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Research Question

What impact does participation in a collaborative environmental service learning project have on the knowledge, skills and dispositions of at-risk students in an alternative education center?

Rationale

“Service learning addresses three major issues in education: relevance of the curriculum, level of rigor, and relationships. It is about hope, inspiration and learning for kids.”

Dr. Rudolph F. Crew, Superintendent, Miami-Dade County Public Schools

A well-structured service learning project has the potential to address all of the social, emotional and academic issues raised by at-risk students. Service learning is a teaching method that connects rigorous academic content with an identified need in the community. Students develop an in-depth understanding of course curriculum while planning and implementing a project within the community (Berger-Kaye, 2004). Through participation in service learning students are able to see real-world connections and application of course content, find success that can help build self-esteem, learn according to their strengths and reconnect with their community in a meaningful way (Scales, Blyth, Berkas and Kielsmeier, 2000). As a result, students develop a sense of ownership of their community and can become lifelong learners and contributors to society.

The student body at this alternative school is comprised of students who have been identified as being at-risk for dropping out of school according to criteria

determined by the State of Florida. These criteria include having failing grades, having been retained, being

behind in credits, having a low grade point average, performing poorly on our state's standardized tests, and/or demonstrating poor attendance patterns. While the root causes for these issues are varied, the resultant in-school attitudes and behaviors of these students tend to be consistent.

Generally, students in this school feel disconnected from both school and community. Regardless of whether the students are not successful because they do not feel connected, or they do not feel connected because they are not successful, there are definite indications that they are not active participants in the school community.

Students at our school choose to leave their home school and attend an alternative education center. We are geographically located near downtown Miami, a significant distance away from most of our students' home schools. The fact that they would choose to enroll in a school that is located away from their homes and assigned schools gives an indication that the students do not feel a sense of belonging. Another indication that students are disconnected from their home school is their poor attendance records and, the resultant poor academic performance. This lack of connection frequently results in students feeling that they do not have a responsibility to the school or community. Because students do not see their role and responsibilities to school or community, they feel little need to participate in either.

Students in our school also exhibit behaviors indicative of low self-esteem, lack of self-efficacy and depression. They are easily frustrated and frequently give up on tasks that they perceive to be beyond their capabilities. The students tend to

have a high incidence of self-destructive behaviors including smoking, alcohol abuse and use of controlled substances. Frequently the students come from extremely challenging home situations and use these self-abusive behaviors as means to escape their circumstances. They also tend to believe that they have little power to control those circumstances and, as a result, rationalize their self-destructive behaviors.

Students at the school also tend to have non-traditional learning styles making it particularly difficult for them to be engaged and interested in the traditional school setting. With recent emphasis on standardized testing and the “back to basics” approach, it is becoming increasingly difficult for students with non-traditional learning styles to find success. In this climate the preferred learning style of students frequently does not correlate well with the instructional delivery style of the teacher. They see little correlation between what they are able to do, what they learn in school and the real world in which they must learn to live. This results in tremendous challenges to the students’ abilities to successfully complete school (Roth and Bowman Damico, 1999).

The challenge for these students is to create a learning environment that can reconnect them with school and community by utilizing their learning strengths. Such a learning environment should be structured to allow all students to be successful and to develop a sense of ownership and efficacy. By creating such a situation, the students will also be able to see direct connections between what they learn in school and the real world around them. Service learning was selected as an

instructional tool that would address the many needs of the at-risk students in this school.

Background and Context

Students at our school are at-risk as a result of behaviors and/or conditions that decrease the likelihood that they will successfully complete high school. As a result of this classification, the students and their parents have chosen to enroll the student in an alternative education center. This school is significantly different from the traditional school setting. Class sizes are small, teacher leadership is strongly encouraged, the school site is in a business building, and innovative instructional modes are supported and encouraged. While the setting of this school is unique, the requirements for graduation remain the same as for other students within the district. Students must complete a specific number of courses in particular areas while maintaining a 2.0 grade point average. They must successfully complete the statewide standardized tests in Reading and Math. Many of our students experience great difficulty in passing these tests because of their history of nonsuccess. As a result, these skills are incorporated across the curriculum in order to support student efforts to address specific gaps in knowledge and skills and successfully complete the required standardized tests. The students must also complete a community service project outside the school day. Projects conducted within the context of the school day do not count toward this requirement regardless of the impact on the student or the recipient of the service. Oftentimes students engage in community service simply to complete the requirement and little, if any, impact is seen in the

development of a sense of stewardship or civic responsibility. One of the many goals of this project is to engage students in meaningful service in order to instill a sense of stewardship and civic responsibility where none had been before.

The 25 students involved in this project were 56% Hispanic, 36% Black, 8% Caucasian; and 70% of them qualify for free or reduced lunch. There were 12 female and 13 male participants who ranged in age from 14 to 17 years of age.

