

Evaluation of Haile Middle School Engineering Academy
Justin Erickson
University of South Florida

Project Rationale

The intent of this research is to discover avenues of continued improvement of the Haile Middle School Engineering Academy. The term continued improvement in this research can be narrowed to the impact of successful middle school programs enrollment and retention, and also community awareness and local employment preparation. Research was guided by the following three focus questions:

1. Is the academy promoting retention in high school programs?
2. Does the curriculum provide focus of career readiness?
3. What actions are required to improve the overall success of the academy?

A stride to improve engineering education academies in Manatee County and also in conjunction with Florida House Bill 1255, in 2012 Haile Middle School established a dual enrollment engineering academy. This academy is the first middle school engineering academy established in the District of Manatee County and has a mission of increasing student performance outcomes regarding career readiness while aligning with standards and guidelines for middle school career academies. To ensure the success of the CAT academy, standards were developed which replicated the standards of the National Career Academy Coalition. The mission National Career Academy Coalition is to “To create and support a national network of existing and emerging career academies” (National Career Academy Coalition, 2013). Career academies benefit the student by integrating themes from career backgrounds while teaching methods and curricula to prepare students for success in four year colleges and universities (National Career Academy Coalition, 2013).

To date there has been no research or tracking of the student body enrolled in the engineering academy. While the National Career Academy Coalition is responsible in development of national standards and benchmarks for career academies, the coalition also recognizes that in order to maintain the “integrity” of the academy, it is important to gather data, report data in regards to accountability measures including factors such as retention and attendance in programs. Development of these essential practices places accountability of teaching and learning effectiveness upon each school and program. Although no academy is faultless 100% of the time, advancement of student performance should be vital to the academies mission (National Career Academy Coalition). Evaluating the academy at this time will facilitate and improve teaching and learning within the academy.

The capstone academy course is compiled of twenty-five 8th grade students who have already completed two years of engineering at the middle school level. An application process was implemented for students to be accepted into the academy to uphold rigor and relevance. Meetings with feeder secondary program teachers took place to establish a curriculum. Students enrolled in a capstone course will have the opportunity to earn high school credit and receive an industry certification in SolidWorks. This research documentation could give further insight into

the effectiveness of offering a dual enrollment engineering course and industry certifications at the middle school level.

Data outcomes as far as vocational students completing programs fall heavy on the negative side. To merely analyze the data from entry level students regarding retention is simply avoiding the complexity of the situation (Round, Brownless, & Rout, 2012). Questioning could also display what impact career academies and industry certification hold on the retention of students. Retention is an action which can be promoted through a “shared vision, open-mindedness, and a strong commitment to learning” (Hoachlander & Yanofsky, 2011). A stronger recognition of these characteristics could benefit programs and employers. Horn in 1998, examined the college dropout trend of 1989 and 1990. He questioned if there was a similar first year dropout rating (16%) among vocational students and of students of four year colleges and universities (Ko, 2005). Research has noted that many of the most successful and brightest students have little to no contact with working adults, or the extensive range of career opportunities in science, technology, engineering and mathematic associated fields (Hoachlander & Yanofsky, 2011). Nationally recognized training and skills embedded into a classroom culture is critical in retention and endorsing enhanced use of skills (Smith, Oczkowski & Smith, 2008). Retention commonalities promote question in many categories of education. Currently, some school reform designs are driven by career academies. Academies are developed to better prepare students for current job markets, skill sets and needs. Career academies are designed for students to be trained in smaller learning situations, focusing on integrating work based learning (Estacion, D’Souza & Bozick, 2011). According to Doug Wagner, Director of Adult, Career and Technical Education in Manatee County Florida, after 3 years of data collection of participation of STEM (Science, Technology, Engineering and Mathematics) elementary students, scored better than students in schools that did not offer STEM programs. Charles Dayton, former coordinator for the Career Academy Support Network stated, “Career academies are a logical place to bring academic and vocational education together” (Lewis, 2005). A great deal of further research involving career academies is needed as Assistant Secretary of Education Susan Sclafani stated, “we do not yet have the gold standard of research on career academies, but the standards provide a document researchers can use (Lewis, 2005).

According to Kemple in 2004, for young men the opportunity to be involved in a career academy improved their chance of obtaining a job. This is a group that has been in a steady decline over the past few years as far as wage earnings. Kemple found on the other hand, academies had no large impact on the young women. Research has shown that there are 54% more girls than boys (46%) currently enrolled in career academies (Estacion, D’Souza & Bozick, 2011). A larger percentage of the population enrolled in career academies were Hispanic (Estacion, D’Souza & Bozick, 2011). However, the larger picture shows career academies are a viable source for a range of students to develop skills needed for high skilled, high pay jobs. School to work transitions for at risk populations proved to be the most beneficial as far as academies improving the labor market (Kemple, 2004).

In a Periodical titled *Recognizing Career Academy Innovation*, Cheryl Carrier discusses the partnership of Ford Motor Company and the need to prepare students for success in professional careers. She recognizes that high school is a “pivotal” point in a young person’s life. Key success and failures will occur at this point and can have great impact on personal and

financial growth in the remainder of their lives. “Educational programs that emphasize career and college preparation through strong academics and exposure to future opportunities ensure young people will not only learn the critical content of today—science, math, engineering—but important life skills such as teamwork, innovation, critical thinking, problem solving” (Carrier, 2007). The Ford PAS program developed a 12 point action plan which incorporates best practice which are crucial in “sustainable career academics” (Carrier, 2007). Carrier also states, “To make learning relevant, we must create links between schools and businesses, between courses students take and real life experiences” (Carrier, 2007).

