many ways depending on the needs of the organization/institute. In case of designing CBE, (i) one approach could be to identify core competencies that are critical to master a specialized course or (ii) to organize the competencies based on their types, such as leadership, personal effectiveness, communication, critical thinking or technical capacity or (iii) to develop a

framework based on specific job level. The PMAN Program CBE development team used a combination of the approaches and identified the following five steps for developing the CBE framework.

1. Identifying the Learning Goals
2. Creating Competencies
3. Identifying Descriptors
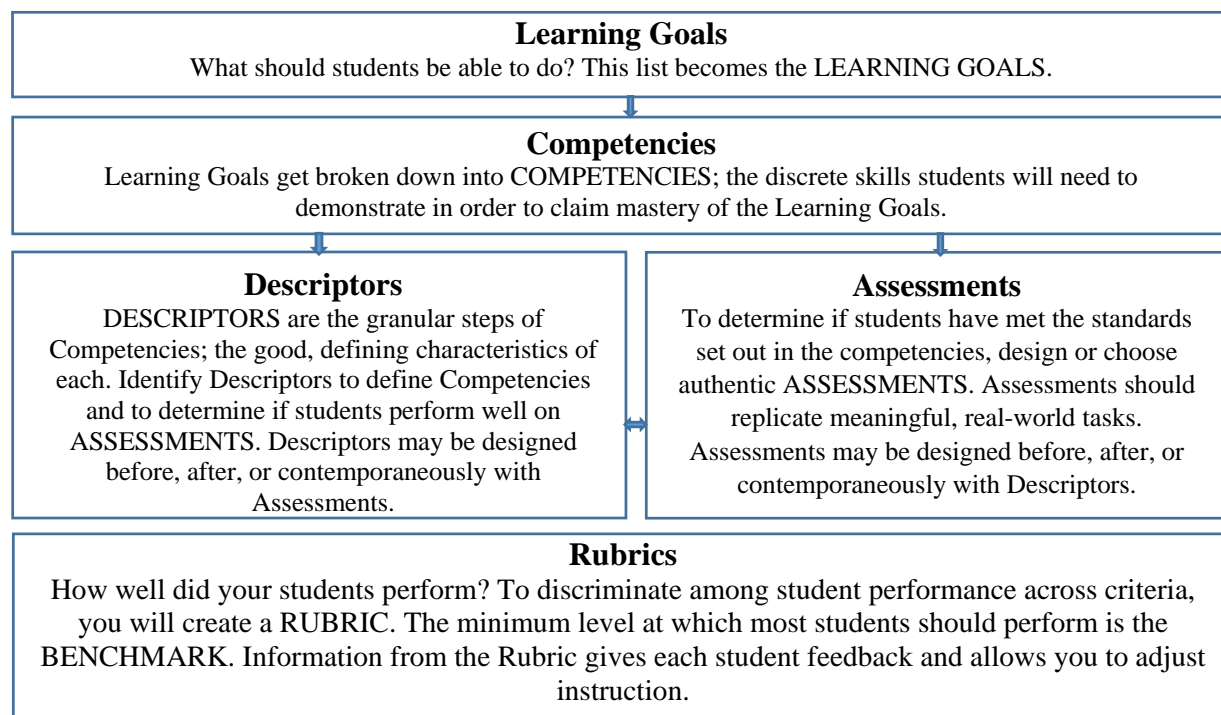4. Designing Performance-Based Assessments
5. Creating the Rubric

Learning Goals
What should students be able to do? This list becomes the LEARNING GOALS.

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Competencies
Learning Goals get broken down into COMPETENCIES; the discrete skills students will need to demonstrate in order to claim mastery of the Learning Goals.

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Descriptors	**Assessments**
DESCRIPTORS are the granular steps of Competencies; the good, defining characteristics of each. Identify Descriptors to define Competencies and to determine if students perform well on ASSESSMENTS. Descriptors may be designed before, after, or contemporaneously with Assessments.	To determine if students have met the standards set out in the competencies, design or choose authentic ASSESSMENTS. Assessments should replicate meaningful, real-world tasks. Assessments may be designed before, after, or contemporaneously with Descriptors.

Rubrics
How well did your students perform? To discriminate among student performance across criteria, you will create a RUBRIC. The minimum level at which most students should perform is the BENCHMARK. Information from the Rubric gives each student feedback and allows you to adjust instruction.