The students selected for this project were primarily tenth-grade students. These students were selected for several reasons. First, tenth-grade students must take and pass FCAT, our state's standardized tests in Reading and Math to graduate. These test scores are also used to grade schools according to a statewide plan to evaluate school effectiveness. In many schools, to address this issue, high-quality educational experiences take a back seat to test preparation. The design of this project was intended to support the notion that high quality educational experiences are good test preparation. Second, these students must also take a state-mandated standardized science test. A significant issue with this test is the content. The test is divided down into four strands: Earth Science, Physical and Chemical Science, Life and Environmental Science and Scientific Thinking. While the students had, with a few exceptions, completed earth science and most of biology, they had not even started to take physical and chemical science. Yet, 25% of the test covers Physical and Chemical Science. Essentially, the students were being assessed on something they had not yet learned. The comprehensive nature of this project was intended to address some of the topics covered by the test, but not yet addressed in class. Most of the students had been enrolled in my science

class the year before. As a result, I was very familiar with their learning strengths and challenges facilitating my ability to design an effective program to address their needs. There were also five ninth-grade earth science students who participated in this project. These students had demonstrated the need for a more substantial challenge than was being presented to them in their earth science class.

While few resources and little support are available at the district level, our school had designed and implemented service learning programs for the previous eight years. Service learning was selected as an instructional technique for our students because of the potential it holds for addressing the diverse needs of our student population. This investigation is intended to document the ability of a service learning project to provide high-quality educational experiences while concurrently addressing the issue of academic rigor and student achievement as measured on standardized tests. The project was designed to address some of the physical and chemical science objectives by integrating them into a project intended for a biology class. Service learning was also selected because of its potential for helping students build the requisite skills and dispositions for becoming active and successful in the community at large. Familiarity with student situations allowed for the design of a project that utilized their strengths to address the areas in which they were challenged.

Service learning is a teaching and learning method that connects classroom content with meaningful community service. It is intended to improve student achievement, create a sense of civic responsibility and develop the ability of students to function effectively in the world outside of school.

Service learning is characterized by four distinctive steps that help to distinguish it from community service (Berger-Kaye, 2004). The first step is preparation. Students and teachers alike participate in the planning and development of a high-quality service-learning project. Providing students the opportunity to be involved in the planning of the project allows them to develop a sense of ownership. This step intends to connect students with the project and community, thus laying the foundation for the development of a sense of stewardship and civic responsibility.

Students were actively involved in the planning and implementation of our environmental service learning project for the majority of the school year. While I ultimately made the initial determination of where the service would take place, the students were responsible for deciding the specific projects that they would complete to help restore Historic Virginia Key Beach. This area at our time had been the only beach that African Americans could visit and had fallen into disarray as a result of neglect and apathy. There had also been recent threats to preservation efforts by developers. Over the last 40 years the area had become prime real estate and, thus, an area of high interest for developers. Fortunately, well-informed citizens resisted development efforts, but lacked the resources to maintain and restore the area to its former glory. Coincidentally, the great grandmother of one of the students is a well-known community activist who played a major role in the development of the African American community in Miami and in the preservation and restoration efforts of Virginia Key Beach. Recent years have seen a renewed commitment to the area and the historical significance will be preserved with the construction of a museum and

other displays as a direct result of the efforts of the great grandmother of my student. The environment, however, has been neglected and continues to be so.

While the preservation of the historical significance of the park was an important aspect of this project, so too, was preservation of the natural environment. As a result, students learned about the native flora and fauna, historical significance, and ecological problems while visiting other parks that had been maintained over the years. As part of the collaborative aspects of this project, teacher education students from Barry University gave presentations to the students about several other parks within the community. The students then visited Virginia Key Beach to compare the state of this park with the others they had visited and learned about. The students were divided into working groups and each group developed a plan based on their assessment and interests for a project that they would carry out to help restore the Virginia Key Beach. Projects included beach clean-ups, native plant propagation, exotic removal, a survey of the wildlife and the planting of native plants to restore the natural habitat. The project was woven into the course content and was the primary mode of instruction for the students for a majority of the year.

The second step in service learning is action or the actual implementation of the project. Once the students created a plan and had it approved by the teacher, they were charged with carrying it out. Implementation of the project also involved the assistance and cooperation of numerous community resources including: faculty and students from Barry University and Florida International University, Metro-Dade Parks, and Citizens for a Better South Florida. Representatives for these organizations provided support in a variety of ways. They conducted presentations,

lead nature walks, served as chaperones and worked side-by-side with the students to complete their projects. Students had to communicate with representatives of each of these organizations in order to complete their projects effectively.

Many of the students had a history of negative and, sometimes volatile, relationships with adults in their lives leading to a fundamental discomfort in working with adults. Including various organizations in a collaborative project whose adult participants were willing to work side-by-side with the students was an integral part of the design of this project intended to provide assistance to students in completing their projects. This aspect of the project also provided an opportunity to create positive effects on student self-esteem, self-worth and perceptions of adults within their community.

The third step of service learning is reflection. This is likely the most significant manner in which the service learning differs from community service. "Reflection is indispensable to the entire service learning process and is what weaves it all together intellectually and emotionally for everyone involved." (Berger-Kaye, 2004) Taking the time and making the effort to sit back and consider the implications of their actions allows students to cement information and lessons learned into their long-term memory. Students were asked on a regular basis to reflect on their work and what they learned about themselves and the environment. It is through these reflections that we can gain an insight into the effectiveness of this project in meeting stated goals.

The final phase of service learning is demonstration. Demonstration allows students to communicate with others what they have learned and gained from their

participation in the service learning project. Methods of demonstration can vary greatly, but the students in this project were asked to produce a display or other product that demonstrated their understanding of the scientific concepts and reflected the purpose and result of their actions. Because the student projects were put on display at the Miami Children's Museum they needed to communicate the sum of their experiences without the benefit of narration.