Ford Partnership for Advanced Studies promotes project based learning and student created projects to encourage learning involving applicable business issues. Topics such as global economies, engineering, design and corporate citizenship are discussed while promoting skills such as problem solving, communication and core academic studies. The fast paced 21st century economy has forced a rethinking of the high school career education objectives. The Fords PAS program is “designed to meet the demands and link the local community to the classroom”. According to Jim Padilla, President and Chief Operating Officer of Ford Motor Company, Ford PAS programs promote academic knowledge and practical skills which give students the assurance they can enter the workforce with confidence (Carrier, 2006).

Ten standards of practice were developed by the Manatee County Adult, Career and Technical Education Department for the benchmarks of the engineering academy at Haile Middle School. The applied standards directly link with *National Standards of Practice*, in order to promote rigor, relevance and retention within the program. To comply the academy must a) Define a Mission and Goals, b) Develop an Academy Structure, c) Host District and Secondary School, d) Higher qualified educators, e) Participate in continuous professional development, f) Design a governing structure, g) Evaluate Curriculum and Instruction, h) Link program to Employer, Higher Education, and Community, i) Measure Student Assessment, and j) Develop a Cycle of Improvement. If these standards of practice are applied, results could lead to rigor and relevant learning which promotes retention of students in vocational settings.

Define a Mission and Goals

The mission of the Engineering Technology program at Haile Middle School is to make certain that all students can be technologically literate and work ready through industry themed learning and career related skills.

Develop and Academy Structure

A successful career academy will be a well balanced structure of the middle school. Structure can be defined as but not limited to student recruitment, cohort scheduling, the physical space for the academy and a clear career or industry theme.

Host District and Secondary School

The importance of the career academy cannot only dwell within the schools teachers and administration. Adequate funding for the program such as facilities, equipment and material needs to be supported by the school board, superintendent and the community.

Higher qualified educators

In most academy situations, it is important that the teachers are qualified in the content area in which they teach. The teacher at Haile Middle School holds a valid Florida Teachers Certification in Industrial Arts, and a professional industry certification in SolidWorks (3-D engineering modeling software).

Participate in continuous professional development

Career academies demand skills from teachers that they may not had in previous traditional training. Continuous professional development for the academy teachers ensures that the student's education is relevant to today's industry standards. Common planning encourages teaches to be collaborative in career themed lessons.

Design a Governing Structure

It is important that the academy follows view that is positive to all stakeholders. Advisory committees which involve local industry members can develop a positive partnership between school and community. Students must apply to be a part of the academy as well as having successfully completed at least one year of Introduction to Technology (Course 860010)

Evaluate Curriculum and Instruction

The curriculum of the Haile Middle School Engineering program meets the standards of the district, state and industry. Curriculum acknowledges the goals and views of feeder programs, and incorporates elements from state and national standards ensuring that the program promotes rigor and relevant learning.

Link program to Employer, Higher Education, and Community

Haile Middle School Engineering focuses on the importance of a link between school and community. The program involves the community, higher education and potential employers in certain aspects of operations to establish the importance and relevance of learning and skills.

Measure Student Assessment

Central to the academies mission should be student performance. Programs should have a focus of Technical learning through multiple measures of collecting student data. The evidence of impact shall be accurate reported regardless of the results.

Develop a Cycle of Improvement

Not all academies will operate flawlessly 100% of the time. Program leaders should asses how the academy is functioning through its strengths and weaknesses. Reviews will lead to refinements in the program. Changes that are made due to these refinements should always reflect the overall mission of the academy.

In attempt to answer the key questions in this research students were surveyed at the middle and high school level, middle school teachers were interviewed, high school teachers surveyed and the academy was evaluated by the standards of the National Career Academy Coalition.

Review of literature

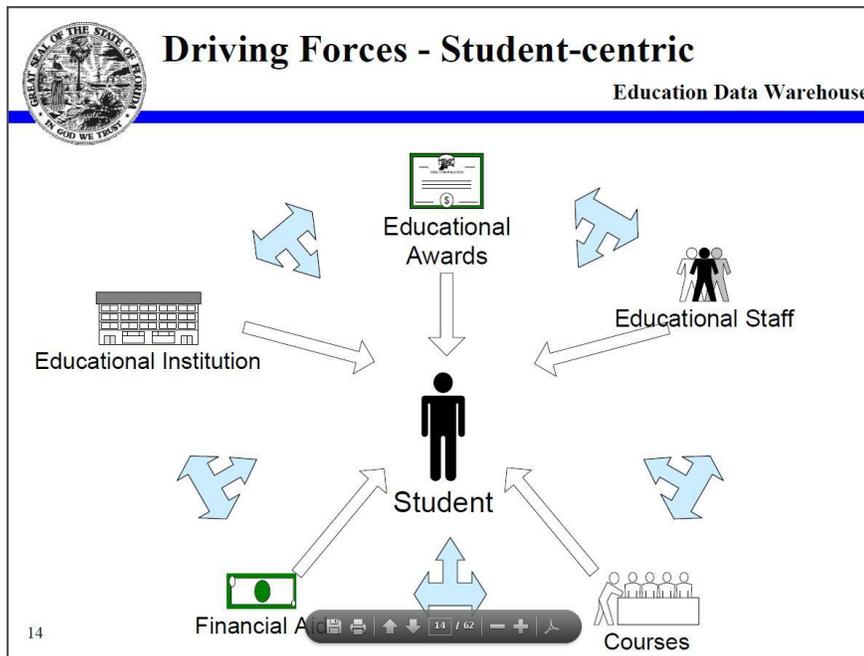
Introduction

According to the *Journal of Engineering Education*, the United States may have already lowered its status in the “global engineering and technology hierarchy”. Therefore it is imperative to assess the effectiveness regarding retention, career readiness and needs improvement of engineering and technology education programs. Other countries in the world such as China are not challenged by reduced enrollment in engineering programs. In 1995 there were approximately one-hundred thousand engineering graduates in the United States, and climbing to one-hundred and twenty thousand in 2005. The shocking comparison is that China generated one-hundred and fifty thousand graduates in 1995 and soared to five-hundred and seventy five thousand in 2005 (Davis, Yearly & Sluss, 2012).

