

# **Project Management's Future: Teaching Project Management to High School Students Using Project Learning**

**John J. Byrne, DBA, PMP, Keller Graduate School - DeVry University**

**Jim Snyder, MBA, PMI - Delaware Valley Chapter**

**Danielle Seward, MPM, Philadelphia School District**

## **Introduction**

### **Presentation overview**

The world is changing. The job market is changing. Globalization is impacting all of us and changing the way we interact in the work place. The skills needed in today's work place are different than what was needed fifteen or even ten years ago. The question is: is the education system changing to meet the changing business environment? Is our education system preparing our children for the new realities of a global economy? Unfortunately, it seems our educational system does not do a very good job of preparing our children for today's work environment. This paper will examine the quality of the education system in the United States, the effects of globalization on future job prospects, and a pilot project in Philadelphia to help rectify some of the short comings noted in our educational system.

### **Objectives of presentation**

The objectives of this presentation are as follows:

1. To provide an overview of the skills needed in today's workforce.
2. To examine how the education system in the U. S. is addressing the needs of today's workforce.
3. To review the Philadelphia High School Project Management Project, its methods, and its objectives.
4. To look for ways to improve and expand the Philadelphia Project.

## **Analysis of Today's Educational System in the United States**

### **21<sup>st</sup> Century Skills**

In the spring of 2006, the Conference Board, Corporate Voices for Working Families, Partnership for the 21<sup>st</sup> Century Skills, and the Society for Human Resource Management performed a study to determine how prepared our children are to enter the work force. The first question asked by the study was what are the basic knowledges and skills needed by today's high school graduates to enter today's workplace. This question was asked of a number of fortune 500 companies to determine the skill and knowledge requirements of today's workforce. The study broke the results down into two general areas: knowledges and applied skills. Exhibit 1 below shows the highest scoring needs in each area (the Conference Board, INC, the Partnership for 21<sup>st</sup> Century Skills, Corporate Voices for Working Families, and the Society for Human Resource Management, 2006).

#### **Knowledges**

Reading comprehension  
English  
Mathematics  
Foreign languages  
Science

#### **Applied Skills**

Professionalism  
Teamwork  
Oral Communications  
Ethics  
Problem solving  
IT  
Written communications  
Diversity  
Self Direction  
Creativity  
Leadership

## Exhibit 1- Knowledge and Skills needs

Once the needs were established, the next question asked was: how good are the schools at meeting these needs. The study broke each of these down into three possible outcomes: deficient, adequate, and excellent. Exhibit 2 below shows the areas in which the study found high school students to be deficient. High school students were found to be adequately prepared in only three areas: Information Technology, Diversity, and Teamwork. High School students were found not to be excellent in any of the areas. This data are presented in rank of most deficient at the top of the list. For the remainder of this paper, only the applied skills will be examined. The reason for this is simple: most of the issues were from the applied skills area, not the knowledge area. As having the most need, it appeared to be the most important.

<b>Applied skill</b>	<b>Percentage deficient</b>
Written communications	80.9%
Leadership	72.5%
Professionalism	70.3%
Critical thinking	69.6%
Self direction	58.2%
Creativity	54.2%
Oral communications	52.7%
Ethics	44.1%

## Exhibit 2 – Applied Skills Deficiencies

As exhibit 2 shows, high school students in the United States are lacking in many key areas needed to survive in today's work place (the Conference Board, INC, the Partnership for 21<sup>st</sup> Century Skills, Corporate Voices for Working Families, and the Society for Human Resource Management, 2006). Lacking in these key areas may create a condition in which those deficient have a difficult time obtaining and maintaining reasonable employment. As for the economy as a whole, not properly preparing our students for employment places a much larger burden on our employers and the society as a whole.

Reviewing exhibits one and two, showed that much of needs and deficiencies were knowledge areas of the PMBOK. It seems that project management would address most of the applied skills issues shown in the study.

