Applying Project Based Learning
In the Training of Health Educators

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Abstract

The purpose of this paper is to demonstrate the use of Project-Based Learning (PBL) to enhance the training of health educators. This study examines the elements and evolution of PBL in contrast to traditional education. It looks at successful use of PBL in the classroom and training of educators in secondary and post secondary situations. Examples of health education programs using PBL are investigated and, finally, a case study of a successful program illustrates the significant results of Project-Based Learning in the field of health education.

Introduction

Project-Based Learning is not a new idea in education, but one that is finding new life. This renewed interest comes from the mounting evidence that students need more opportunities to exercise their higher-order thinking and problem-solving skills. The Secretary's Commission on Achieving Necessary Skills Report identified "new basic skills" all students need to master (SCANS, 1991). Murmane and Levy (1996), examined these changing demands and concluded that PBL is one methodology that can build students' skills and provide meaningful practice in all of these new basic skills. If students are going to enter the job market armed with the necessary skills, educators must change their current method of instruction. (Diehl, Grobe, Lopez, Cabral,1999).

The goal of education is to prepare students for the future. Reenergizing health education with Project Based Learning does not change that goal, but by shifting the roles of health educators, learners, and policy makers, the potential to accomplish the goal is greatly increased. Students participating in such programs are empowered to take responsibility for their own learning, and as a result, their creativity, motivation, and confidence increase. As healthcare providers cooperate with teachers and employers to provide real-life learning experiences, students' ability to learn and apply healthcare concepts soars. The following examination of Project Based Learning as a teaching strategy in health education programs reveals that collaboration leads to success.

Literature Review

Project-Based Learning Overview

Project-Based Learning (PBL) organizes learning around projects instead of or in addition to, textbooks and lectures. A project involves a number of activities leading to an end point and resulting in a product or presentation. However, simply completing a project does not guarantee that learning is taking place. To ensure learning occurs, projects need to be carefully selected and designed to cover the necessary content and assess the desired skills. Project-Based Learning engages students in complex, real world issues and problems. It requires students to use inquiry, research, planning, critical thinking, and problem solving skills to learn, and requires them to apply content-specific skills, standards, and knowledge in a variety of contexts as they work. PBL also provides opportunities for students to learn interpersonal skills as they work in cooperative teams and with employers and community members; these interactions give students practice in using many skills necessary for success in their adult lives and careers. Finally, PBL includes expectations regarding learning outcomes, while incorporating reflective activities that lead students to think critically about their experiences (Schwarts, 1999).

Project-Based Learning is known by many other names: Problem-Based Learning, Thematic Instruction, School-to-Work, or career programs. No matter which title is used, these methods have common components. Each provides learning experiences through complex projects that enable students to develop particular abilities and knowledge. These models share strategies that recognize that significant learning taps students' inherent drive to learn, capability to do important work, and need to be taken seriously. They are successful because they focus on learning in which the results are not predetermined, yet require students

to draw from many information sources and disciplines in order to solve problems. By their very definition, these models require students to coordinate time, work schedules, and project outcomes to accomplish shared goals (Rogers, 1996).

Elements of Project-Based Learning

PBL is a curriculum development and instruction system that simultaneously develops both problem-solving strategies and disciplinary knowledge bases. "PBL is not necessarily intended to replace other classroom models so much as to supplement traditional methods with additional resources to enhance student learning" (Kingsley, 1997). There are many definitions of Project-Based Learning yet all agree that PBL is a strategy that gives students an opportunity to learn through their experiences and interests. The PBL Network, formed by the Autodesk Foundation, defines true PBL through these basic elements: relevance, rigor, active learning, experiential learning, and incorporation of instruction, reflection, and assessment.

Relevant projects are able to meet the curriculum needs and the interests of students. A relevant project has practical value beyond the classroom in the community, and requires that teachers endeavor to relate curricula to real life issues that help students grasp what they are learning and why they are learning it (Kingsley 1998).