While seemingly little support exists for programs in terms of training and development, service learning holds tremendous potential to reform and rejuvenate our schools and student experiences while in those schools. By connecting community service with rigorous content, service learning makes classroom content relevant to student experience. The development of these connections can be a springboard to impacting the knowledge, skills and dispositions of students. Service learning was selected in direct response to the identified strengths and challenges facing the students in my classroom.

Review of Literature

The literature is rich with studies showing a positive impact on the cognitive, social and emotional growth of students when actively engaged in service learning projects.

Service learning has the potential to positively impact student academic learning because of the connection between the classroom content and real-world applications addressed by the project. The literature supports this assertion. For example, in a study by Weiler, et.al. (1998), students showed moderate gains on student achievement tests, engagement in school, sense of educational

accomplishment and homework completion. In addition, service learning was associated with higher scores on state standardized tests of basic skills (Anderson, et. al., 1991) and higher grades (O'Bannon, 1999; Shumer, 1994; Shaffer, 1993). Supik (1996) and Rolzinski (1990) examined middle and high school students in a service learning tutoring program and found that participating students experienced an increase in test scores and found that students were less likely to drop out of school.

Service learning helps students develop requisite skills for success in the real world. According to Berkas (1997) and Billig, et. al. (1999) students enhanced their communication skills and exhibited positive increases in career exploration knowledge. Furthermore, Weiler, LaGoy, Crane and Rovner (1998) concluded that students who engaged in SL programs developed skills and positive attitudes toward work.

Perhaps the most promising aspect of service learning is its potential to revitalize education by reconnecting students with their school and community. This connection can serve to build confident and capable citizens who will actively engage themselves in the community. According to Shaffer (1993) students who engage in service learning were more likely to increase their sense of self-esteem and self efficacy. Students also feel more connected to their community and possess deeper feelings of self-worth when involved with service learning projects (Krystal, 1998). Moreover, Switzer et. Al., (1995) found that middle school male students reported increased self-esteem and fewer behavioral problems after engaging in service learning.

Numerous researchers have concluded that students who engaged in high quality service learning programs showed an increase in awareness of community needs and believed that they could make a difference. The students also demonstrated a commitment to service now and in the future (Berkas, 1997; Cairn, 1999; O'Bannon, 1999; and Melchior, 1999). In a document entitled "The Civic Mission of Schools" researchers from the Carnegie Corporation of New York reported that young people develop a stronger sense of efficacy and are likely to become civically engaged if they believe their actions can lead to change.

Methodological Tools Used in Data Collection

In order to assess the impact of this project on the knowledge of students I utilized our state's standardized test scores, student reflections and the projects produced by the students at the conclusion of the project.

The state of Florida requires that all students successfully complete the Florida Comprehensive Assessment Test (FCAT) Reading and Math sections to graduate from high school. These sections of the test are given at the high school level in both ninth and tenth grade so that student gains can be evaluated. Upon completion of the tenth-grade FCAT test a Developmental Scale Score (DSS) for each student indicates improvement between the ninth and tenth grade.

Students in Florida also take an FCAT science test at the tenth-grade level. While successful completion of this test is not required for graduation, it is intended for use on the statewide school grading system that is currently in place. While the test has not yet been used for school grades, it will be used in the near future. DSS scores are not available because there is not a comparable test that is administered

at the ninth-grade level. This data source was analyzed by comparing consecutive years' students and by comparing our school performance with that of other schools.

Students completed reflections about their experiences throughout the project. They were asked to reflect on what they learned about specific topics at various phases of the project and the use of service learning as an instructional method.

Upon completion of the project, students were required to create a visual display of their project and describe what they learned. The students were given the freedom to decide the format for their visual display and were provided a rubric to guide them in creating the required elements of the display.

To determine student development of skills during this project I utilized student reflections, administered a quiz about the various skills utilized during the project and observed student performance of the targeted skills.

Students were asked to reflect on skills they believed that they learned from participation in the project. They were asked about what they were able to do upon completion that they had not been able to do before.

While student choice is central in the development of service learning projects, I identified specific technological skills that I wanted the students to learn. I specifically wanted them to learn how to use, or improve their skills with a Global Positioning System (GPS), digital camera and the Internet as an informational resource. Because most of the students are economically disadvantaged, I felt it particularly important to address issues concerned with the "Digital Divide." To determine skill development in the three aforementioned areas, I developed a simple

questionnaire/quiz that was administered to the students before and after participation in the project.

I believe the most efficient means by which to gauge skill development is observation of the actual use of the skills. I kept detailed notes concerning student use and demonstrated comfort level with the various skills developed during participation.

There were two main areas of interest for me as far as student dispositions were concerned. I was particularly interested in how service learning might impact the students' connections to the school community. I wondered if a renewed connection with school might positively impact student learning. I was also interested in what responsibility the students felt toward the community and their sense of stewardship and civic responsibility. It was my contention that if the students could be reconnected with the community at large they might then feel some responsibility to contribute to its preservation. I also believed that by creating a connection with school by teaching to student strengths and making the classwork relevant student achievement would improve.