President Barack Obama stated in a speech at the National Academy of Sciences in 2009, for educators to “think about new and creative ways to engage young people in science and engineering, like science festivals, robotics competitions, and fairs that encourage young people to create, build, and invent—to be makers of things, not just consumers of things” (Davis, Yearly & Sluss, 2012). With the current downturn of the job market, assurance is expected that students are prepared to enter the labor force highly skilled and highly qualified (Wilcox, 2006). However, in 2005 the Gates Foundation reported 81% of students who dropped out said “more real world learning may have influenced them to stay in school” (Bridgeland, 2005).

Research has acknowledged that Career and Technical Education is momentous to a young person’s education and can add value to the probability of their success. However, current daily practices in high schools across the country are still at this time liberated by *lectures, individual silent work, and recall based assessments* (Hoachlander & Yanofsky, 2011). Recent studies have revealed that Career and Technical Education students enroll in higher math, reading and science classes. Of these students enrolled in higher level courses, results of 12th grade test scores significantly increased. In regards to employment, CTE students are more likely to earn a higher wage and obtain a job after graduation. Most importantly Career and Technical Education enrollment promotes retention of secondary students (Lewis, 2005). The objective of the academies is to better prepare students for the workplace. Integrating career themes through technical courses and work based learning and career academies offer technical training in a more personalized learning environment (Estacion, D'Souza & Bozick, 2011). Educational awards, educational staff, courses, financial aide, and institution all focus on the student. According to the Education Data Warehouse Centralized student learning can be a successful driving force of a program. The 1980’s empowered the teacher to become the “central manager” of their education environment. Attention has now shifted to “school based curriculum development and research based in service education” (McNiff, 2002). This pattern of

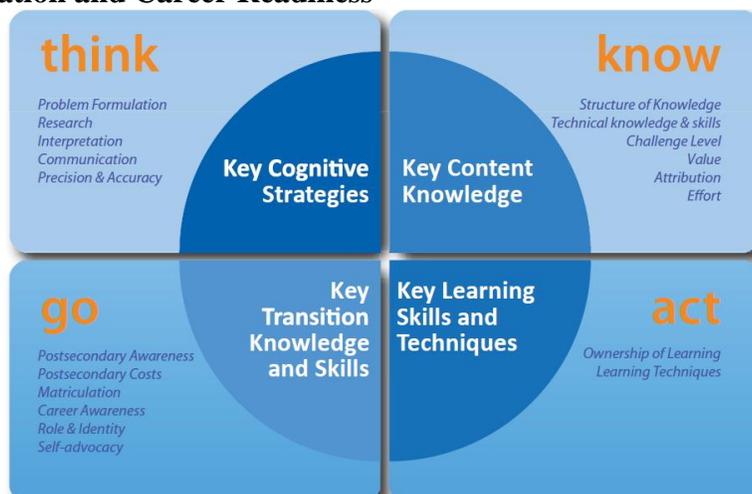
critical thinking pushes schools to put their own needs in perspective. It is a common pattern for schools not only to have curricula which is strictly content focused, rather than adding teacher’s skill sets and attitudes (Mcniff, 2002).



Career Readiness

The primary focus of a secondary program should be for students to be given the opportunity to obtain knowledge and skills to prepare them for the workforce, with a measurement of success in the chosen occupation or postsecondary school preparation. “All schools have the ability to prepare students in a common core of foundational knowledge and skill while also acknowledging the strengths of students who have passions and interests in particular career pathway areas” (4). Students will be considered “ready” upon mastery of four key benchmarks of a) cognitive , b) content knowledge, c) skills and techniques, and d) transition of knowledge and skills (Conley, 2012).

