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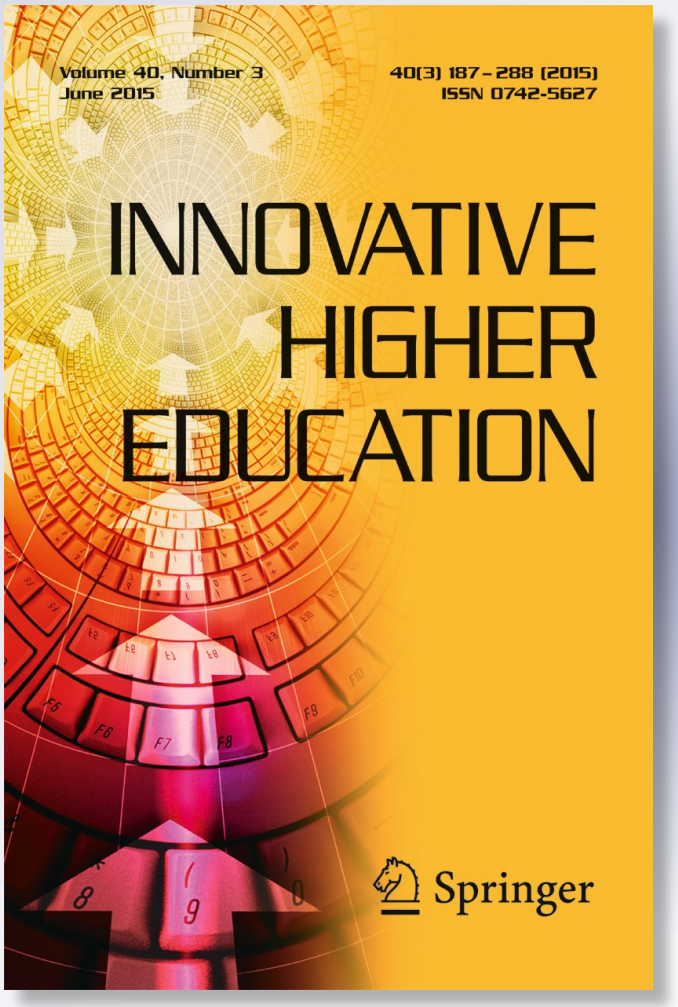

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Enhancing College Students' Life Skills through Project Based Learning

Scott Wurdinger · Mariam Qureshi

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Abstract This study examined whether life skills could be developed in a Project Based Learning (PBL) course. The participants were students enrolled in a graduate level PBL course. The same 35-question survey was given to students at the beginning and end of the course, and students were asked to rank their life skills using a Likert scale. Additionally, we interviewed three students in order to capture some of the student's views on the use of PBL. A paired sample t – test revealed that there was no significant difference from survey 1 to survey 2 in time management, collaboration, and work ethic; but there was a significant difference from survey 1 to survey 2 in responsibility, problem solving, self-direction, communication, and creativity. However, on average all life skills showed an increase. The interviews also indicated that PBL allowed students to practice and develop life skills.

Keywords Project-based learning · life-skills · engagement · motivation · students' self-perceptions

Project based learning (PBL) has been defined as:

> . . . a teaching method where teachers guide students through a problem solving process which includes identifying a problem, developing a plan, testing the plan against reality, and reflecting on the plan while in the process of designing and completing a project (Wurdinger, Haar, Hugg, & Bezon, 2007, p. 151).

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With this approach students design and complete projects, many of which require solving multiple problems during the process. Solving problems, in order to complete a project, takes more time than passive methods of learning because students may undergo multiple trial and error attempts before completing a project to their satisfaction.

To learn in this way students create and produce projects. For instance, they might construct a model from a blueprint, create an instructional video, design a web page, or create a learning portfolio as a project. Some educators are more teacher-directed with this approach and identify the projects for students, whereas others are more student-centered and allow students to create their own projects based on their own interests. This research study investigated whether a 16 week PBL course can enhance graduate students' life skills such as problem solving and time management.