### **Perkins Title IV**

The Federal Government has also recognized some of the issues regarding applied skills in the workforce. Hence, this led to the passage of the Carl D. Perkins Career and Technical Education Act of 2006. This act was designed to provide money for school districts to provide life skills education to school students. Perkins is the most recent of a series of Perkins Acts starting with Perkins Title I. This latest act places much more emphasis on the importance of the knowledge and skills needed by our high school graduates to keep the U. S. competitive in the world (U. S. Department of Education, 2008). This act provides only money; it is up to local school districts to use it and how to use it. In short, it is up to the local school districts to find or develop programs to incorporate the requirements of the Act.

### **Project based learning**

Project based learning is basically learning by doing. This is done by teams or by individuals using a hands-on approach (Mergendaller, 2006). It is not two plus two equals four like most high school courses or training classes. It is: here is a problem - fix it. It is: here is a vacant lot – fill it with something useful to society.

According to Bernie Trilling of the Oracle Education Foundation, project learning is, “students working in teams to experience and explore relevant real-world problems, questions, issues or challenges; then creating presentations and products to share what they have learned. The teacher’s role is one of coach facilitator, guiding, advising and mentoring – not directing or managing all student work.”

Since most of the applied skills shown to be needed by our high school students were related to the field of project management, it seemed appropriate to explore using some of the attributes of project based learning as a method to

address these applied skills deficiencies. This pedagogy seems perfectly aligned with teaching applied skills. Additionally, teaching applied skills and project management using an actual project seemed as a reasonable instructional method for high school students. This method seemed as an excellent method to allow the students to learn the material while maintaining their interest in the subject matter.

## **Analysis of External factors on Education in the United States**

### **Globalization and its affect on students today**

Today's economy is a global one. We all have heard that. But what does this really mean? In one respect, it means that many of our careers and the careers of our high school students could be affected by individuals and events anywhere on the globe. Let's look at one of the fastest growing industries, the IT industry, for instance since many high school students plan on a career in the IT industry.

Unfortunately, the Department of Labor's Bureau of Labor Statistics, citing research work of Forrester Research Inc. and the Brooking institute, estimates that greater than a half a million IT sector jobs will be lost in the United States due to outsourcing and/or offshoring by 2015 (Bednarzik, 2005). This works out to approximately 50,000 to 70,000 IT sector jobs lost per year between now and 2015. This is a chilling statistic for any IT sector project manager let alone an ill prepared high school student. But why is this so? To evaluate that question, we need only look at two other world economies: China and India.

Let's begin with China. According to Dr. Parker of the University of Nevada in Reno, China is either the second or sixth largest economy in the world depending you which measurement you use. It has the fastest economic growth rate and population. It graduates 30 million high school seniors a year. It has 2.4 million traditional college graduates a year with 1.9 million returning adult graduates a year and 150,000 advanced degree graduates a year. As for advanced degrees, the two most popular majors are engineering and management (Parker, 2007). These two degree paths are also two critical components in the field of project management. China is rapidly moving from a worker based economy to a knowledge based economy. How will China's growth affect a high school student's future possibilities?

Moving on to India, according to Jo Johnson of the Financial Times, over half of the population of India is under 25 with a mean age of 23. The country has three million college graduates a year. Of this, about 25% of the graduates are in engineering with approximately 15% suitable for outsourcing work (Johnson, 2006). By comparison, the United States has much, much fewer college graduates across the board. Overall, India is becoming a country with a workforce of young, educated individuals. India already is the world leader in call center, accounting, and IT outsourcing. Just looking at China and India alone would indicate that in order to be competitive, the U.S. would have to do a superior job of preparing its students.

## **The Philadelphia Program**

### **Overview**

To address the issues show above, PMIEF, DeVry University, and the Delaware Valley Chapter of PMI formed a partnership with the Philadelphia School District to bring Project Management education to high school students in the Philadelphia School District. The pilot class began in the Philadelphia School District in the summer of 2008 with additional planned classes into the fall of 2008 and spring of 2009. The program uses PMI Delaware Valley Chapter members as mentors. Thus, this initiative provides volunteer opportunities for local component chapter members to mentor high school students.

### **Issues encountered**

Many issues were encountered throughout this program. Exhibit 3 shows many of these issues and the details surrounding each issue.