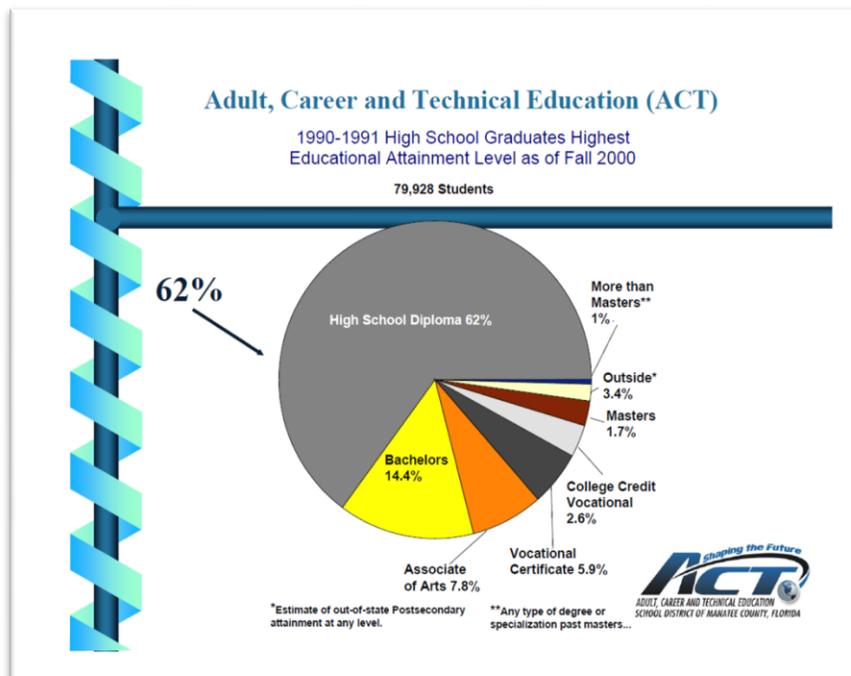
Implementation and Career Readiness



Four keys and academic performance

As presented above students who fall in to the category of career ready, will display the ability to demonstrate key performance targets of cognitive strategies, content knowledge, skills and techniques, and transaction of knowledge and skills. Students should be able to interpret a broad range of information and material, comprehend data and information from charts, graphs and pictures, demonstrate the ability to utilize different methods of writing, demonstrate understanding of number systems within algebra and geometry, interpret data from a broad range of sources, recognize the organization of the scientific method, understand social systems and historical trends, have explored careers and career planning, some knowledge and understanding of a second language, and experience and studies in the creative arts (Conley, 2012). The development of a program based upon a foundation of skill standards and a strong foundational comprehension of a subject can sustain multiple objectives. These teaching objectives can be met by incorporating learning which prepares students to earn industry certifications in relevant engineering careers. This detail of alignment strategy between classroom and industry will better assist students in experiencing the benefits of becoming industry certified and career ready (Wilcox, 2006).

New York’s Manpower Demonstration Research Corporation (MDRC) developed the most comprehensive research of career academies in March of 2000. The covered more than 1,700 students currently enrolled in career academies. The study revealed many negative aspects involving career academies. The group noted in regard to course content and teacher strategies, that academies had little influence over these central decisions. Standardized test scores showed no creditable effect on students enrolled in academies, and also added no cause in connection to future employment (Black, 2004). However, in 2000 and 2001, Katherine Hughes and Melinda Karp of Columbia University Institute on Education and Economy completed a study with 199 graduating career academy seniors. This sample of students felt their involvement in career academies brought forth engagement in learning, development in career plans, while enrolled in smaller classes with supportive teachers. Most importantly students rate their coursework as rigorous and relevant, giving the feeling that they are academically prepared for today’s workforce (Black, 2004). Figure 1 illustrates a study of the attainment levels of graduates from 1990-1991 in the year 2000. Figure 2 is a comparison in 2005 of graduates from 1995-1996.



In 2005 there was an 8% increase in standard diplomas and a 72% achievement in Manatee County. A question to discover will be if this success is connected to student achievement in career academies.