Academically rigorous projects ensure that students use prior academic knowledge and research skills, determine what new academic knowledge and research skills are needed, and then acquire them. In these successfully rigorous ventures, students gather information from a variety of sources, while teachers encourage work that is complete and drawn from the full range of students' abilities. The Coalition of Essential Schools concludes that situating

learning in real world context can breathe new life into academic explorations and new rigor into work-related studies (Horace, 1998).

The use of Project-Based Learning has lead to increased emphasis on inquiry-based learning, hands-on experiences, cooperative learning, authentic assessment, and embedding the learning in real context. These changes are at the core of much of the educational reform throughout the country. Darling-Hammond discussed these fundamental changes in her 1998 book on education reform.

> Work that results in deep understanding has at least three features: it requires the use of higher-order cognitive functions, taking students beyond recall, recognition, and reproduction of information to evaluation, analysis, synthesis, and production of arguments, ideas, and performances. It asks students to apply these skills and ideas in meaningful context, engaging them in activities they have real reason to want to undertake. And it builds upon students' prior learning, pressing them toward more disciplined understandings (Darling-Hammond, 1998, p.109).

Another key aspect of PBL is experiential learning. Experiential learning is the term used for the process of drawing learning from experience. While experiences can include listening to lectures or passively reading reference materials, experiential learning is about active learner involvement (Resnick, L. & Wirt, J., 1995). Steinberg and Lubart (1991), found that teachers or a textbook formulated most classroom problems, and that they tended to be simplistic, unrealistic, and intellectually unchallenging. They observed that when students are allowed to define their problems, teachers noticed that creativity increased. For students to develop their creativity, the attributes of tolerance, ambiguity, risk taking, and confidence in oneself need to be encouraged. Enabling students by shifting power to them through PBL can

develop each of these qualities (Steinberg & Lubert, 1991).

In working with teachers as they plan effective curricular projects, Jobs for the Future uses a framework designed by Adria Steinberg. In her book <u>Real Learning, Real Work</u>, she suggests the following "Six A's" to consider when designing projects.

Authenticity: Where in the "real world " might an adult tackle the problem or question addressed by the project? How do you know the problem or question has meaning to the student? Who might be an appropriate audience for the student's work?

Academic Rigor: What is the central problem or question addressed by the project? What knowledge area and concepts will it address? What habits of the mind will students develop? What learning standards are you addressing through this project?

Applied Learning: What will students do to apply this knowledge to a complex problem? Which of the competencies in a high-performance work organization, (e.g., working in teams, using technology appropriately, communicating ideas, collecting, organizing and analyzing information), does the project provide opportunities to develop? Which self-management skills, (e.g., creating a work plan, prioritizing pieces of work, meeting deadlines, identifying and allocating resources), does the project require students to use?

Active Exploration: What field-based activities does the project require students to conduct? Which methods and sources of information are students expected to use in their investigation?

Adult Connections: Do students have access to at least one adult, outside the classroom with expertise in the area they are exploring, who can provide feedback and offer advice? Does the project offer students the opportunity to observe and work with

adults during at least one visit to a job site with relevance to the project? Will an adult

from the industry tell students about real-world standards?

Assessment Practices: What are the criteria for measuring required student

outcomes? Are students involved in reviewing or helping to establish the project

criteria? Which methods of structured self-assessment are students expected to use?

Do students receive timely feedback on their works in progress from teachers,

mentors, and peers? What work requirements are students expected to complete during

the life of the project? Do students prepare a culminating exhibition at the completion

of the project to demonstrate their ability to apply the knowledge they have gained?

When educators use this framework to design curricular projects, students will be

drawing learning from experience. Although a portion of the student experiences will include

listening to lectures or reading reference materials in order to gain background information for

the project, this framework for experiential learning ensures active learner involvement.