<b>Issue</b>	<b>Details</b>
Getting to appropriate school district personal	This needs to be addressed early as it will quickly stop the project. Second, many school districts acted interested, but did not follow up.
Finding qualified instructors	This proved to be very difficult, as finding an instructor that is good with students and knows project management was very difficult to find.
Syllabus	The syllabus needed to be created that reflected project based learning, 21 <sup>st</sup> Century skills, mentoring, and Perkins Title IV.
Finding qualified mentors	Mentors had to be available during class time and after work to assist their team.
Website	A website was created to allow team and mentor communications.
Mentor training	Mentors had to be trained in what they could and could not do in class. This proved to be difficult to get this training.
Advertise for students	An advertising plan had to be created to get students interested in the program
Contractual issues	Many contractual issues arose among the partners in the project.
Keep focus on students	Keeping other issues out of the project was an issue throughout the project.
Background checks	In order to work with high school students, all individuals had to have numerous background checks.
Obtaining books	Funding for and obtaining books became a major issue at the beginning of class, as only ½ of the class had books.
Application process	The application process did not work well, as getting application to and back from students did not function properly.
Testing of students	Students were tested to ensure they would have a chance of success in the project. Unfortunately, these were college level tests used to qualify high school students.
MS Projects	Software licenses were not purchased in time for the class. This negatively impacted the class.
Location of program	This needs to be decided on early. Options include: on campus, at the high school, or at another location.
Security	Security of the instructors and mentors must be considered with the consideration of a location.
Supplies	How to acquire and pay for supplies for the class needs to be considered.
State requirements	State and local requirements need to be considered.
Mentor selection requirements	A method needs to be created to select proper mentors for this program.
Additional room for students to work	Since the project involved much teamwork, each group of students requires its own "space" to work in.

#### Exhibit 3 – Issues

Exhibit 3 is not all inclusive. Many smaller issues were found and overcome in short order, thus did not make the list. Many of these issues could have been show stoppers, but due to drive of those involved, all were overcome.

### Design of Program

The Philadelphia Project was designed to fill as many applied skills deficiencies as possible while combining Project learning with Perkins Title IV requirements. In short, we tried to combine the needs of high school students with the best methods available. Initial issues that were considered were: ensuring that the needs of the workplace were included in the program, incorporating project based learning methodology, and considering the abilities of the student.

The needs of the workplace were considered paramount as the needs of the workplace translate directly to the needs of the individual high school student. Hence, the project incorporated as many of the needs as compared to the

deficiencies identified by the 21<sup>st</sup> Century study. Once the needs presented and the deficiencies identified were cross referenced with the Guide to Project Management Book of Knowledge (PMBOK)® the major topics of the course were identified. These cross referenced topics are shown in Exhibit 4.

### **Topics included in the program**

Given the basics of project management and a good project idea, identify elements of a comprehensive project plan.

- Define a project and differentiate projects from routine operations Understand the balance of the technical and socio/cultural sides of the project
- Understand the difference between project management and general management
- Understand the project management cycle

Given the processes required to ensure that the project includes all the work required for achieving the project objectives, develop a project charter and scope statement.

- Organize the project team
- Create a complete Project Charter
- Create a complete scope statement

Given the project charter and scope statement, compose and organize a project to be completed under time and resource constraints.

- Create a WBS and the project network
- Construct a project network diagram using network diagramming methods
- Provide a process for computing early, late, and slack activity times and identify the critical path
- Understand the importance of the critical path and slack in precedent diagramming modeling

Given the processes required to ensure that the project is completed within the approved cost, time and resource constraints, develop a detailed budget for a project.

- Develop a cost estimates for a project
- Develop a project budget
- Understand budget control for a project
- Understand the budget as a resource

Given the processes required to ensure that the project will be properly controlled, develop a change management and control plan for a project.

- Understand the importance of project control
- Develop a change management plan
- Develop a project control plan to control a project's schedule and scope
- Develop and understand termination rationale

Given techniques used to minimize risk and the successfully accomplished of prior course objectives, identify, analyze, and propose alternative responses to project risk.

- Identify risks and possible responses to project risk

Given that all project inputs may not be available within the performing organization, establish procedures

for acquiring goods and services from external sources.

