Introduction
For some time, U.S. Federal and state governments have been pushing for educational reform at the high school level that involves students in project-based learning, to increase student interest in science, technology, engineering, and math (STEM). Current research in project-based learning demonstrates that projects can increase student interest in all these subjects. While there has been a push for teachers to embrace STEM teaching, not many comprehensive practical examples exist in the educational literature. I designed this real-life scenario project to be an example of such a STEM project.

- Are students ready for the challenges of today’s highly technological society?
- Can they be productive members of a team? Leaders?
- Can they use today’s workplace tools including software analysis tools?
- Are students’ needs (both cognitive and non-cognitive) being met in today’s classroom practices?

Methods & Materials
Real-life scenario project-based learning
Project opportunities were investigated and students brainstormed to come up with possible choices. Students were provided with a variety of job situations (all jobs required acquisition of the same cognitive and non-cognitive skills) under the umbrella of different topics. Every effort was made to have students feel invested.

Lab equipment was inventoried and prepared for individual lessons. Preparations were made to obtain access to unavailable tools and equipment. A list of possible fieldtrips and contacts was prepared. Workshops were prepared. Consultation with necessary expert scientists took place. Permits and software were acquired.

Students participated in workshops where they learned surveying techniques including GPS, the use of testing equipment (photometer, air testing) and how to calibrate equipment before its use. Students read technical manuals and journals. Students learned time, presentation, and team management skills including how to use Google Calendar, Google Cloud, online journal entries and professional email.

Results
Upon completion of the project, students demonstrated the acquisition of 21st Century Skills in various degrees of proficiency, and all individuals demonstrated growth. The skills that are required for this project take time to master. Students assume leadership roles unlike those possible in a regular science course.

Students’ attitudes generally changed towards science. Students who had not previously expressed an interest in scientific careers are now considering one. Students see value and have expressed a need to be scientifically literate in order to be a responsible citizen (student survey).

The more difficult the project got, the more time the students were willing to spend on the project. About 20 percent of students completed more than 15 hours above the time which was required, and they wanted to continue the research even though they had received grades for the completion of the project (perseverance).

The completion rate for the real-life scenario project was 100% in comparison to other projects at the school, which on average had 12.5% of students who did not participate fully or who did not do the work.

Students demonstrated “a level of academic growth” clearly related to “future success in academia and the workplace” according to an evaluator. Teachers observed a level of complex higher level thinking that was not expected from “average” students.

Impact
The future workforce of New Mexico is in school right now.
Are students in New Mexico prepared to meet the needs of a now global economy?
Will these students join our communities as well-rounded individuals and assume positive roles in their communities?
What is the school system doing in the classroom to meet today’s needs?

While the real-life scenario project may not have all the answers:

- Students who were passive learners are now active learners.
- Students who did not have educational goals now do.
- Students who were not interested in science or math are now ready to excel in college.
- Students who were not interested in science are now college-bound.
- Students who had no involvement in their community have acquired some of the means to do so.
- Students are better prepared for the difficult challenges of today’s highly competitive workplace.
- The research resulted in practical strategies to be shared with other teachers and opens the door for communication and growth through meaningful classroom changes.

Conclusions
New curriculum initiatives and testing requirements, while necessary and a step in the right direction, are not the only items to consider if the students of New Mexico are to be fully prepared for academia and the workplace, and become well rounded and productive members of our society.

Teachers need to be able to do research and explore possible solutions to the issues that affect student success in order to better prepare students for the demands of today’s workplace.

Students exposed to this project not only learned skills necessary for today’s workplace but are now ready to excel in college. Students who did not have any idea of what careers to pursue in college have now chosen geology, chemistry, computer and mathematics majors. The fact that the project took seven months to complete, integrated disciplines as they are in the workplace, and fostered perseverance is one of the major reasons for its effectiveness. I use the strategies learned to be a more effective teacher and share the expertise with administration and other teachers.

References & Acknowledgements


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