Traditional Education

Scientific, economic, and technical changes have profoundly impacted the nature and

structure of work in our society. Traditional ways of educating students fall short of the new

reality (Bailey, 1995). Takahashi reports that a number of studies have pointed out the nature

of traditional education as relatively autocratic, putting importance on speed, orderliness,

respect for authority, and competition. "In general, traditional education puts heavy emphasis

on transmitting knowledge, memorizing facts, and finding answers to questions which have

prepared answers." Traditional education tends to give knowledge to students in order to

work through previously solved problems (Takahashi, 1999). Dewey described the

characteristics of such traditional education by saying, "The subject matter of education consists of bodies of information and of skills that have been worked out in the past. Therefore the chief business of the school is to transmit them to the new generation." (Dewey, 1938). In contrast to traditional classroom instruction, projects give students substantial input in the learning process by encouraging them to negotiate with teachers and employers on the content, time frame, and assessment criteria for the project (NWREL,1997).

Through his studies at Southern Illinois University Medical School, Howard Barrows has concluded that the particular way in which students are asked to learn has a strong influence on how well they will be able to recall and apply what they have learned in the real clinical world outside of medical school. If the major concern of an educator is only that students perform well on written tests of recognition and recall, they approach education by exposing students to all the information they deem essential then test them at the end of the course to see if they are able to regurgitate a sufficient amount of that information in an oral or written test. Students will forget most of what educators have asked them to memorize and will not be able to apply what they can recall in practice. Barrows calls this approach educational malpractice that " is tragically inefficient when one considers how much energy faculty put into teaching and students put into studying during preclinical years to result in such a small yield." He believes this conventional medical education approach is inappropriate if educators expect their students to become independent, reason through patient problems, recall and apply what they have learned, recognize when their skills and knowledge are not adequate, and acquire new information and skills as they need it (Barrows, 2000). Gwendie Camp, of The University of Texas Medical Branch, agrees: "Faculty who want students to learn, to remember, to apply, and to continue to learn once out from under their tutelage have,

under the 'traditional' format, often been disappointed. Too many students memorize, forget, fail to apply or integrate knowledge, and resist further learning." She believes student autonomy, building on previous knowledge and experiences, and the opportunity for immediate application are all known to facilitate learning in adults, and thus should foster the success of a Project-Based Learning approach with medical students who are adult learners (Camp, 1996).

Traditional curricula, in which students acquire background knowledge of the basic sciences in the early years of coursework and in the later years apply this knowledge to the diagnosis and management of clinical problems, has been criticized for a number of reasons. It creates an artificial divide between the basic and clinical sciences; time is wasted in acquiring knowledge that is subsequently forgotten or found to be irrelevant; application of the acquired knowledge can be difficult; the acquisition and retention of information that has no apparent relevance can be boring and even demoralizing for students. PBL avoids these problems as learning occurs in context and builds upon what students already know. This educational approach aids retention, adds interest, and increases motivation to learn (Finucane, 1998).

The emphasis that permeated the traditional school was recitation, memorization, recall, testing, grades, promotion, and failure. For this kind of education it was necessary that children primarily listen, sit quietly and attentively in seats, try to fix in their minds what the teacher told them, commit to memory the lessons assigned to them, and then, somewhat like a cormorant, be ready at all times to disgorge the intake. This fixed, closed, authoritarian system of education perfectly fitted the needs of a static religion, a static church, a static caste system, a static economic system (Hirsch, 1996).

Evolution of Project-Based Learning

While credit is given to Smith Vocational-Agricultural School in Northampton, Massachusetts as the place PBL was first developed on a systemic basis to make agricultural education both concrete and practical, the methods used in PBL have a deeper history (Alberty, 1927). Mention of project-centered curricula was made as early as 1918 in the Teachers College Record. William Kilpatrick wrote, "The concept of building curriculum around a project is not a fact newly born." (Alberty, 1927). The great educational philosopher John Dewey discussed the very same issue long before that article was written in The School and Society which was published in 1899 (Dewey, 1916).