Figure 6. PMAN Competency Model (Adapted from Mueller, J. (2013) *Authentic Assessment Toolbox*. Retrieved from http://jfmueller.faculty.noctrl.edu/toolbox/index.htm)

Identifying the learning goals. A Learning Goal is a very broad statement of what students should know or be able to do. The purpose for crafting a set of goals is to give a brief and broad picture of what the program expects its students will know and be able to do upon graduation. In identifying the Learning Goals related to project management, the PMAN program also includes university-wide goals, such as Communication, Critical Thinking, Quantitative Literacy and Leadership. An example of a PMAN program Learning Goal would be:

- *Project Risk Management: Students demonstrate competency in identifying, assessing, and mitigating project risks, while taking advantage of opportunities.*

Creating competencies. A competency is a measurable human capability that is required for effective performance. A competency may be comprised of knowledge, a single skill or ability, a personal characteristic, or a cluster of two or more of these attributes. Competencies are the building blocks of work performance (Marrelli, Tondora, & Hoge, 2005). In developing competencies for the PMAN program, the team considered the following questions:

• Why do we think this knowledge or skill is important?
• Realistically, are students ever going to have to know this/do this/use this?

• Can we really assess this? Should we assess it?
• Is this knowledge or skill essential for becoming a professional? How? Why?
• Is this knowledge or skill essential for program mastery?

For a competency to be amenable to assessment, it must be observable and measurable. For example, "Students will correctly add two-digit numbers" IS observable and measurable; however, "Students will understand how to add two-digit numbers" is NOT observable and measurable. While a student's understanding cannot be observed directly, it can be observed through performance. Related competencies are rolled up to a learning goal. The team made sure that a competency does not mention any specific task by which students will demonstrate what they know or are able to do. For example, asking to "Identify cultural differences between two cultures using a Venn diagram" is too specific; specifying "Venn diagram" in the competency requires the teacher create exactly that assessment, even though others certainly could work.

Examples of competencies related to the Learning Goal of *Project Risk Management: Students demonstrate competency in identifying, assessing, and mitigating project risks, while taking advantage of opportunities* would be:

- Plan Risk Strategy.
- Engage Stakeholders.
- Facilitate Risk Management Process.
- Monitor and Report Risks.
- Analyze Specialized Risks.

Identifying the descriptors. A descriptor further defines a competency. A competency can have more than one descriptor. The team kept the number of descriptors to the essential elements of the task. The assessments (or Learning Demonstrations) are mapped to particular competencies and descriptors. Taking the same Learning Goal and list of Competencies for *Project Risk Management*, the following are examples of descriptors that were developed:

Plan Risk Strategy

- Develop risk assessment processes and tools that quantify stakeholder risk tolerances in order to assess and determine risk thresholds for the project and set criteria for risk levels.
- Update risk policies and procedures using information such as lessons learned from projects and outputs of risk audits in order to improve risk management effectiveness.
- Develop and recommend project risk strategy based on project objectives in order to establish the outline for the risk management plan.
- Produce risk management plan for the project on the basis of inputs such as project information, external factors, stakeholder inputs, and industry policies and procedures in order to define, fund, and staff effective risk management.
- Establish evaluation criteria for risk management processes based on project baselines and objectives in order to measure effectiveness of the project risk.

Selecting performance-based assessments. Performance-Based Assessments (Learning Demonstrations) give students the opportunity to demonstrate that they are capable of meeting the competency. We will consider the same example from above: Competency: *Plan Risk Strategy*. A risk management strategy provides a structured and coherent approach to identifying, assessing and managing risk. It builds a process for regularly updating and reviewing project risks based on new developments or actions taken. Risk management is both a quantitative and qualitative approach to determine impact, probable likelihood and overall project impact of risks to scope, schedule and costs in any project.

Students will play the role of project risk managers to demonstrate competencies in project risk management for a given project context. Students will be expected to first identify the stakeholders, and then evaluate and identify project risks in order to create a preliminary risk breakdown structure (RBS) for the project. Using the risks identified, students will then move on to developing a risk assessment (with inputs such as stakeholder tolerances, lessons learned from past similar projects, benchmarking data), developing risk response management and finally risk control development as described below:

- Risk Identification. In this step, students will:

  - Identify project primary risk sources and risk events
  - Determine project stakeholder tolerances on project risks
  - Develop Risk Register
- Quantitative Risk Analysis. Students will assess risks in terms of:
  - Investigating the likelihood that each specific risk will occur and its potential impact on the project objectives such as schedule, cost, quality or performance
- Qualitative Risk Analysis. Students will numerically assess the risks on the overall project. Some tools and techniques include:
  - Risks' Expected Monetary Value
  - Risk Analysis using simulation
- Risk Response Planning: Students will:
  - Develop a strategy to reduce possible damage and enhance opportunities to project objectives
  - Develop a Risk Management contingency plan
- Monitor and Control Risks. Students will:
  - Implement the risk response plan via Risk Register documentation
  - Track the risks identified and monitor any new risks
  - Evaluate the effectiveness of the risk management process