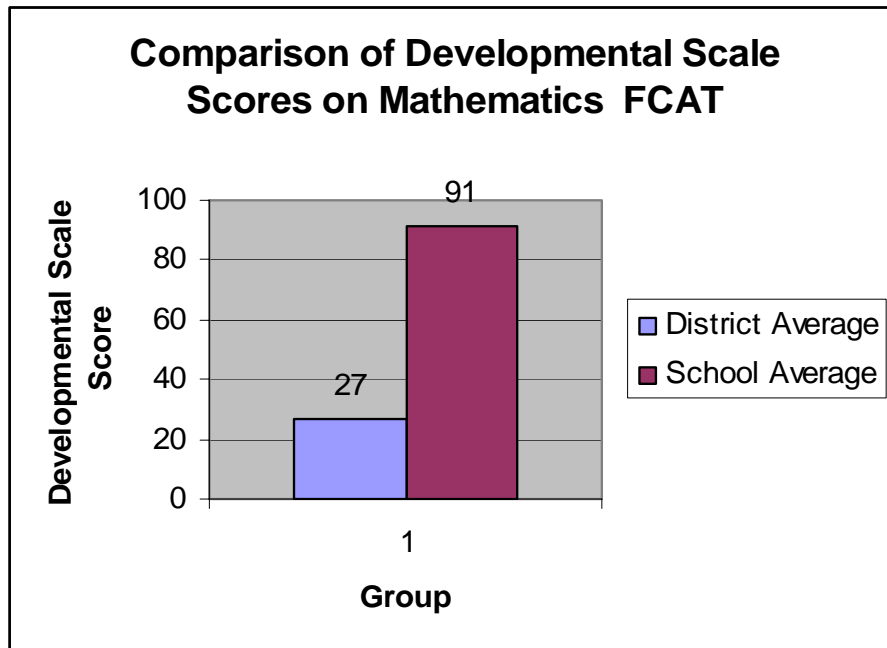
Students were surveyed about the sense of responsibility they felt toward the environment and their community. I made detailed observations of interactions between students and their behaviors while in the schools and broader community. Student reflections were also analyzed to determine shift in attitudes toward schools and the environment.

Data Summary and Analysis

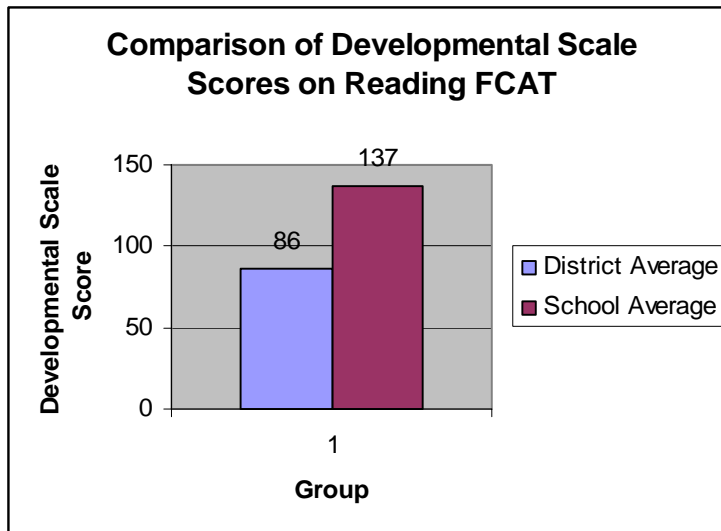
Knowledge

Changes in standardized test scores were significant for three portions of the Florida Comprehensive Assessment Test (FCAT); Reading, Mathematics and Science. The Reading and Mathematics portions of the FCAT are administered in both the ninth and tenth grades allowing for a comparison from year to year to determine progress. This progress is indicated by the Developmental Scale Score or DSS. The Science test is currently only administered in the tenth grade, and thus does not allow for the retrieval of scores that would gauge the progress of individual students. Therefore, I was forced to compare the performance of the previous year's students with that of those students involved in the project. While this is not an ideal situation, comparisons of our school performance scores and changes over time versus the average scores across the district do allow for some indication of progress as compared to other schools within the district.

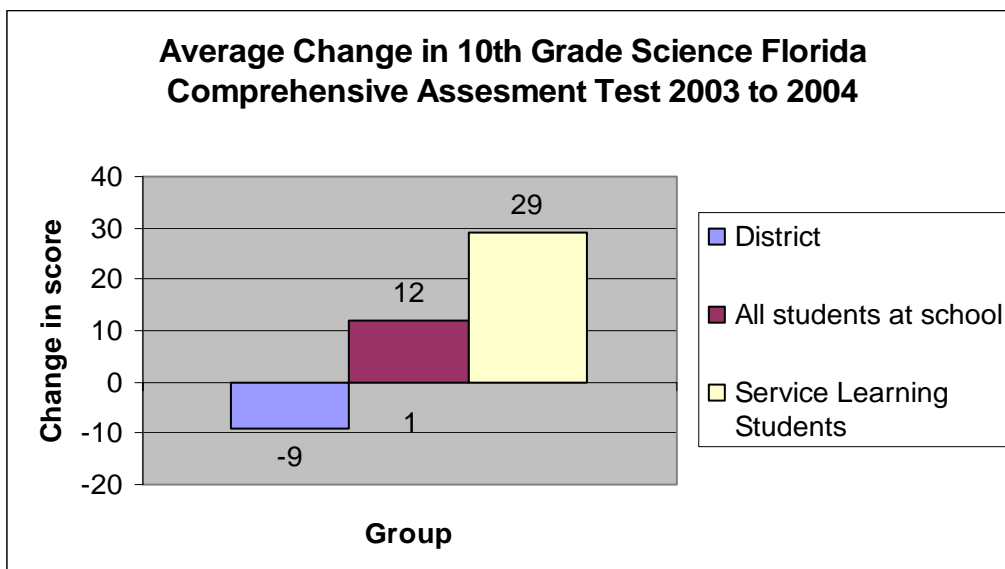
Student Developmental Scale Scores for the Mathematics portion of the FCAT showed an average increase of 91 points. The district average DSS score was 64 making our average improvement in score 27 points higher than the district average. The improvement was the fifth highest increase in a district of 50 high schools.