Project-based learning is based on the Constructivist Model. Jean Piaget, John Dewey, Seymour Papert, and Alan Kay have shown this model is valid and academically sound by proving the construction of knowledge is emotionally satisfying. Dewey states that learning is the quintessential emotional experience. Dewey believed that learning should be experiential and that students must construct their own knowledge. In the late 1800's he proposed that learning should be natural and meaningful and that, through the continual experimentation, the "scientist" in students would learn. Dewey was concerned with the need for learners to experience democracy in their education in order for them to become mature and responsible. He knew that learning should be initiated by the student and sustained as student oriented. Dewey published an early description of these student--centered, progressivist approaches in The School and Society. New research in the areas of cognitive psychology and learning, coupled with enormous changes in the world for which students must be prepared, have only recently given impetus to PBL (Rogers, 1996).

Danner and Lonky, (1981) concluded in their study of educators and learner control that students need more options in expressing their knowledge. Students were motivated by tasks that grew increasingly more difficult. They found that the best way to match students' abilities to tasks was to give the students a choice of activities and, therefore, responsibility for their own learning. (Danner & Lonky, 1981) Similarly, Nelson and Frederick found that allowing students to help design the curriculum increased motivation and ownership (Nelson & Frederick, 1994).

Whether a teacher subscribes to the philosophy of Dewey and permits students the opportunity to choose their own project ideas or not, the topics must be generative. Through the "Teaching for Understanding Project" Perrone examined the need for "generative topics." These topics are defined as ones that are broad and complex enough to elicit interest, even passion, in the learners involved. Without a vested interest in the work, students are not as likely to gain meaningful, lasting knowledge (Perrone, 1994). Wiske asserts that projects break teaching taboos. Traditionally the role of teachers was to have authority over learners, give knowledge, and take responsibility for all learning. Teachers using the methods of Project-Based Learning share their role with learners, and students are empowered by their own abilities and opportunities. Breaking that taboo also requires that teachers become learners and learners become educators (Wiske, 1994).

German schools have long emphasized the view that learners are responsible for their own learning. Zahorik and Dichanz, (1994), found that German schools produce lifelong learners by implementing multi-year grouping, community-based curricula, and responsive teaching. Educators in Germany have the same learners in class for more than one year, ensuring that the students' needs and abilities are well known. Their students connect

classroom work with their communities by involving people outside the schools in projects and studies. Through projects, the learners come face to face with real solutions that can impact their world. This early awareness of community needs starts learners on a path to lifelong involvement as pro-active members of society (Zahorik and Dichanz, 1994).

Examples of Effective Programs

Case Western Reserve University

The Project Based Learning pedagogy was pioneered at Case Western Reserve University in the early 1950's (Savery, 1994). Currently, over eighty percent of medical schools in the U.S. use the Project Based Learning methodology to teach students about real and hypothetical clinical cases (Bridges, 1991). Case Western educators recognized real life problems seldom parallel rigidly structured classroom scenarios, hence the ability to solve traditional school-based problems does little to increase the relevant, critical thinking skills medical students need to interact with life beyond classroom walls. The lockstep solution sequence taught in traditionally structured classrooms is seldom transferable. Instead, real-life problems present an ever-changing variety of goals, contexts, contents, obstacles, and unknowns that influence how each problem should be approached and Case Western students are encouraged to assume greater responsibility for their own learning.

Evaluations conducted in the medical field indicate that Case Western students and others taught through Project Based Learning master content as well as students in the traditional courses. PBL students scored higher on the NBME II and NBME III clinically oriented standardized exams, than students in traditional courses (Merrill, 1993). These tudents also demonstrated better clinical performance in residency programs. Medical

students schooled using the PBL method consistently score better than traditional students with respect to learning skills, problem solving, self-evaluation techniques, data gathering, behavioral science, and relation to the social-emotional problems of patients (Albanese, 1993).