Relevant Literature

Wagner (2012) interviewed a number of college students in an attempt to discover key elements that help individuals become innovative thinkers. One of the key themes that re-occurred throughout these interviews was the use of projects in the learning process. After interviewing students whom he viewed as innovative thinkers, he concluded, "Once again, we see the importance of an outlier teacher whose collaborative, project based, interdisciplinary approach to learning had a profound effect on the development of a young person" (p. 78-79).

Multiple research studies suggest that students are engaged in their learning when creating and completing projects; and they learn important life skills such as problem solving, time management, responsibility, and collaboration (Hall, Palmer, and Bennett, 2012; Starobin, Chen, Kollasch, Baul, and Laanan, 2014; Wolff, 2003; Zhang, Peng, and Hung, 2009). Krauss and Boss (2013) also identified important life skills that students learn while engaged in PBL, which included flexibility, organization, self-control, task initiation, time management, and metacognition (p.18). Increasingly, faculty members are beginning to use this method because they know it challenges students on an individual level, motivating and inspiring them by tapping into their own learning styles (Bender, 2012).

Other researchers have analyzed different benefits of using PBL such as student achievement, creativity, motivation, and teamwork. Barak and Dori (2005) conducted a research study with college freshman chemistry students and discovered that the project based experimental group outperformed the control group, the members of which were exposed to traditional textbook chemistry problems. After being involved in a project requiring the construction of molecular models, the project based group scored higher on their final exams and "enhanced their understanding of chemical concepts, theories, and molecular structures" (p. 117). Zhou (2012) conducted a qualitative research study with 20 first year engineering students who were enrolled in a PBL course. He discovered that students believed creativity was extremely important in helping them to design projects, to become more effective team members, and to improve motivation to learn. Palmer and Hall (2011) conducted a survey with engineering students, asking them questions about their experience with PBL courses. They sent out 237 surveys and received 72 back. They categorized some of their findings as "best aspects" and found that students enjoyed working in teams, believed that real world applications were important, would rather do project work than take examinations, enjoyed exposure to professional engineering work, and thought the instructors were helpful and supportive (p. 363). Jollands, Jolly, and Molyneaux (2012) interviewed 20 graduates from a School of Civil, Chemical, and Environmental Engineering. Some of these students had been enrolled in several PBL courses, and others had not. Both groups recognized that enrolling in PBL courses resulted in benefits such as project management skills, time management, confidence, communication skills, and systems thinking (p. 152).

In higher education one is likely to find individual faculty members using PBL. However, several undergraduate programs at Olin College and several undergraduate and graduate programs at Massachusetts Institute of Technology are using it extensively (Wagner, 2012). Neumont University in South Jordan, Utah, and Westminster College in Salt Lake City, Utah, integrate PBL in many of their courses. At Worcester Polytechnic Institute (n.d.) students complete a Major Qualifying Project in the students' major fields of study that allows them to spend a significant amount of time on an in-depth project.

The Study

The focus of this study was to determine if life skills could be developed in graduate students enrolled in a 16-week PBL course, which met for three hours per week. The University's Institutional Review Board had approved the research proposal. The life skills we investigated included time management, responsibility, problem solving, self-direction, collaboration, communication, creativity, and work ethic. We speculated that students might enhance these life skills if they were given the freedom to work on projects that were relevant and meaningful to them. The PBL course included book readings and discussions on PBL as well as the use of technology with PBL, but the most significant portion of class time was used for students to work on their projects.

There were 15 graduate students in the study who were enrolled in either a Master's Degree Program in Experiential Education or Educational Leadership. The students ranged in age from 22 to 55. There were seven males and eight females. One student was from Canada, one from Taiwan; and there was one deaf student.