Students will be introduced to essential project risk management concepts, tools, and techniques as they apply them to the given project context. All performance based assessments are developed as a set of scripted activities involving real life scenarios with built in feedback checkpoints (Figure 7).
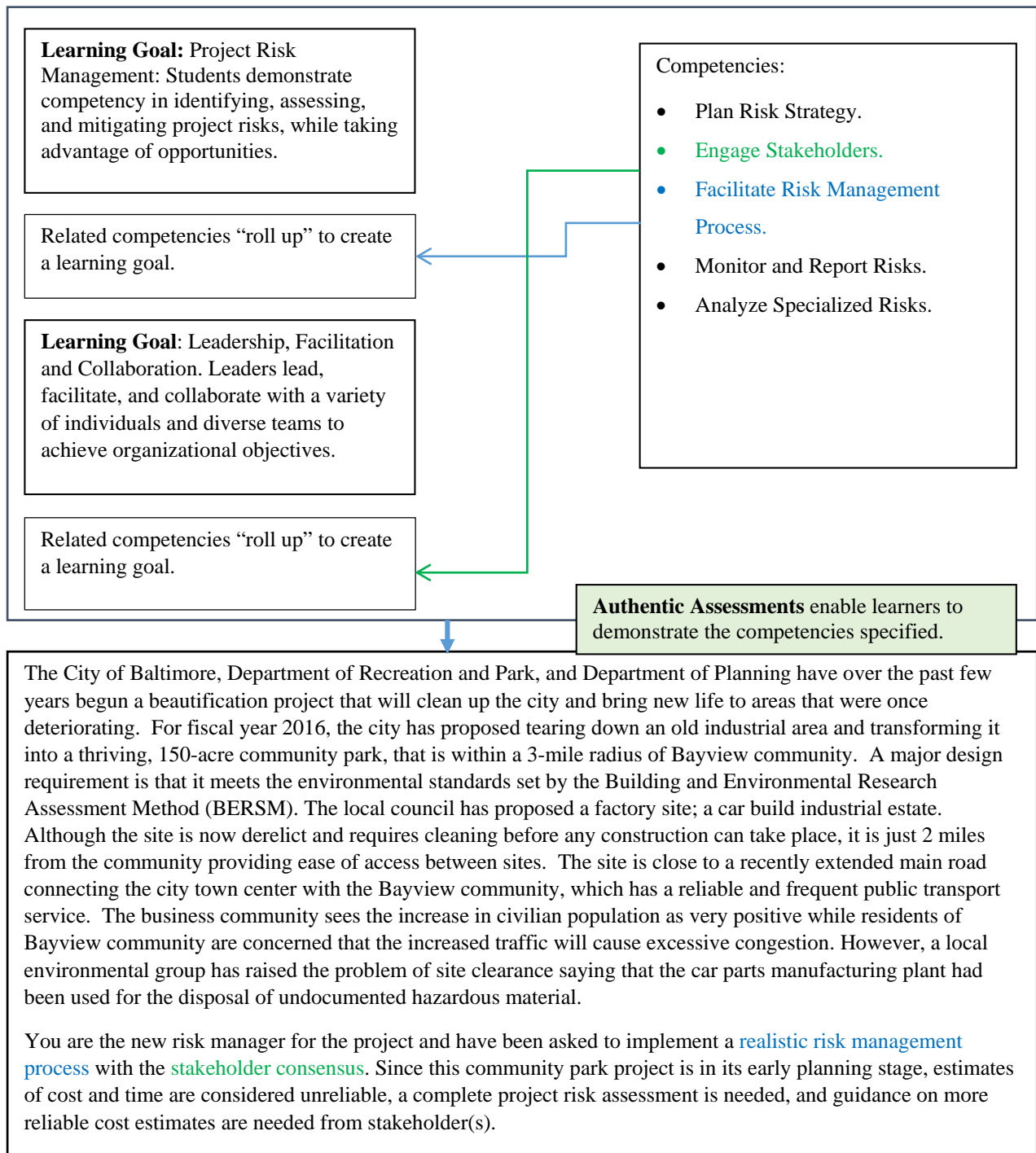
Learning Goal: Project Risk Management: Students demonstrate competency in identifying, assessing, and mitigating project risks, while taking advantage of opportunities.	Competencies: • Plan Risk Strategy. • Engage Stakeholders. • Facilitate Risk Management Process. • Monitor and Report Risks. • Analyze Specialized Risks.
Related competencies "roll up" to create a learning goal.	
Learning Goal: Leadership, Facilitation and Collaboration. Leaders lead, facilitate, and collaborate with a variety of individuals and diverse teams to achieve organizational objectives.	
Related competencies "roll up" to create a learning goal.	