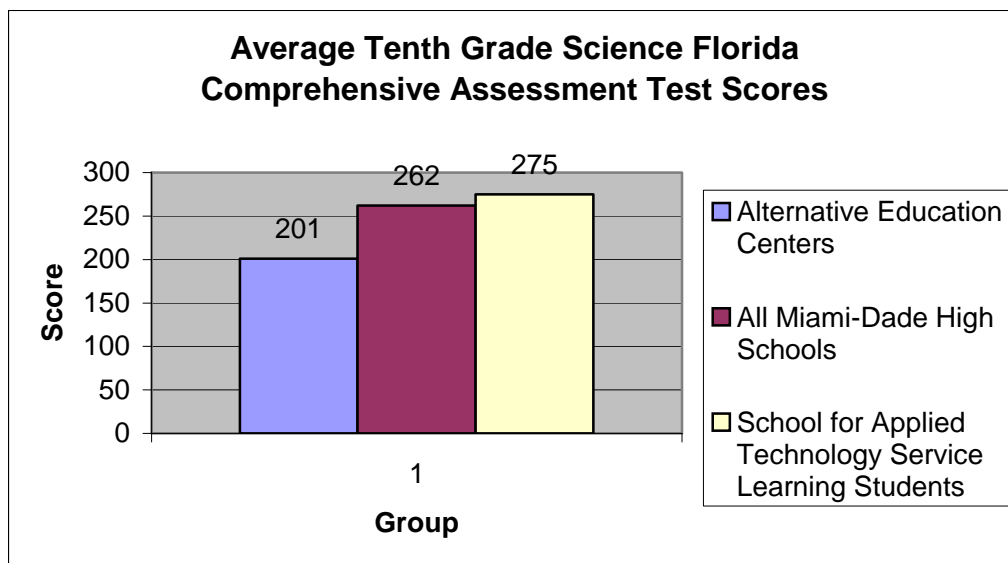
For the Reading portion of the FCAT, students at my school showed an average Developmental Scale Score of 137 points. The district average change was 86 points. This indicates a difference of 51 points between our school and the district and was the fourth largest improvement in the district. Also, student performance on the FCAT is correlated to a level from 1 to 5. Student performance on the 2004 Reading FCAT test also indicated that our school had the sixth highest percentage of students in the entire state of Florida that improved from Level 1 to Level 2 and Level 2 to Level 3.



On the 2004 Science FCAT the students in this project had an average score of 275, and the school had an average score of 258. The average score for the school for the 2003 Science FCAT was 246, indicating a 12-point increase from 2003 to 2004 for all of the students who took the test and a 29-point increase for those who participated in the project. The average school increase was the greatest increase of all high schools in the district. On average, all schools within the district had an average change in score of -9 points, from 271 to 262. Students involved in the project showed an increase of 38 points above the average change for the district.



In addition, the average score for all high schools was 262, making the scores of students in this project 13-point higher than the district average. The average score for alternative schools was 201, making students involved in this project 74 points above schools with similar populations to ours.



Students were asked to reflect on their learning and experiences throughout the course of this project. When asked about service learning as a teaching method, 100% of the students indicated that they thought they learned more by participating in a service-learning project than they would have using traditional instructional methods. When utilizing traditional teaching methods, students will frequently have difficulty verbalizing what it is that they learned from a particular unit. After the service learning project, 100% of the students indicated that they had learned something during this project and were able to identify specific knowledge gained.

Students were asked, without the benefits of being given a list, what they felt that they had learned. While 100% of the students reported having learned something, the most frequently mentioned topics that students felt that they had an in-depth understanding of were:

1. Native and Exotic species (16 students)
 2. Classification and characteristics of organisms (15 students)
 3. Interdependence of organisms (11 students)
 4. History of the area (7 students)
 5. Impact of pollution on environment (4 students)
- Number of students: 25

Traditional classroom assessments also support the notion that the students learned a significant amount of information about the environmental, ecological and historical aspects of the area in which they worked. Student test scores were higher during the project and student responses to essay-type questions reflected an in-depth understanding of concepts not seen when utilizing more traditional instructional approaches.

Another assessment utilized during this project was student-created visual displays that illustrated their chosen projects and conveyed what they had learned from their participation. While the displays were graded according to the effectiveness in conveying student learning through visual and linguistic media, the students also had the additional task of creating a display that elementary school students could read and understand. Upon completion, the student projects were put on display at the Miami Children's Museum. Student-made projects demonstrated significant increases in the knowledge base of the students who participated in this project. They were able to describe conditions that lead to environmental and

ecological problems, analyze and evaluate the impact of the given conditions, and develop and implement a plan to address the identified issues in the given area.