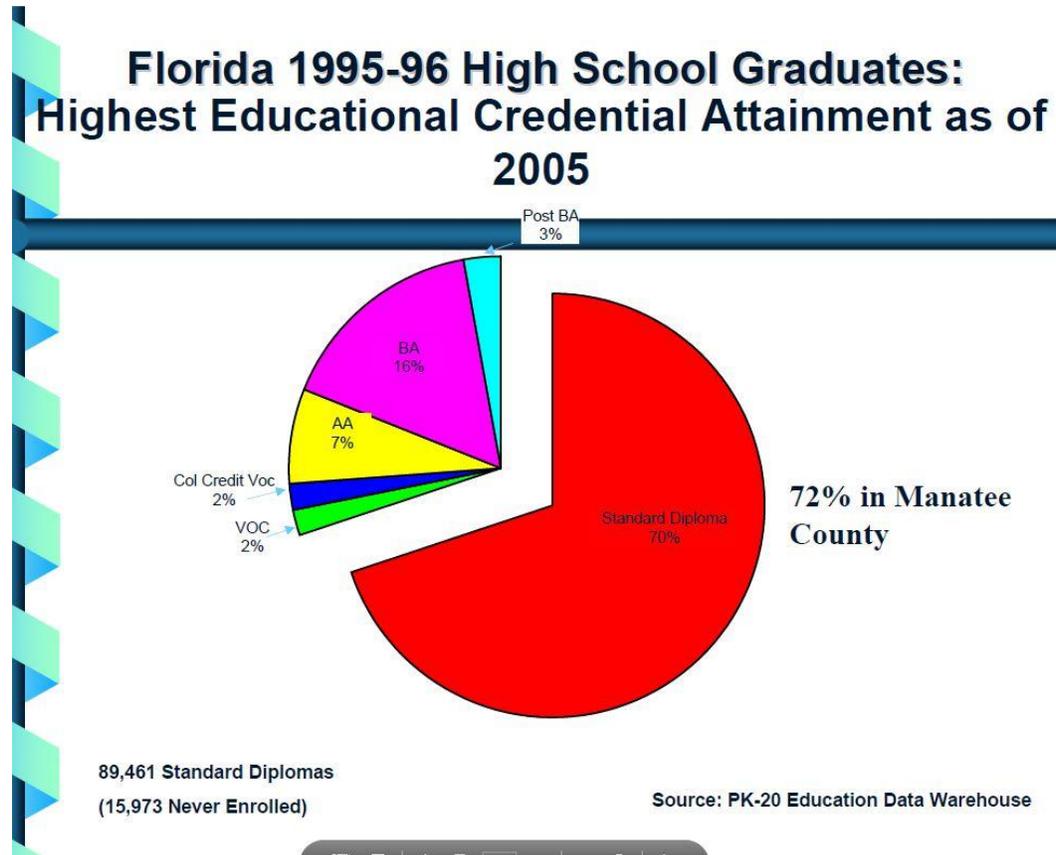
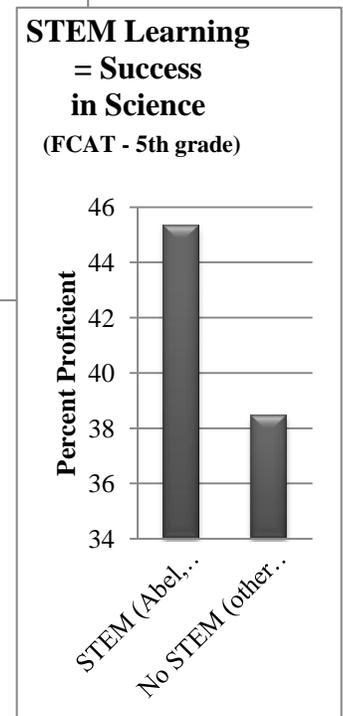
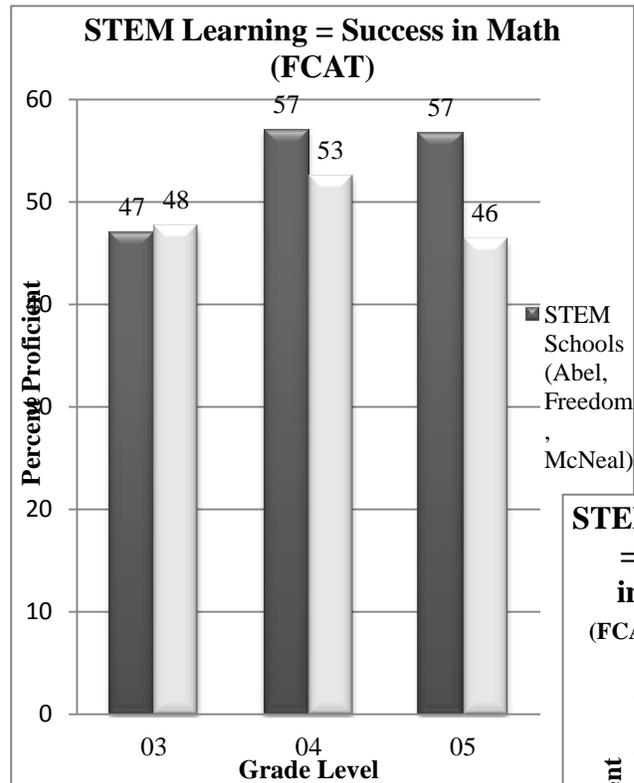
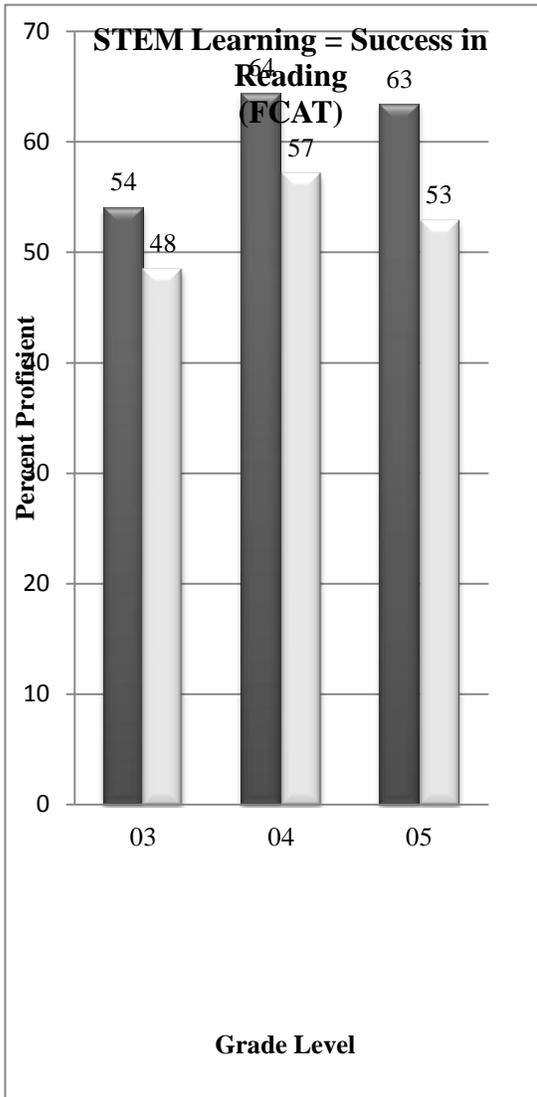


Figure 2

Manatee County School District continues to better develop the implementation of K-12 engineering program. Studies revealed that scores in math, reading and science in STEM (Science, Technology, Engineering and Math) themed elementary classrooms across the District of Manatee County are increased compared to schools with non STEM focused programs. The objectives of STEM learning in the elementary school are to introduce students to content and skills, which will be required for college and career readiness. This model supports a “bottom up” approach involving schools, teachers, students, and community (Wagner, 2012). This approach accelerates learning, and increases anticipation of elementary students enrolling into middle school STEM programs. Data shows FCAT scores increasing at schools with STEM programs.



Conclusion

In 2011, Estacion, D'Souza & Bozick conducted research of twelve Districts in the state of Florida. Of the twelve districts surveyed (332,010 students), 15 percent (49,795) were participating in career academies (Estacion, D'Souza & Bozick, 2011). Haile Middle School Career and Technical Academy (CAT) began in 2012. The need for the academy was to be in conjunction with Florida House Bill 1255, which states that by 2011-2012 school years, each

district shall include plans to implement at least one career and professional academy in the district. According to the bill, academies must provide instruction in courses targeted at careers in high growth areas. Integrating content from core subject areas along with aligning course work with approved industry certification training is a necessity (Florida House Bill 1255). Research findings indicated there is a need to continually assess and improve engineering technology programs in order to maintain effectiveness and clearly support the proposed research project of discovering program retention, career readiness effectiveness and needs improvement of the career academy.