Students were allowed to work together on their projects, however, they all chose to work alone because of their own individual interests. Students completed a short project proposal form that asked the following questions. "What three questions would you like answered concerning your project, how does your project affect your life outside of school, what makes this project important to the community or world around you, what help from other instructors or experts might you need, and what are three different resources you will use to complete the project?"

Readings were assigned and discussed during the first three classes. Students turned in their proposal forms during the fourth class after having discussed the proposals and receiving feedback from their peers in small groups. The next 11 class meetings were designed for students to network with peers and experts that could help them develop the project and overcome obstacles they were facing while moving towards completion. The last 30 minutes of class was used for students to report out to the large group on their progress. On the final day of class students presented a 5 minute power point presentation explaining their completed projects. Because students were given wide latitude, some chose projects that they were able to implement during the 16-week period of time, whereas others chose projects that were larger in scope and they then presented about their plans for implementation. Project examples included developing a summer academic program for Taiwanese middle school students; developing an experiential-based, best practices charter school in Alaska; and using PBL in health and physical education high schools classes.

We used a mixed method approach for this study that included surveys and interviews. The same 35-question survey was given to students at the beginning and end of the course. The first 34 questions asked students to rank themselves using a Likert scale where 1 represented Poor, 2 Fair, 3 Satisfactory, 4 Good, and 5 Excellent. Question 35 was an open-ended question asking students to identify those life skills that are important to learn prior to graduation. Each

question, except for 35, was attached to a specific life skill. For example, questions 1, 14, 19, and 30 were attached to the life skill of time management. A total of eight life skills had been identified for the survey, which included time management, responsibility, problem solving, self-direction, collaboration, communication, creativity, and work ethic. Anywhere from three to five questions were attached to each life skill. Our intention for using the same survey at the beginning and end of the course was to determine a baseline with the results from the first survey and then with the second survey to determine whether there had been any growth in life skills during the 16-week course.

At the end of the course students were invited to be interviewed, but only three volunteered. The small number of volunteers may have been due to the fact that it was the end of the school year and that students were leaving to return home or start a job. The interviews lasted 10-20 minutes and included three questions. Notes were written down from each interview, and we identified key themes and ideas. The three interview questions were as follows.

- Did you learn most of your life skills such as problem solving, communication, creativity, time management, responsibility, self-initiative, teamwork, and perseverance through your high school education classes, college classes, extra-curricular activities, personal life experience, or other? Please explain.
- Were there certain types of courses you took in high school or college that allowed you to practice life skills? Which ones and why?
- What are the most important skills you are learning from doing your projects?

Results

Survey

Eight life skills were measured in the survey: time management, responsibility, problem solving, self-direction, collaboration, communication, creativity, and work ethic. Figure 1 shows the self-reported average scores on the survey from the students before the course was taken and after the course was taken.

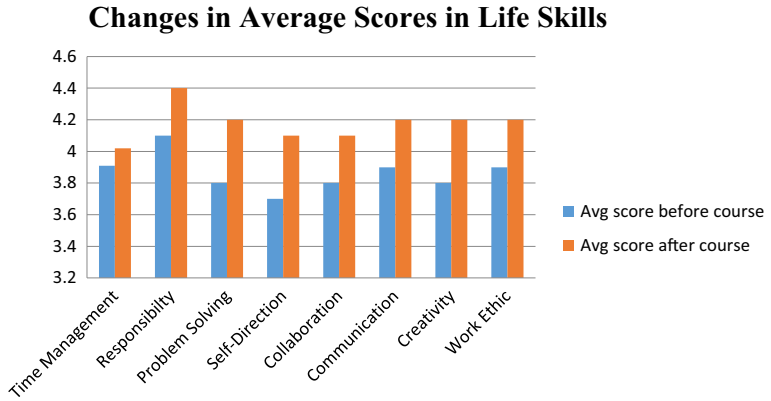

Fig. 1 Before & after average scores for all life skills

We conducted paired sample t-tests to compare the before and after scores. The predetermined significance level for the t-test was 0.05. Time management, collaboration, and work ethic showed no significant difference in change from survey 1 to survey 2, whereas responsibility, problem solving, self-direction, communication, and creativity showed a significant difference in change from survey 1 to survey 2. We conducted paired sample t-tests to compare the before and after scores. There were three skills that showed no significant difference in change from survey 1 to survey 2: time management, collaboration, and work ethic. Five skills showed a significant difference from survey 1 to survey 2: responsibility, problem solving, self-direction, communication, and creativity.