Skills

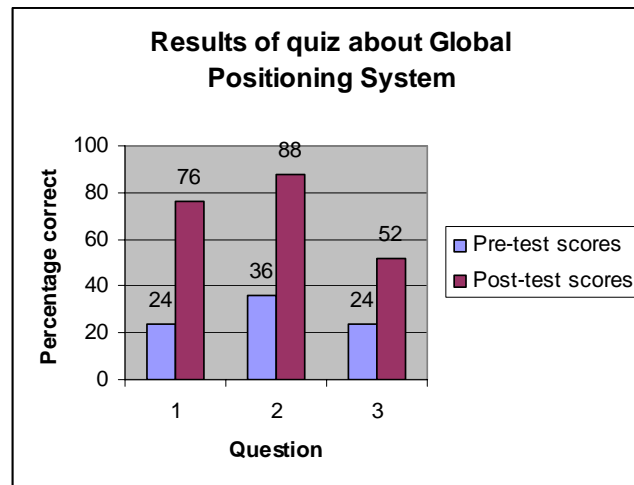
Upon completion of the project, students were asked to reflect about the skills that they believed they gained from their experiences. The students were not given a pre-determined list and were not required to list any specific number of skills. All students indicated that they had learned specific skills. The most frequently mentioned skills were:

1. Use of GPS (15)
2. How to plant things (15)
3. How to classify organisms (9)
4. Use of a digital camera
5. Use of seine nets (4)

While a basic tenet of service learning is student choice, I felt that these students needed to develop specific technological skills. Few of the students had access to computers and technology at home, making it important that they have opportunities to develop skills while in school. I was specifically interested in the students learning how to use a Global Positioning System, digital camera and the Internet as a resource for information. These skills were selected because of their increasing prevalence in everyday life.

The students took a quiz before and after participation in the project. When asked to explain what a GPS is and what its purpose, scores jumped from 24% to 76% (6 to 19) of the students responding correctly. This represents an increase of 52%. When asked to explain what information a GPS provides, scores jumped from 36% to 88% (9 to 22) of the students responding correctly for a 52% increase. When

asked to describe three ways the information from a GPS could be used, student scores went from 24% to 52% (6 to 18) of the students responding correctly for a 28% increase.



While most students reported that they had used a digital camera before the project, very little use was indicated. All students were required to use the digital camera throughout the course of the project so that they could document their individual projects and their progress. Students reported an increase in experience and comfort level with a digital camera. Students also had increased opportunities for computer usage for Internet research while creating their display projects. Students began demonstrating more sophisticated use of Internet resources with increased usage.

Perhaps the most reliable indicator of having learned a skill is the ability to utilize the skill in the appropriate context and in an efficient manner. Teacher observations of student performance of various skills indicate that specific skills were acquired. During various lead-up activities students were provided instruction and practice in the use of the Global Positioning System (GPS), digital camera and

Internet as a research tool. Lessons and activities were structured so that the students were also responsible for tasks such as the removal of exotic species and introduction and propagation of native species. When the time came for the students to select, plan and implement their individual programs, the students integrated these new skills into their projects. This indicates a comfort level and understanding of these skills that supports the notion that student skills were acquired as a result of the service learning project.

Students were allowed to create the “team” with which they wanted to work. One of the teams chose to create a restoration “island,” an area that they designated to clear of exotics and restore with native species. This project involved a significant amount of manual labor while utilizing various tools to complete the task. These students had never used a shovel, hoe, rake or any other garden tools. Most of these students had never planted anything before and none of them had ever planned and implemented any type of gardening project. Selection of such a significant project despite a distinct lack of experience is indicative of substantial changes in skill acquisition and disposition changes. Experiences such as these can help lead to a greater understanding of, specifically, science content because it gives students a real-world context in which to place curricular concepts. For instance, a discussion of levers in class is much more effective if students have used a shovel and tried to dig holes using the handle to increase mechanical advantage.

Students also learned how to propagate various plant species by transplanting a variety of native species. The teams eventually engaged in a competition to see which could transplant more plants. This indicated to me a keen

interest in doing this well and development of the skill if they were able to complete a large number of plantings.

Students were able to locate various landmarks and specific native species utilizing the GPS. On the nature trail students were asked to indicate the coordinates of the 10 signs that marked the trail. Once they had practiced using the GPS on the trail, they were then asked to determine the coordinates of the location of a recently discovered endangered plant species. These coordinates were then plotted on a map and sent to a local organization doing research on that plant species. Once the existing plants were located and plotted, the students were asked to identify and recommend locations for future plantings of this endangered species. These locations were submitted to the park management and plans have been made to place some of the new plants in the locations recommended by the students.

Throughout the project students were asked to document their progress and experience by utilizing a digital camera. While most had used a digital camera, few had used one extensively and felt comfortable with the various functions. Student use of digital cameras was significant throughout the project and students indicated an increasing comfort level as usage increased.

Another area of discomfort for students was the use of the Internet as a research tool. Few students have computers in their homes and, as a result, did not feel very comfortable in their ability to locate information and to discriminate between reliable and unreliable information. As students progressed through the project they were asked frequently to locate information for various reasons and uses. As use

increased so, too, did comfort level and the ability to discern good information from unreliable information.

The best indicator of the acquisition of skill is the ability to use the skill. Students demonstrated the ability to use many new skills as a result of their participation in this environmental service learning project.