University of Delaware

The University of Delaware recognizes that the United States Health Care system is in a state of change. The system is moving from a primary, hospital-based approach to health care patterned after the medical model, to an outpatient service more closely aligned with the health or preventive medicine model. These changes in the way health care is delivered to people impact the professional development of soon-to-be health care practitioners. In response to the changing needs of students and the community in 1995 the Department of Nutrition and Dietetics at the University of Delaware developed its own Dietetic Internship program. The Program is Project/Problem Based and is described by Barbara Duch, associate director of Math and Sciences Education Resources Center at UD, as a means of "challenging students to 'learn to learn' so that they can achieve their highest potential in their chosen professions." (Duch, 1995). The University of Delaware had historically relied upon the case study method of training Registered Dietitian students, but this new approach has maximized the opportunity for authentic learning experiences. In working to solve real-world problems students are provided public health case studies, each focusing on a different dimension of professional responsibility. This simulated, interactive, multimedia-based approach eliminates practice exams and case study methods, offering many improvements over traditional methods. Currently, the program is accredited and co-sponsored by the Delaware

Division of Public Health and serves as a professional development ladder for state public employees seeking to become registered dietitians. Although the program began in Delaware, it is now a national distance education option through which prospective applicants will remain in their home locations while completing the internship requirements. The freedom the Internet affords students is also the ideal solution to the perplexing problems involved in educating practitioners situated in under-served areas of the country. This new system provides interns with professional development opportunities that develop their skills today, so that they may better serve their communities in the future (Kemery, 2000).

Comprehensive Community Health Models of Michigan

There are many good examples of community level work in Project Based Learning and health education throughout the state of Michigan and the country. In Michigan, partnerships have been developed to bring effective programs to those in need. The Comprehensive Community Health Models of Michigan Initiative is committed to putting tools in the hands of people and expanding community capacity to reshape the health systems that serve them (CCHM, 1999). Through this partnership the W.K. Kellogg Foundation provides information, technical assistance, and training to assist three counties in assessing local health systems and health status, identifying community priorities, and redirecting resources to meet the health needs of people. The objectives of the Comprehensive Community Health Models of Michigan initiative are to establish an inclusive, accountable health care decision-making process, improve health by increasing access to affordable coverage and preventive health services, expand the availability of health status and system information, and increase health system efficiency by fostering the development of a

comprehensive, integrated health system. The CCHMs Initiative involves a diverse group of stakeholders, providers, purchasers, and consumers in dialogue about health, health priorities, health systems, and health resources. It is creating a central forum for community debate and decision-making around health issues, identifying barriers to access within communities, and implementing collaborative solutions for reducing them. Finally, the CCHMs Initiative is refining a model for inclusive community decision-making on health priorities, resources, and opportunities (CCHM, 1999).

The basic elements of health education and Project-Based Learning are embedded in the key assumptions guiding CCHMs Communities. These communities believe that since health services are purchased, delivered, and consumed at the local level, health is a community issue and it is more than medical care. Another keystone is that access to adequate coverage and appropriate care will improve the health of people. Additionally, they understand that creating effective links between medical care, public health, and human services will improve health status. CCHMs Communities have proven that active participation by consumers, payers, and providers can build community support for health system change. Finally, they believe shifting revenues and incentives to primary care and prevention will improve local health status. The heart of the Initiative is allowing the patients to become self-directed problem solvers, and the health care providers to act as facilitators rather than disseminators of information.

This unique, community-based solution to the problem of healthcare has been developed by the Muskegon Community Health Project (MCHP) in partnership with the Comprehensive Community Health Models of the W.K. Kellogg Foundation and the Community Foundation for Muskegon County. This pilot program follows a three-year effort

of community meetings, work group planning sessions, and wide-ranging research. Participants in this effort have come from all sectors of the community. From the inception of the project everyone involved has shared a commitment to the virtue and feasibility of community ownership of the solution, as opposed to a legislative mandate for expanded health care. There is a sense of great civic pride in this effort.

The MCHP has developed a community decision-making process engaging consumers, providers, and purchasers in assessing community health, identifying priorities, and managing resources. It has expanded community-wide coverage to ensure appropriate health system access to citizens, and created an integrated, comprehensive health delivery system focused on primary care and prevention. Finally, the Muskegon Community Health Project has developed a health information system to support informed decision making among consumers, providers, and purchasers, and is pursuing ongoing heath assessment to evaluate community health status and needs. Polling, outreach, and area mayor's forums have helped project leaders identify a wide range of health issues including the lack of minority providers, the need for dental care among under-served populations, and the need for coordinated approaches to address pressing local health problems.