- Understand the need and value of engaging in project partnering, and why project partnering efforts succeed or fail.
- Understand how to perform a make or buy decision

Given accepted human resource management and leadership practices, create a strategy for the most effective use of the people involved with the project.

- Understand the significance organizational culture plays in managing projects.
- Identify characteristics and understand leadership skills needed for a high performance project team.
- Build skills that encourage teamwork.
- Understand motivational techniques for use in project management
- Demonstrate good presentation and communication skills and aides needed for project management
- Develop and use conflict mediation and negotiation skills

Given the need to interact with communities and community organizations about matters that may affect them, incorporate an appropriate communications strategy with respect to these groups.

- Understand the importance of legal, regulatory and financial advice in project management
- Identify community stakeholders associated with project management
- Identify community issues related to project management
- Identify regulatory compliance issues that affect the project
- Develop a response plan to these community issues

Given the successful completion of all previous objectives, present the project plan to sponsors and stakeholders.

- Present project plan and review lessons learned

#### Exhibit 4 – Topics included in the program

Second, the Philadelphia project incorporated project learning. The course was designed as one big project. The class was broken into teams for work on the project. The project was to design and develop a project plan for a vacant lot next to the Philadelphia School District Headquarters. To accomplish this, the class needed to do presentations. The first presentation was on the project team's charter and scope statement for the project. The second presentation was on the project's WBS, Schedule, Communication Plan, and a community involvement/stakeholder involvement plan. The final presentation included the first two presentations with a control plan and a risk management plan.

Abilities of the students presented a special challenge. How does one get a high school student interested in project learning or project management given the current methods used in the education system of the U.S.? How does interest a high school student in areas of life they in all likelihood have never yet heard of or considered? In order to address this issue, we decided that college credit would be required to get the student to have a "what is in it for me". This provided incentive to high school students to participate in the program.

Second, the use of mentors from the PMI Delaware Valley Chapter provided the students with contact with experienced project managers. This provided a volunteer opportunity for local chapter members and an opportunity to help high school students in the local area. This use of mentors was found to be of great value to the students in the course, as provided a conduit between the abstract learning with concrete applications of the material.

## **Implementation of Program**

The pilot of the project began in June of 2008. It completed in August of 2008. The pilot class began with 15 students. Twenty five students were to be in the first class, but only fifteen actually attended. Of the fifteen students, none passed a pretest given on the first day of class. The mean grade of the pretest was 35.2%. The results of the program are as follows. The class presented their final presentations on August 5, 2008. All students passed the final presentations. A final examination was given the following day, this served as the post-test for the course. The mean grade of the post-test was 78.7%. These results reveal a statically significant difference between the pretest and post-test at a .05 confidence level. This indicates the course was successful in addressing its student learning goals.

## **Doing a similar program elsewhere**

The Philadelphia project was constructed so that it could be easily replicated anywhere in the United States. The first step in moving forward for PMI local chapter members is to explore the idea with local school officials. Some important issues to consider are show in exhibit 5.

### **Issues needed to be Explored**

- Are there enough available and supportive mentors in the local PMI chapter?
- Does the local chapter have the resources to support the program?
- Is there a nearby DeVry University campus to support the project?
- Is there interest from a local school district?
- Is there strong school district support?
- Is there corporate support of mentoring in your area?
- Does the local school district have the organization to support such a program?

Exhibit 5 – issues to be explored to commence such a program

## **Closing**

### **Review key points**

This paper was written to describe a program started in the Philadelphia School District for high school students to improve applied skills by the use of project learning and project management. This program combined 21<sup>st</sup> Century skills with Perkins Title IV requirements to create a program to support the education needs of American youth. It is hoped that this program will become a national program to address some of the shortcomings of the education system of the United States.

### **Contact information**

Dr. John J. Byrne, PMP  
[jbyrne@devry.edu](mailto:jbyrne@devry.edu)

Jim Snyder  
[Jsneaker@comcast.net](mailto:Jsneaker@comcast.net)

Diane Fromm  
[Diane.Fromm@pmi.org](mailto:Diane.Fromm@pmi.org)

Danielle Seward  
[dnhargrove@phila.k12.pa.us](mailto:dnhargrove@phila.k12.pa.us)

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