Dispositions

One of the most striking characteristics of the students at our school is the lack of connection felt by students toward both their schools and their communities. Students at this alternative school come from all over our county from their home schools. The fact that the students are willing to leave their home schools to travel, in many cases, hours to get to our school, is a strong indicator that they do not feel connected to their home schools. This lack of connection to school is also reflected in a marked lack of participation in school wide activities, all of which have lead to a lack of success in a traditional school setting. The students also tend to not feel any responsibility toward the school and environment. Perhaps the lack of connection has lead to a lack of responsibility. Of paramount concern at our school and throughout this project was student connection and a sense of responsibility to both school and community.

Upon initial survey, only 67% (16 of 24) of the students indicated that they had any responsibility to protect the natural environment. After concluding the project, 100% (24 of 24) indicated that they have some responsibility to maintain and protect the natural environment.

I also noticed a significant change in student behavior throughout the project with respect to how they treated the natural surroundings. During our initial visits to Virginia Key Beach, students had to be prompted and even coaxed to clean up their area after eating lunch. Garbage was initially spread throughout the picnic area. During our last visit I made significant efforts to identify garbage left by our students and was hard-pressed to find any at all. This behavior appeared to carry over to the school environment as well. As the project progressed there was a marked difference in the amount of trash left in the classroom and common areas where these students tended to congregate.

Students also indicated a strong desire to have more signs posted around the picnic area about placing garbage into the cans for both the aesthetic value of a clean beach, and because of the issues surrounding the feeding of wild animals in the area.

Student reflections, in many cases, indicated a shift in behavior toward a stronger sense of stewardship. For example:

“After the past two days I’ve spent in Virginia Key Beach my feelings towards the environment have completely changed. I used to litter, even though there was a garbage can a few feet away. I used to trash the beach, now I don’t.” Maggie

Students, through their reflections, indicated a stronger sense of belonging to their community and positive feelings toward themselves. When surveyed, 100% of the students indicated that they felt good about themselves because they had helped the environment. Student quotes also support this position. For example:

"I feel good in many aspects when I am working at the park. When I am doing the service I feel like I am helping and making a difference."
Angelo

"I feel good about what we are doing at Virginia Key Beach. I feel as if I am a part of history of Florida nature and beauty. I felt hot and tired, but after I see how much we did in so little time, it was all worth it. I feel like I made a change in the world." Steven

"While working at Virginia Key I felt I was accomplishing something great. For me, being black I got a great sense of pride out of the activity. I'm proud of my group, and myself. We worked hard. Moreover, I feel like I am a part of history, me! I did something to help the environment, I am proud to be a part of this activity." Paulnishia

Students were asked for ideas for future extensions of this project. All students had ideas and made suggestions to extend the project and 63% indicated a desire to work at other parks, especially inner city parks. Reasons cited for this included "because those neighborhoods really need it" and "because the kids in those areas do not have anything to do." Thirty eight percent indicated a desire to teach younger children what they had done and why they had done the work that was completed.

I was particularly interested in the impact that the service learning project had on student attitudes toward school and class. When asked, 100% of the students indicated that the project made class more interesting, helped them learn more and made real-world connections. Ninety-three percent said that other teachers should use this approach to teach curricular concepts. Interestingly enough, one of the students who said that other teachers should not use this approach said that she felt like this was "Our special project" and did not want to share that experience with

another teacher. Eighty-one and a half percent of the students said that the project helped them gain a better understanding of careers that involve biology.

Results and Conclusions

In this time of increased accountability and emphasis on student performance on standardized tests, it is frequently difficult to garner support for teaching methods that do not fall into a traditional model. Service learning, while possessing a body of evidence supporting its impact on student achievement, does not fall into what would be considered a “traditional” approach to teaching. The data from this study supports prior research supporting the ability of service learning to improve student achievement. Careful examination of the data gathered indicates that there were substantial increases in knowledge gained by students who participated in this collaborative environmental service learning project. Increases in knowledge were evidenced by increased scores on the Reading, Mathematics and Science portions of the Florida Comprehensive Assessment Test. While students in this project did not receive direct instruction in Reading and Mathematics, those skills were intentionally integrated into all aspects of the project wherever possible. Improved attitudes toward school as a result of participation may have also contributed to improved student performance in both Reading and Mathematics. Certainly if the students find school more enjoyable, they will likely improve performance. Performance on the Science portion on the FCAT provides substantial support to the notion that service learning improves content knowledge. Not only were there

student gains on all three measures of student performance, but the gains were some of the highest gains in the entire district and, in one case, the entire state.

Not only did performance on standardized tests indicate an increase in knowledge but the students also reported that they felt that they had learned more and their work supported this statement. Student projects demonstrated that the students not only gained content knowledge, but also altered their attitudes toward the environment.

Participation in this service learning project improved student knowledge as indicated on all three measures of performance, standardized test scores, student reflections and student work.

Actively engaging students in the service learning projects gives students the opportunity to develop skills they may not usually have the chance to develop in the course of their everyday lives. Data collected during this project supports the statement that participation in service learning results in the exposure, development and improvement of skills. Student skills involved in this project include technological skills, environmental restoration skills and critical thinking skills. Student reflections, classroom assessments and performance of the skills involved all indicate an improvement in the aforementioned skills of students.