A significant difference between the before and after mean scores can be observed in Table 1 for responsibility, problem solving, self-direction, communication, and creativity skills. No significant difference can be observed in Table 1 for time-management, collaboration, and work ethic.

Interviews

The first question we asked students was whether they learned most of their life skills such as problem solving, communication, creativity, time management, responsibility, self-initiative, teamwork, and perseverance through high school education classes, college classes, extracurricular activities, personal life experience, or other.

LB said she learned most of her life skills through extracurricular activities such as soccer, Key Club, and Kiwanis service club. Soccer was a key activity for her because she learned how to communicate effectively with her teammates, as well as how to reach higher levels of technical skill. She also learned how to persevere by practicing challenging soccer skills to become a better player. As she reached higher skill levels she decided to pursue coaching positions, which taught her how to organize and manage a soccer team. She mentioned a number of in-depth projects she was involved in with Key Club and Kiwanis and how they taught her skills that she did not learn in high school classes. These projects were important to her development because they taught her how to solve problems, think critically, and be responsible for following through with them until they were completed. She also mentioned they helped her become a more effective communicator.

JJ mentioned that it was a blend of high school classes, college classes, extra-curricular activities, and personal life experience that taught him life skills. Specifically, he stated that there were particular instructors with whom he developed a personal relationship that taught him these skills.

Table 1 Overall summary of student perception scores for each life skill including the mean for survey 1, mean for survey 2, difference, and standard deviation

Life-Skills	Survey 1 Mean Average	Survey 2 Mean Average	Difference	Standard Deviation	Statistical Change
Time Management	3.91	4.02	0.105	0.881	Not observed
Responsibility	4.1	4.43	0.333	0.514	Observed
Problem Solving	3.86	4.25	0.391	0.556	Observed
Self-Direction	3.79	4.16	0.375	0.482	Observed
Collaboration	3.85	4.1	0.245	0.479	Not observed
Communication	3.97	4.25	0.275	0.281	Observed
Creativity	3.84	4.24	0.401	0.593	Observed
Work Ethic	3.98	4.23	0.253	0.511	Not observed

He said these instructors became role models for him and he wanted to work harder for them because they were investing more time to get to know him and understand his passions and interests.

SZ also mentioned that it was a blend of academic classes, extracurricular, and personal life experience. In particular he mentioned band, drama, singing, and serving as yearbook editor that were especially meaningful to him because he was allowed to pursue projects that were not being graded and he was able to exercise more freedom to pursue his ideas and make decisions.

The second question was whether there were certain types of courses taken in high school or college that allowed one to practice life skills. LB mentioned the courses that taught her the most in this area were those in which instructors allowed discussion and debate in the classroom. She said the two courses that taught her the most were a health class and a religion class. The health instructor raised a number of controversial issues and then held debates, and the religion instructor held discussions and asked probing questions that made students think about their own worldviews. Problem solving and critical thinking were important skills that these professors emphasized in their courses.

JJ said it was less about the way the course was taught and more about how the instructors treated their students. He said he learned the most about life skills from his art and history teachers because they were authentic and tried to make the courses relevant to all the students. He stated that they focused their classes on issues that were important to students as opposed to following the curriculum and textbooks. SZ said it was his speech and communication courses that taught him the most because he learned how to communicate better by giving a variety of speeches and was forced to do research on topics that allowed him to be prepared and feel more comfortable when giving his speeches.