This community health project is a successful one because it integrates the concept of Project Based Learning with health education on a new level. Like so many other medical centers, the Muskegon Community Health Program blends multiple models of health education to create a seamless presentation of information. However, unlike other medical centers, the project recognizes the need to connect to the community in which it is based. Maintaining the Project Based Learning approach to health education empowers the Muskegon community to invest themselves in their own health care. Coupling PBL and

health education has yielded a partnership between the health care community and the

community at large which promises to continue to reshape the health systems of tomorrow.

Evaluation of Project Based Learning

Project-Based Learning has generally been shown to be effective in increasing student

motivation and in improving student problem solving and higher order thinking skills.

Problem-based learning practices, which share most of the features of Project Based Learning

in K-12 settings, have been used for many years in higher education (Barrows, 1996 Schmidt,

1994; Williams, 1992). Recently, two reviews have summarized more than twenty years of

evaluations of PBL in medical education (Albanese & Mitchell, 1993; Vernon & Blake,

1993). These studies show that medical students in PBL programs perform as well as

students in traditional programs on conventional tests of knowledge. Additionally, PBL

medical students do better on tests of clinical problem-solving skills.

Project Based Learning is especially effective when supported by educational

technology (Blumenfeld, et al, 1991; Means & Olson, 1997; Coley, Cradler, & Engel, 1996).

Strong evidence of learning gains was shown in evaluations of K-12 instruction associated

with PBL plus technology. Ryser, Beeler, McKenzie, 1995; Pellegrino et al, (1992) Means

and Olson gathered observational and interview data in preparing the Technology and

Education Reform: Technical Research Report confirming evidence for the proposition that

technology is an important enabler for classes organized around complex, authentic tasks.

When technology is used in support of challenging projects, it in turn can contribute to

students' sense of authenticity and to the "real life" quality of the task at hand. Being able to

access the tools that are used by professionals for similar tasks allows students to aspire to a

level of work and quality of product that more closely reflect what they see and know of the outside world. Technology use allows students to be actively thinking about information, making choices, and executing skills than is typical in teacher-led lessons. When technology is used as a tool to support students in performing authentic tasks, the students are in the position of defining their goals, making design decisions, and evaluating their progress (Means, 1995). In Union City, New Jersey eighth graders in an interactive multimedia education trial scored approximately 10% higher than students from other urban and special needs districts on statewide assessments of reading, mathematics, and writing achievement (Educational Development Center, 1994). Such changes were reflected in teachers' reports that technology use increased the amount of collaboration, student regulation of their own learning, and students teaching teachers. Technology facilitates a change in the teacher's role also by making it easier to act as a diagnostician and coach for the cognitive aspects of task performance. Technology can help to make the students' thinking processes more visible to the teacher, something that does not happen when students simply turn in a completed assignment for checking and grading. As teachers observe their students working with computer applications, they can see the choices each student is making, stop and ask about the student's goals, and make suggestions for revisions or different strategy (Means, 1995).

When evaluating the impact of Project Based Learning versus traditional education there are several points to consider. The many studies that have been carried out to evaluate the effectiveness of problem-based learning are fraught with problems that make them difficult to interpret. PBL is linked to the constructivist theory of learning, which necessitates a shift in learning objectives by stressing higher order thinking skills and performance-based authentic assessments, therefore standard achievement tests may not be the best measures of

its impact. PBL is typically implemented in the context of comprehensive educational reforms and it is difficult to isolate the direct effects of PBL on student learning. Project Based learning and closely related instructional strategies are implemented differently in different contexts and therefore it is difficult to compare results across cases (Pellegrino et al, 1992).