Students became more comfortable and capable of effectively executing technological skills involving the use of a Global Positioning System, a digital camera and the effective utilization of the Internet for research. These skills are crucial for students to develop in order to function and flourish in an ever-advancing society. The students in this school tend to be those who do not have computers in

their homes or a working knowledge of, or understanding of, the necessity for technological skills. Without opportunities to develop these skills in school, these students may lack requisite abilities to advance in future careers or educational endeavors.

Most students reported never having had experience in planting anything or working with plants. They had never used a shovel, dug a hole or decided where to place a plant. Participating in these types of activities helps students to better comprehend science content and have a context in which to place new knowledge and information. Basic tenets of educational practice indicate the need to assess students' prior knowledge. If students have no prior experience, they cannot have prior knowledge and, thus, no context in which to place new information. While planting and gardening skills may or may not be career skills, they are important in helping students to understand the greater world around them and develop content knowledge with a basis in context.

The data indicates that students in this project developed greater capacity to solve problems and think critically. Providing the opportunity for students to identify a problem that they would like to see addressed, and then develop and execute a plan to address that problem, is not only a basic tenet in service learning, but also an effective way to develop problem solving and critical thinking skills. Students in this project were asked to identify a specific need within the community and address that need in an appropriate manner. Asking students to think and problem solve aided in their ability to think and problem solve. This service learning project allowed students

to participate in this process while addressing community needs and meeting curricular goals while developing problem solving and critical thinking skills.

Marked changes in student dispositions toward school and the environment were seen as a result of student participation in this project. Student surveys, student reflections and teacher observations support the conclusion that participation in this service learning project helped alter student dispositions concerning school and the environment. Upon conclusion of the project, students expressed a feeling of responsibility for the environment that had been absent prior to engaging in service learning. Their reflections indicate a wide range of positive feelings about their involvement in, and contributions to the community. This feeling even extended into an expressed desire to share with other students in order to educate them as well.

Not only did student attitudes change, so did their behavior. Upon conclusion of the project, students were less likely to drop garbage on the ground and leave it there both at the park and back at school. The change in student behavior is a true indicator that they understood the lessons and concepts involved and internalized it to the extent that it altered their behavior.

Service learning is an effective teaching strategy that can serve to improve student achievement, develop skills and impact student dispositions. While there seem to be few resources and little support available to teachers at the schools and district level, this study supports the notion that service learning improves student learning in a variety of ways.

Policy Implications

Recommendation 1 – Districts and schools should actively encourage and support the development of service learning projects within individual classrooms and schools.

Service learning has an ever-increasing body of research that supports the idea that it can have substantial impact on student achievement. In the case of this study, service learning was effective in increasing the knowledge, skills and dispositions of at-risk students in an alternative education center. Despite this body of research, school districts and school sites tend to view service learning activities as extra-curricular rather than as viable means to impact student achievement. District and school level administrators should actively encourage the development of service learning projects in classes and schools. While service learning does not fall into what might be considered a “traditional” approach to education, it can serve to produce all of the expected outcomes of a high-quality educational experience.

Recommendation 2 – Collaboration between teacher preparation programs and k-12 educational institutions in service learning projects should be encouraged and supported.

One impediment to the development and implementation of service learning in the classroom is a lack of preparation and training of the classroom teachers. While service learning is quickly becoming an integral part of the college experience, few teacher preparation programs have incorporated it into their programs. As a

result, few new teachers entering the profession have a working knowledge of service learning as an instructional technique. Collaboration between teacher education programs and k-12 programs should be encouraged and supported to assist with development and implementation of service learning in all schools. Collaboration between teacher education programs and k-12 institutions would allow for regular interactions between the pre-service teachers and real classrooms, additional support for classroom teachers implementing service learning and effective preparation of the pre-service teacher in the implementation of service learning within the context of the school.

Recommendation 3 – Consider students who participate in service learning projects during school hours as having satisfied community service graduation requirements.

Many districts have implemented some sort of community service requirements for graduation. The intent of these requirements is to encourage young people to become active citizens within their communities. In our district the community service requirement must be completed outside of school hours, regardless of the impact on student attitudes and dispositions with regard to the intent of the requirement. This study has provided data that supports the idea that service learning helps affect student dispositions towards the larger community. Districts should allow participation in service-learning projects to meet the community service requirement for graduation because it produces the outcomes that are intended by this requirement.

Recommendation 4 – State and district-level officials should adopt policies that support and encourage the use of service learning as a viable means by which to improve student achievement and develop higher order thinking skills.

Public education is in the midst of an increased call for accountability. Students are increasingly expected to successfully complete standardized tests to satisfy graduation requirements and as evidence that schools are properly educating children. Frequently, this push for accountability has resulted in the sacrificing of high quality educational practices for increased test preparation time. Effective teaching methods like service learning are sometimes discouraged despite an increasing body of research supporting its ability to improve student achievement. State and districts should adopt policies recognizing and encouraging the use of service learning as a viable means by which to improve student achievement, develop higher order thinking skills and improve student dispositions toward schools and the environment.

Recommendation 5 – Districts should create a district-level position to provide the necessary resources to schools and teachers for the implementation of service learning in every school.

Major drawbacks to the implementation of service learning within the context of the school are a lack of training of teachers and a lack of funding at the school level. Districts should create a service learning administrative position to secure funding, identify community partners, provide training and support for teachers and oversee the development of district policy and projects.

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