Method

The overall purpose of scientific research is to Describe, Predict, Control, and Explain. Research is a word that can have many different definitions pending the audience. According to Leedy in 1974, simply glancing at particulars and writing them down is “fact finding” (Leedy, 1974). It has been established that the origin of action research originated through the work of Kurt Lewin, an American psychologist in the 1940’s. Through the years the emphasis of action research has been altered pending the purpose of the research. Action Research has been driven by two distinct traditions. The education tradition is linked to a British culture which connects “research to improvement of practice”. American culture utilizes Kurt Lewin’s developments to bring about social change (Norton, 2009).

Characteristically, Action research begins with a question. Upon a delivery of a question, a research plan typically follows. Declaring a clear statement of the problem is an essential for defined research. The flow of the plan shall stem through the main problem into sub problems. The overall course of the research will root from hypothesis. Quality research will not only organize data to support a hypothesis, but also expose a clear meaning.

Focus Questions:

1. Is the academy promoting retention in high school programs?
2. Does the curriculum provide focus of career readiness?
3. What actions are required to improve the overall success of the academy?

Examining the potential effects of a successful implementation of an engineering career academy at the middle school level could encourage student success and learning through (a) choosing engineering as an elective in high school, b) intent of further industry certifications and c) further pursuit of engineering related careers. This study illustrated the importance of developing academies which model industry skills and knowledge at the middle school level. Developing programs uniform with industry standards could ensure that the United States continues to develop students who are prepared to enter into competitive engineering and technology careers. There seems to be a need to strengthen the link between student academic performance and workforce preparation. This can happen with an academy program focusing on rigor, relevance and relationships which model the work place objectives and skills.

During this project, a survey research method was utilized to better understand the current status of the academy. Activities were developed to complete research involving the school districts Quick Query system to research student data such as reading levels, ethnic background, state testing scores, age, and gender. This research delivered information needed in discovering the population of students the schools engineering program is reaching. An annual self assessment of the academy was evaluated by a district administrator to ensure the teaching and learning of the academy in remaining engaging and of high quality while aligned with academy standards of practice. Current high school teachers were surveyed to better understand expectations of current students and middle school academies. Finally a pre certification exam was administered to academy students to gauge a level of knowledge and preparedness regarding industry certification.

Program Demographics

Haile Middle School is located in a rural setting which is defined as less than or equal to 2.5 miles from an urban area. 44 full time teachers with an average teaching experience of 8 years, a total of 336 students eligible for free and reduced lunch. Enrollment consists of 974 students, and a 22:1 student/teacher ratio. The Manatee County School District Quick Query system was used to assess the student enrollment of current academy students. Among the students enrolled, 95.6% are Male, and 4.4% are Female. Ethnic backgrounds include 86.96% White 4.35%, Black, and 8.7% Hispanic. Age levels include 91.3% age 13, 4.35% age 14 and 4.35% age 15. 21.74% of these students have an Individual Education Plan and 4.35% of migrant status. Reading levels were evaluated using the Florida State standardized testing system. Reading levels range from 1-5, with one being a low level reader and five being high level. Reading levels ranged as follows: 26% level 2, 30% level 3, 26% level 4 and 17% level 5. Math levels were also evaluated using the same system. Math levels of academy students were as follows: 17% level 2, 34% level 3, 26% level 4 and 21% level 5.

One Industrial Technology certified teacher oversees the academy. Demands of large class sizes seem to have decreased the quality of learning in the program. This pressing issue is a doubled edged sword. Larger classes expose more students early on to engineering careers; however, high level teaching and learning requires more one on one student teacher interaction. In this situation the instructor becomes more of a facilitator than teacher, which guides students to more exploratory learning closer to the experience of career environments.

Results

Middle School Teacher Perspectives

An interview method was used to gather opinions from core teachers regarding the academy and career readiness education. A meeting was called to order in March of 2013 in order for Haile Middle School departments to collaborate more closely to promote STEM education and career readiness. The meeting consisted of a member from each core department (math, science, language arts and reading). Teachers felt if more collaboration was achieved, the academies career education would be become a better reflection of what the core teachers were teaching. Core teachers were excited to have the opportunity to also promote career readiness in their classrooms along with a stronger emphasis on technology. The group also agreed the opportunity of alternative assessments coming into their classrooms from use of equipment and

technology within the engineering program would better promote research, value added efforts, career awareness and ownership of their work.

High School Teacher Perspectives

Three high school teachers were surveyed to attempt to gain an understanding of their feelings of their middle school feeder programs. 100% agreed that the current middle school structure added value to their programs. 100% of the teachers surveyed hold a current industry certification. High school teachers believe that the middle school programs are building a foundational knowledge which is helping accelerate the learning path. Middle school programs are teaching available industry options while in a career focused environment. One teacher felt there needed to be a stronger emphasis on basic skills such as reading a ruler. All three teachers agreed there was great value in students entering high school programs already certified.

When asked to describe their opinion of negative aspects of middle school career academies, teachers felt there a) are not enough of them, b) there is too large of gap in knowledge and skills gap between students coming from different middle schools. However, 100% of the teachers have students earning multiple certifications, and all teachers agreed that their programs were reaching benchmarks for current industry needs. 66.7% state students in their programs enroll for 2-3 years. 33.3% of the teachers stated they have 10-20 students which enroll in college level programs and 66.7% have 20-30 students which enroll in college level programs. Two of the teachers have 10- 20 students who utilize their industry certification directly out of high school, while one teacher has 20-30.