Authentic Assessments enable learners to demonstrate the competencies specified.

The City of Baltimore, Department of Recreation and Park, and Department of Planning have over the past few years begun a beautification project that will clean up the city and bring new life to areas that were once deteriorating. For fiscal year 2016, the city has proposed tearing down an old industrial area and transforming it into a thriving, 150-acre community park, that is within a 3-mile radius of Bayview community. A major design requirement is that it meets the environmental standards set by the Building and Environmental Research Assessment Method (BERSM). The local council has proposed a factory site; a car build industrial estate. Although the site is now derelict and requires cleaning before any construction can take place, it is just 2 miles from the community providing ease of access between sites. The site is close to a recently extended main road connecting the city town center with the Bayview community, which has a reliable and frequent public transport service. The business community sees the increase in civilian population as very positive while residents of Bayview community are concerned that the increased traffic will cause excessive congestion. However, a local environmental group has raised the problem of site clearance saying that the car parts manufacturing plant had been used for the disposal of undocumented hazardous material.

You are the new risk manager for the project and have been asked to implement a realistic risk management process with the stakeholder consensus. Since this community park project is in its early planning stage, estimates of cost and time are considered unreliable, a complete project risk assessment is needed, and guidance on more reliable cost estimates are needed from stakeholder(s).

Figure 7. Learning Demonstrations to assess students' proficiency in the specific competencies.

Creating a rubric. In the first step, we identified what the program wants the students to know and perform: This is the Learning Goals. Next, we created observable, measurable competencies that support the Learning Goals. By defining Descriptors, we then ask the students how they could demonstrate that they had met the Competencies. In devising these activities, we created the Performance Based Assessments and identified the characteristics of good performance on the Performance Based Assessment. Finally, for creating the rubrics, we translate our Descriptors into the means by which the students will be evaluated. A good analytic

rubric needs at least two criteria and at least two levels of performance. We used the Descriptors as basis for the rubric criteria; in that way, the goals, the assessments and the rubrics will be aligned. As an example (Figure 8), this is how the PMAN *Project Risk Management* Goal's first competency *Plan Risk Strategy* looks in a 3-level rubric:

Risk Mgt. Outcomes	Low/No Proficiency	Proficient	Highly Proficient
After reviewing the given project context, comprehensively identifies and assesses all risks associated with the event or activity	Addresses only some of the categories of risks; Addresses only obvious risks.	Identifies some basic risks in each category	Provides a comprehensive list of all risks; Not only identifies the primary risks, but clearly understands the various kinds of associated risks
Clearly identifies stakeholders and develops techniques to gather stakeholder tolerances.	Stakeholder list and the techniques are not comprehensive.	Identifies complete list of stakeholder, but lacks in defining the techniques for gathering stakeholder tolerances. (or) Identifies incomplete list of stakeholder list, but defines clear techniques for gathering stakeholder tolerances.	Provides complete list of stakeholders and clear techniques for stakeholder tolerances.
For the given context, realistically assesses all risks, considering the probability of occurrence and severity of consequences.	Over or under estimates the probability and/or severity of the risks identified.	Gives some logical consideration to the probability and severity of the risks identified.	Realistically estimates the probability and severity of all risks identified.
Comprehensively explores and examines actions that can be taken to mitigate each risk.	Minimally explores options to mitigate risks; Only explores options for the most basic risks.	Brainstorms options to mitigate most of the risks.	Thoroughly considers various options to mitigate all risks identified.
Selects the most appropriate mitigating actions for each risk.	Selects some inappropriate mitigating actions; may select actions solely based on cost or ease of implementation.	Selects mostly appropriate mitigating actions; Somewhat considers the prior risk identification and assessment.	Selects appropriate mitigating actions for each risk based on the prior risk identification and assessment.
Develops thorough contingency plans.	Minimally plans for emergency response.	Establishes basic plans for managing emergencies.	Develops clear and thorough contingency plans.

Figure 8. Sample rubric. Adapted from Student Leader Learning Outcomes Project at Texas A&M University.