Unfortunately most of the reviewers who have attempted to synthesize the results of studies evaluating problem-based learning do not realize how difficult it is to generalize from reports and studies from individual schools that claim to use problem-based learning. In fact, most medical teachers are unaware of the many marked differences that are present in these schools and how erroneous it can be to generalize about problem-based learning from observations or reports from a particular school. PBL curricula can differ remarkably in curricular design, the extent of the curriculum that is problem-based, the problem formats used by students, the role of the teacher, the size of the student group, the degree to which conventional curricula_compete with problem-based learning, the kinds and number of subjects or disciplines that are not included in the problem-based learning curriculum, the degree to which students are given responsibility for their learning as opposed to the teacher, the stress put on self-directed learning or clinical problem solving, the methods used for student assessment, and the use of grades versus pass-fail decisions. There are uncontrolled variables in the educational setting that could affect student performance independent of problem-based learning (Barrows, 2000).

Methods

Health education is described as "any designed combination of methods to facilitate voluntary adaptation of behavior conducive to 'improved' health practices." (Green, ET al, 1980). Health behavior is included as the central concern in every definition of health education and is the crucial, dependent variable in research on the impact of health education intervention strategies. Positive change in health behavior is the ultimate goal of health education programs. A working definition of health behavior should include not only observable, overt actions, but also the mental events and feeling states that can be reported and measured to give a full picture of health (D'Onofrio, 1992). Educators in general education and health education in particular seek the same goals for those that they teach: independence, self-efficacy, and continued growth. This case study is examining the use of an addition tool in health education, PBL and the application of PBL training for health educators.

Protocol

Case studies are papers in which the author describes case material obtained while working with an individual or organization to illustrate a problem, to indicate a means for solving a problem, or to shed light on needed research or theoretical matters. The case study method of research has the lowest level of constraint in scientific research. Case study research is carried out with one subject at a time focusing on the subject's behavior with little constraint focused on the subject by either the researcher or the setting. One limitation of a case study is that it looks at limited cases rather than the total context and natural flow of behavior (Graziano & Raulin,1993).

The following case study is an example of the successful application of Project-Based Learning in the training of health educators. The GASC Technology is a county school serving a population of approximately 2500 students of whom 600 are interested in pursuing careers in health. The portion of the curriculum that was examined was the partnership the Technology Center has with the American Lung Association. This partnership was the beginning of a project involving students from the GASC Technology Center and the elementary students in the Flint Community Schools.

The context of this case study is the association between the training of health educators in PBL and the increased success of community health education programs, specifically the Open Air Ways program. The objective of this study was to examine the benefits of having GASC students deliver the curriculum through a PBL preparation to the elementary students. The design of the study is to look at elementary students who have asthma or symptoms of asthma and teach them how to identify and manage their health problems. The measures that were taken were pre-tests, and post-tests, and feedback from teachers, parents and students who delivered the programs.

Case Study

GASC Technology Center

The GASC Technology Center provides career and technical education to high school students throughout Flint, Michigan. Developed in 1969, GASC is a non-traditional educational setting where Project Based Learning can be seen at its best. This alone, however, is not what makes GASC successful. The health occupations program has sculpted

the foundation for blending health education and PBL. A major component of this program requires student preparation and implementation of a health education project in local elementary schools. Each class of students has the opportunity to develop a project that serves the health needs of the community, and these projects have ranged from teaching simple hand washing practices to teaching students with specific health issues how to better manage their illnesses. Project development has many levels. The GASC teachers join with the broader medical and educational communities to train future health educators. Next the high school students become self-directed learners in planning their projects; this is real PBL. Finally, the GASC students join with the greater medical and educational communities to be health educators while the elementary students become self-directed clients; this is PBL enhanced health education.

In response to the high incidence of respiratory disorders in Genesee County, GASC Technology Center students, faculty, and the American Lung Association, a community agency, implemented a Project Based health education program called "Open Air Ways" for elementary students with asthma. A component of the larger, community-wide coalition "Childhood Asthma Task Force," the project was designed so that the GASC students became health-care educators after receiving basic asthma training from the American Lung Association. Elementary students identified as having asthma or symptoms of asthma became the clients. The student health educators met with the children six days for forty-five minute sessions, engaged them in a pre-test and post-test to assess learning, and developed games and activities to teach the curriculum provided by the American Lung Association. The children showed marked improvement in the post-test, as well as in their ability to discuss and ask questions about their condition. The group added to the comfort level because everyone there

had asthma. The educators reported positive feedback from parents and teachers who witnessed the results the asthma management strategies provided. All of the participating schools asked for the student educators to come back the following year.