The third question was related to the PBL course and was specifically about what the students were learning while doing their class projects. The question asked was what were the most important skills being learned from doing the projects. LB mentioned that organization was one of the primary skills she was learning. She stated,

> I have learned that I am a lot better at managing my time when I have a busy schedule than when I don't have a lot going on. I have also learned that, when I am passionate about something, I can spend a lot of time learning about it and focusing on that topic. Finally, I have realized that I am persistent when I reach a problem and become determined to find a solution.

LB is one of the students who is also a teacher, and she was implementing her project with her own students. Her project was to integrate PBL with her health and physical education classes. She commented, “I am working on making projects more individual for my students. It's important to let kids work at their own pace and on their own ideas and passions.” JJ stated,

> I'm learning about my own interests and abilities. In considering the project for this class and looking ahead to a project (a creative project is one option for a culminating graduate experience at this University), I take stock in what I really want to do with my life. I'm thinking about starting my own school based on old world art techniques.

His class project might evolve into his capstone project for his master’s degree program. SZ stated that,

> I am learning how hard it is to tackle a big idea/project and break it down to a manageable size, as well as how to set smaller, measurable goals, which help me move forward without losing sight of the bigger goal.

SZ is a Teaching Assistant in the speech communications department and is trying to figure out how to integrate projects into the courses he teaches.

Discussion

Life skill development is not easy to assess because these skills require time to develop and individuals continue to improve upon them over time. Interestingly, at the end of the 16 week PBL five of the eight life skills showed statistically significant differences as self reported by the students. These skills were problem solving, communication, creativity, responsibility, and self-direction. This suggests that the PBL course did indeed have an impact on life skill development. However, the researchers recognize that other factors such as family life, extracurricular activities, or personal life experiences during this 16-week time period may have effected life skill development as well.

Collaboration, time management, and work ethic increased but not at a statistically significant level. Collaboration may not have increased because students were not required to work together on their projects, and work ethic may have already been well developed because of family upbringing where parents encouraged them to work hard at school or in job environments. It is possible, and probable, that these students, who were at the graduate level, already had well developed time management skills through the process of obtaining their undergraduate degree. One other limitation to the study was that we did not ascertain whether or not these students had any prior experience with PBL in their undergraduate or graduate education.

Nonetheless, significant in-depth projects allow students to practice life skills, which appears to be an effective teaching method in helping students develop these skills. When students are given the freedom to develop relevant in-depth projects over a 16 week period of time, they must solve problems that crop up during the project process, be creative in developing plans, communicate with peers and consultants, and ultimately become more self-directed with their learning. Project development is time consuming and requires effective communication between the student and instructor so that the student may continue to move forward in project process.

The learning process with PBL is complex and involves solving multiple problems along the path to completion. For example, creating a charter school is an in-depth project that requires solving a variety of problems in the areas of curriculum development, teaching methods, the hiring of teachers who fit the school's philosophy, budget, and school governance. Each one of these project components consists of multiple problems that will have to be solved. Students must learn how to create plans, test them against reality to determine their worth, and reflect on what to do next. Depending on the scope of the project, students will need to go through this process many times before the project is completed. The PBL model (Figure 2) illustrates how the learning process begins at the present and leads out into the future spiraling from one problem to the next. Each problem requires planning, testing, and reflecting to determine whether or not a solution has been obtained, and with each spiral students are using and learning life skills. In depth projects not