Student Data

Information was first gathered to gain some insight of the currently enrolled 8th graders in the academy program. 70.8% of the students answered yes, when asked if someone in their family or someone they know was an engineer. 100 % of the students surveyed felt their enrollment in an academy course will further advance their learning beyond their peers. 87.5% of the students plan on taking 4 years of engineering in high school and only 12.5% plan on entering the workforce immediately after high school. 45.8% plan on choosing engineering as a career.

100% of the Students surveyed stated they were going to attempt to obtain an industry certification in middle school, while only 91.7% of students stated they would attempt a second certification in high school. It was clear students comprehend the connection of learning and careers when questioned as to why they felt an industry certification was important to their future and responses were as follows; so I can possibly obtain a job, so I can have the opportunity to get to University of Florida, So that I can get a good job over the summer, Because our world is turning into computers and technology, so I can be a engineer when I grow up because I like to design stuff and create the thing I design, To get a job in high school, I enjoy making changes to things to better them, and I want a good job that is fun, because I want to find work in the industry, Because I have fun doing SolidWorks and it would be cool to have an Engineering job, I am attempting to earn an industry certification because I want to be an engineer when I grow up, Because it can help me get better, higher paying job. Also because it is something I enjoy, for a computer engineering degree.

115 high school students were given a similar survey to attempt to discover a connection from middle to high school engineering programs. Bridging this relationship could help better understand if the middle school academy programs are effectively preparing students for high school and the workforce. Typically, 66% of a freshman cohort is unprepared to enroll in college (Bridgeland, DiIulio & Morison, Civic, 2006). Only 44% of the students in high school stated that someone in their family or someone they knew was an engineer. 90% felt their involvement in the academy was advancing their education experience. 72% plan on completing 4 years of engineering in high school, and only 5% will enter into the workforce after completing high school.

Industry Certification

In regards to industry certification and high school students, survey results and opinions varied from the middle school students. Further research may be needed to see if current middle school academy students are similar in opinion once they reach high school, or further along in their high school years. Of the 115 students surveyed, 72% planned on obtaining an industry certification, and of those 72%, 80% will attempt to acquire a second certification. Responses when asked why they were attempting industry certification were similar to middle school as far as career opportunities and career focus; however there were student responses which displayed much more interest in obtaining a certification for resume purposes. Some of the responses included; I am attempting to receive an industry certification because it would look great on a college application along with all of the sports I participate in. so I can put it on my resume and possibly use the programs in a career, I'm not sure I just chose the class because it's a plus to be certified in these fields, I love engineering I'm a more hands on person just give me something to do and I'll get it done getting an industry certification will also help me when getting into a college and look good on a resume because I want to become an engineer., I'd like to have experience, qualifications and I think this could help to getting a good job, I enjoy the challenges and paths that engineering can bring me and already has, Because I am in the class and I have to, To get a better starting salary out of high school, It is important to develop skills in high school that are applicable in the real world.

The final set of questions asked to the high school students was an attempt to a) better understand their middle school experience and b) to see if their experience would have changed if there had been the opportunity to be in a middle school academy. When asked if an engineering course in middle school influenced your high school experience, 50% stated yes. 78% felt they would have enrolled in an engineering academy at the middle school level.

Pre-test results

A ten question performance based exam was administered to academy student to better understand levels of knowledge and understanding in regards to content area industry certification exam. In 2011, a total of 9 SolidWorks industry certifications were administered. 8 students successfully passed with an average score of 85%. The average pre-test score of current academy enrollment was 54.4%. The test consisted of 4 multiple choice drafting theory questions and 4 software performance based questions. 53% percent of the students answered drafting theory questions correct and 46% of the students answered the performance questions correctly.

Conclusion

Career academies will continue to be a “viable” source for students to develop the skills needed to be qualified for tomorrow’s high skilled, high waged jobs (Kemple, 2004). The evaluation of the engineering academy revealed that students enrolled in the academy do have a career focus and understand the importance of focusing on obtaining skills at a young age for career readiness. This study also revealed that there is much room for improvement within the academy. Aligning the academy standards and best practices with the National Career Academy Coalition Standards is vital to the success of the program. To reach exemplary status academies need to score in the achievement range of 45-50 on the assessment described in Figure 3. The general assessment is an indicator which follows the National standards of practice for career academies.

Academy Department of Education Annual Self-Assessment

Meeting career academy standards for the state of Florida is an obligation of the school and district, each academy will undergo a self assessment review annually. Figure 3 is an example of the Middle School Academy Annual Self-Assessment. The Haile Engineering Academy scored 43 out of 50. This review positions the academy at “Meets Requirements” status. The Assessment is a review of the ten standards of practice developed by the district and aligned with the national career academy coalition. The assessment revealed some key areas for further development to be focused. Discussion and data analysis of Standard 4 exposed that the faculty and staff did not have enough awareness regarding the academy and the value added to the school. Standard 8 was the lowest rating as there is no evidence of an advisory committee to drive the focus of the program to meet community needs. Post review recommendations were to establish an advisory board consisting of teachers, community members, parents, and students. This committee leadership will ensure that the academy is preparing students to meet the demands of the local workforce.

Middle School Academy Annual Self-Assessment

Ensuring that an academy remains high quality requires engaging in a regular, well-defined, objective self-examination. Improvement elements include the examination of an academy's mission, design and implementation, planned refinements, timetables, and measurable outcomes.