This needs-driven project challenged the GASC students to perform under unique circumstances to accomplish reality-based results. Incorporating the concept of Project Based Learning into the classroom has already proven to generate deep understanding of concepts. Clearly the high school students gained insight into the effective treatment of childhood asthma as a result of their experience. The results of learning the American Lung Association curriculum, preparing lesson plans and meeting with the students over the six week period gave the students an excellent opportunity to learn, not only about asthma and how to deal with it, but about the health needs in the community. Post-conference comments from the high school students revealed the learning was important to them at many levels. Their first response was that of awareness of the gap in the need for education and the number of health educators working in the schools. The high school students also became aware that many of the elementary students they had been working with were in difficult home situations that added to their asthma conditions. These conditions included poor nutrition, inadequate housing, and adults in the home that continued to smoke. There were students in need of the service who were not included the first time due to lack a parental permission. The second time the permission slip was worded to keep only the children whose parent's objected to their participation out of the class. The students discovered that some children with asthma had no proper medications or a doctor or clinic that they used regularly. The high school health educators found that for many of the elementary students the asthma class was the first time they had been formally taught about their condition and how to manage it. The use of

spacers and inhalers as well as the signs that are triggers were discussed and generated basic questions from the elementary learners. It was a learning experience for everyone involved and the project-based component gave the high school students a view of the complexities of delivering health education in the community and a good foundation about asthma that was far more meaningful than a lesson in their classroom. The value of learning the lifelong skill of managing their own asthma is of immeasurable benefit to the children and their families. Using the "Open Air Ways" Project Based Learning approach to asthma education allowed the children to embrace their own health. A side benefit was that the young students saw the teenagers doing some career exploration and service learning in the community. This is one example of how health educator's work was enhanced by using PBL. Comparable strides can be made throughout entire communities when this PBL approach to health education is applied more broadly.

Results of the Open Air Ways Class

The results as reported by teachers, parents and students using the post test and follow up discussions were: an increased awareness of the triggers for asthma attacks, an increased understanding of the disease and how to cope with it at school and at home. In addition to the elementary students learning, the high school students benefited with knowledge and an understanding of the health needs of the community. The experience gave the high school students an opportunity to serve and to explore the careers of public health and education.

Conclusion

The need for health educators to create innovative ways to reach the community is always growing. How do we teach the students of today to do that? Active learning, experiential learning, and Constructivist theory are all wrapped up in one package that answers that question: Project Based Learning. Today's educators must embrace this methodology that increases creativity, motivation and confidence of students while helping them to become more effective decision-makers and, therefore, better citizens in their communities. Health educators who are trained to use PBL will find ways to create effective programs that help individuals make life saving changes.

Project-Based Learning is finding new life through programs like the GASC Technology Center. These programs provide students with the opportunity to exercise their higher-order thinking and problem-solving skills, and patients with the opportunity to become invested in their own health care. The projects are carefully selected and designed to cover necessary health content while assessing desired skills and progress. Engaging students and patients in complex, real world issues and problems required them to use inquiry, research, planning, critical thinking, and problem-solving skills to learn and apply healthcare concepts and skills in a variety of contexts. Projects like these also provide opportunities for students and community members to practice interpersonal skills as they work in cooperation with teachers, employers, and healthcare providers.

The difference in the model of Project Based Learning and traditional learning is not what is taught, but how it is taught. It is a shifting of roles for health educators, learners, and

even policy makers. It is a change in expectations that gives learners the opportunity to direct their own learning, to lead, to teach, and to work in the real world. Educators must look forward to finding ways to combine real projects with health education in their communities. The possibilities for incorporating these two methods are exciting when educators work with health agencies to intertwine Project Based Learning with health education programs. The positive implications for PBL and health education are endless.

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