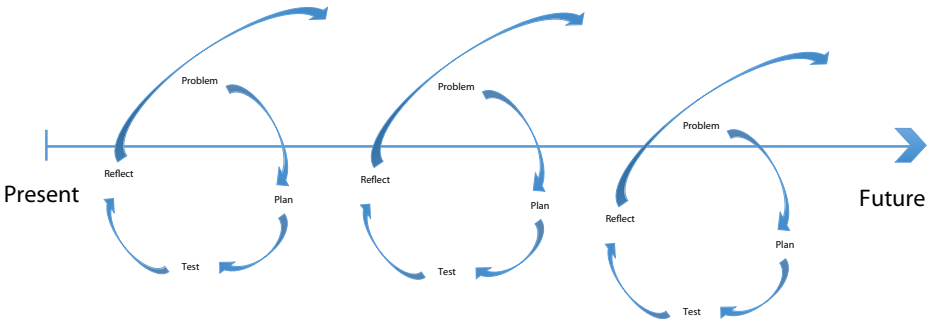

Fig. 2 Project Based Learning

only require students to go through the problem solving process multiple times; it also requires them to use a variety of life skills to complete them.

Conclusion

Our research gives reason to believe that PBL promoted an increase in students' life skills, specifically problem solving, creativity, responsibility, communication, and self-direction; and the study adds to the data and literature about PBL. However, there may have been other contributing factors for these increases in life skills such as other college courses, extracurricular activities, or life experiences. Perhaps college course assessments in general should focus more on learning these types of skills because these are the skills that individuals need and use on an ongoing basis throughout life.

PBL is an effective teaching methodology that motivates and inspires students to learn, as long as they engage in relevant projects. There are pitfalls with any teaching methodology, but the critical aspect in any learning environment is to engage students in their learning. Students, especially at the collegiate level, appreciate the freedom to explore their own interests and passions; and using a student-centered approach with PBL allows them to explore and pursue relevant topics for their projects. We recommend further consideration of PBL as an effective teaching approach at the collegiate level.

References

Barak, M., & Dori, Y. J. (2005). Enhancing undergraduate students' chemistry understanding through project-based learning in an IT environment. *Science Education, 89*, 117–139.

Bender, W. N. (2012). *Project-based learning: Differentiating instruction for the 21st century*. Thousand Oaks, CA: Corwin.

Hall, W., Palmer, S., & Bennett, M. (2012). A longitudinal evaluation of a project-based learning initiative in an engineering undergraduate programme. *European Journal of Engineering Education, 37*, 155–165.

Jollands, M., Jolly, L., & Molyneaux, T. (2012). Project-based learning as a contributing factor to graduates' work readiness. *European Journal of Engineering Education, 37*, 143–154.

Krauss, J., & Boss, S. (2013). *Thinking through project based learning: Guiding deeper inquiry*. Thousand Oaks, CA: Corwin.

Palmer, S., & Hall, W. (2011). An evaluation of a project-based learning initiative in engineering education. *European Journal of Engineering Education, 36*, 357–365.

Starobin, S. S., Chen, Y., Kollasch, A., Baul, T., & Laanan, F. S. (2014). The effects of a preengineering project-based learning curriculum on self-efficacy among community college students. *Community College Journal of Research and Practice, 38*, 131–143.

Wagner, T. (2012). *Creating innovators: The making of young people who will change the world*. New York, NY: Scribner.

Wolff, S. J. (2003). *Design features of the physical learning environment for collaborative, project-based learning at the community college level*. St Paul, MN: National Research Center for Career and Technical Education, University of Minnesota.

Worcester Polytechnic Institute website (n.d.). *Major Qualifying Project. R*etrieved from http://www.wpi.edu/academics/ugradstudies/mqp.html

Wurdinger, S. D., Haar, J., Hugg, B., & Bezon, J. (2007). A qualitative study using project based learning in a mainstream middle school. *Improving Schools, 10*, 150–61.

Zhang, K., Peng, S. W., & Hung, J. (2009). Online collaborative learning in a project-based learning environment in Taiwan: A case study on undergraduate students' perspectives. *Educational Media International, 46*, 123–135.

Zhou, C. (2012). Integrating creativity training into problem and project based learning curriculum in engineering education. *European Journal of Engineering Education., 37*, 488–499.