Standards of Practice

| | | | | | | |
|-------|--|---|---|---|---|---|
| I. | Define Mission & Goals | 0 | 2 | 3 | 4 | 5 |
| II. | Academy Structure | 0 | 2 | 3 | 4 | 5 |
| III. | Host District and Middle School | 0 | 2 | 3 | 4 | 5 |
| IV. | Faculty and Staff | 0 | 2 | 3 | 4 | 5 |
| V. | Professional Development | 0 | 2 | 3 | 4 | 5 |
| VI. | Governance and Leadership | 0 | 2 | 3 | 4 | 5 |
| VII. | Curriculum and Instruction | 0 | 2 | 3 | 4 | 5 |
| VIII. | Employer, Higher Education and Community Involvement | 0 | 2 | 3 | 4 | 5 |
| IX. | Student Assessment | 0 | 2 | 3 | 4 | 5 |
| X. | Cycle of Improvement | 0 | 2 | 3 | 4 | 5 |

TOTAL POINTS EARNED: _____

- 0=No evidence presented
- 2=Partial evidence presented
- 3=Adequate evidence presented
- 4=Exceeds requirements of evidence
- 5=Evidence presented is exemplary

| |
|--|
| Maximum Points Potential = 50 |
| 45-50 = Exemplary status |
| 40-44 = Meets requirements |
| 35-39 = Meets minimum but requires action plan |
| 34-0 = Does not meet minimum requirements |

Please review pages 15-24 within the, *Standards and Guidelines For Middle School Career Academy Development and Implementation in the School District of Manatee County*, to review an explanation and coordinating numeric indicator which describes the level of evidence presented for a particular standard. Each POS will be assessed with a numeric indicator which best describes the level of evidence presented for a particular standard. Each POS will be assessed. An individual school will be given until the end of the first year to rectify any deficiency. All academies must earn 40-44 points to continue the next school year.

School Name _____ Academy Name _____

Based upon results from the teacher survey, student survey, annual self assessment and pre-exam test there is an immediate need for improvement regarding current status of the engineering academy at Haile Middle School. 100% of the teachers surveyed feel middle school academy programs will promote the success of high school academies. Indicators from survey results of students did reveal that 87.5% do plan on enrolling in 4 years of engineering at the high school level, with 45.8% planning to choose engineering as a career. Pre-test results showed most students are not prepared to attempt industry certification during the first semester of their 8th grade year. Data suggest a conclusion can be drawn and the academy is successfully providing students with career focused learning, and encouraging the pursuit of careers in engineering. Based on results students understand the value of career focused learning in the academy environment.

Immediate action required from outcomes of the district evaluation involves the implementation of a proficient advisory committee which will create a stronger connection between school, community and the k-12 engineering structure. The selected committee could develop an action plan for learning to begin when students enter in kindergarten, and end with the knowledge and skills that will be needed at graduation to support the local workforce. This action plan will have to consider the impact of adopting National Common Core Standards by all districts.

In the spring students will be given the SolidWorks industry certification exam and also be surveyed on the following a) what high school they will attend, b) will they choose engineering as an elective, c) will they enroll in an engineering academy if the option is available, and d) what are the students plans after high school. The final results will establish if students are continuing learning in engineering careers after middle school. If the study was prolonged to 3-5 years, students could be surveyed after completing college or a technical school to see if they enter into a high skilled engineering career that their middle school academy had an impact on. A review will be conducted to see if the addition of the advisory committee added value to the further success of the academy.

References

- Bridgeland, J.(2005). et al, *The Silent Epidemic*, Bill and Melinda Gates Foundation,.
- Bridgeland, J. M., DiIulio, J. r., Morison, K., Civic, E., & Peter D. Hart Research, A. (2006). *The Silent Epidemic: Perspectives of High School Dropouts. Civic Enterprises,*
- Davis, C. E., Yeary, M. B., & Sluss, J. J. (2012). Reversing the Trend of Engineering Enrollment Declines With Innovative Outreach, Recruiting, and Retention Programs. *IEEE Transactions On Education*, 55(2), 157-163. doi:10.1109/TE.2011.2157921
- Estacion, A., D'Souza, S., Bozick, R., & Regional Educational Laboratory Southeast, (. (2011). Characteristics of Career Academies in 12 Florida School Districts. Summary. Issues & Answers. REL 2011-No. 106. *Regional Educational Laboratory Southeast.*
- Hoachlander, G., & Yanofsky, D. (2011). Making STEM Real. *Educational Leadership*, 68(6), 60-65.
- High schools focus on engineering. (2008). *Industrial Engineer: IE*, 40(1), 16.
- Lakes, R. D., & Burns, J. Z. (2012). Strategic Global Advantage: The Career Academy/Technical College State Initiative. *Community College Journal Of Research & Practice*, 36(6), 422-435. doi:10.1080/10668920902917492
- Middle School Academy Assessment. School District of Manatee County. Retrieved from, www.manateeact.com, Nov.22,2012.
- Kemple, J. J., & Manpower Demonstration Research Corp., N. Y. (2004). Career Academies: Impacts on Labor Market Outcomes and Educational Attainment. *Mdrc*,
- Wagner, Doug., (2012) Approval to Apply Presentation for Race to the Top Grant October,22, 2012. School Board of Manatee County.
- Wilcox, D. (2006). The Role of Industry-Based Certifications in Career and Technical Education. *Techniques: Connecting Education And Careers*, 81(1), 21-23.
- Back to school ACT presentation. School District of Manatee County. Retrieved from, www.manateeact.com, Nov.22,2012.