In developing a competency-based curriculum for the PMAN program, a thorough modelling process was considered. The PMAN CBE team determined what the model should be and decided the student learning experience would be centered on project-based learning in a sequenced set of performance based assessments. As described above, the first step in the program redesign was to define Learning Goals or Objectives. Then the team worked on determining all the competencies students would need to demonstrate project management skills, starting with general competencies such as written communication, critical thinking, and quantitative reasoning. The competencies were rolled up into the Learning Goal.

Finally, the team ensured that the competencies are not discrete skills, but are embedded in several assessments so they build on, and reinforce, each other.

THE ROLE OF FACULTY IN COMPTENCY-BASED EDUCATION

Pace and Worthen (2014) stated simply that "a highly trained and engaged educator workforce will be the single most important driver of a successful competency education system" (p. 5). The role of the educator in a CBE environment will transition from one of simply instilling a body of knowledge in a student to one of helping the student use that knowledge to master critical competencies. This will require that educators "work individually and collectively to design customized pathways to graduation for every student". Additionally, educators will have to acquire new classroom skills to help students with varying levels of skill, knowledge, and ability to succeed.

Competency-based education programs typically contain two common elements: (1) a framework of competencies that are mapped to and aligned with learning demonstrations or assessments, and (2) methods to assess progress toward mastering the competencies (McClarty & Gaertner, 2015). Inherent in each of these common elements are activities associated with developing and maintaining the course materials and activities associated with using the materials in a classroom setting.

Developing and maintaining course materials. Educators play a primary role in defining required competencies and mapping those competencies to one or more assessments. Competencies must be explicit, measurable, and relevant to the skills and knowledge needed in the chosen career path (McClarty & Gaertner, 2015). Assessments typically identify learning objectives, the learning activities that must be completed, study and reference materials, and assessment methods and rubrics.

Where alignment with national professional organizations, such as the Project Management Institute (PMI), is required or desired, competencies may be derived from professional certification standards published by such organizations. Where national guidelines are not prescribed, competencies may be derived from consultation with external stakeholders, such as employers, unions, or other subject matter experts. Additional competencies may be derived from internal standards required by the learning institution (Ott, Baca, Cisneros, & Bates, 2015).

Another challenge for educators is developing competency mastery assessment methods that are valid and reliable (Schuwirth & Ash, 2013; Ott, Baca, Cisneros, & Bates, 2015). Schuwirth and Ash (2013, p.555) suggest assessment methods should:

- "Support development of an integrated competence.
- Be organized around content domains rather than test formats.
- Value all forms of information, quantitative and qualitative.
- Combine summative and formative functions to inform and guide student learning.
- Be equitable through a balance of assessments that are standardized and tailored to the individual and by focus on improvement of competence rather than solely on detecting incompetence."

Finally, educators must be sensitive to changes in the internal and external environments that affect the relevance and usefulness of identified competencies and assessments and proactively propose updates to learning materials to keep pace (Ott, Baca, Cisneros, & Bates,

2015). For example, project management educators must ensure that course materials keep pace with changes to PMI certification standards and industry demands on project managers as well as changes to university graduation standards. One way this can be done is through continuous interaction with practicing project managers and participation in PMI symposiums and chapter meetings.

Using the material in the classroom setting. Educators, successfully transitioning from time-based education to competency-based education, report increased opportunities for authentic learning as power is transferred to the student and educators assume more of a facilitator, coach, or guide role than a traditional teaching role (Sullivan & Downey, 2015).

In line with this shift from a traditional teaching role to a facilitator, coach, or guide role, Pace and Worthen (2014) suggest educators will need new skills to maximize competency-based education outcomes. In summary, these skills include:

- Providing timely and personalized instruction, aligned to explicit, and measurable learning objectives and based on individual learning needs, so students can progress to mastery along individual trajectories at a sufficient pace to achieve career readiness in time for graduation.
- Using performance-based formative and summative assessments with high validity and reliability to evaluate individual student progress to mastery.
- Supporting student development of lifelong learning skills and social and emotional competencies.

The last skill listed – supporting development of lifelong learning skills and social and emotional competencies – may be more germane to early-stage (e.g., K-12) competency-based education than graduate-level competency-based education.

CONCLUSION

The new economy demands project managers that can successfully manage projects immediately upon entering the workforce as a project practitioner. These project managers must have skill in communicating and managing stakeholder expectations, along with technical skills, and competency in managing project cost and duration.

This paper has outlined a methodology for developing a curriculum that meets the above requirements. The methodology is based on the development of learning goals, competencies, descriptors, assessments and rubrics to ensure graduates of the program have the knowledge, skills, and abilities required to successfully manage projects in a wide range of organizations and industries.

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