FINCH ROBOTS - An integrated STEM experience for students at Egg Harbor Township School District
By Lynne Kesselman & Adam Swift

STEM, Science, Technology, Engineering, and Mathematics, is the hot phrase in education today as districts attempt to provide students with valuable and employable skills necessary to succeed in the 21st century. Although included in STEM, TECHNOLOGY is often the overlooked field despite it being the fastest growing in regards to future employment prospects. How do you convince administrators in education to not overlook technology in today’s world of baseline/standardizing testing? How do you get students engaged in technology, not using but developing? How can we use technology to engage our students in the learning process enlightening them of what computer science is all about in an attempt to break down stereotypes and psychological barriers they have developed? These are the questions the Egg Harbor Township Finch Robot Project set out to answer.

In the fall of 2013, Computer Science Teachers Lynne Kesselman and Adam Swift, submitted an application to participate in Bird Brain Technologies Finch Robot Loan Program. Through a competitive application process, Bird Brain Technologies was loaning out 50 Finch Robots to school districts throughout the country for a one month period. The goal of the program, if chosen, was to use the robots to introduce students of all grade levels throughout the district to Computer Science in a fun and engaging manner supporting the district goal of increasing and encouraging participation in STEM projects. In early October Kesselman and Swift received notification that they had been chosen as 1 of the 76 districts in the country, to participate in the Finch Loan Program. Although the program required at least 250 students be involved, they immediately developed a plan to reach as many Egg Harbor Township School District students as possible.

At the October 2013 district wide In-Service workshop, Kesselman and Swift presented to their technology colleagues, teachers with students ranging from 1st to 8th grade, the opportunity ahead. They discussed their goals for the Finch Robot Program in Egg Harbor Township and asked for support. The goal was to get the robots in the hands of the highest number of students possible throughout the month of March while the district was in possession of them. The sales pitch was this activity would provide all students in the district a basic introduction to computer science in conjunction with a district wide participation in the Hour of Code Event hosted by code.org. Kesselman and Swift set out with their colleagues to put technology at the forefront of the STEM conversation. Buy in was immediate and excitement was built throughout the district, including widespread administrative support.

In preparation for the district wide Finch Robot Tour computer science students, Programming and Web Design, used their free time to practice coding with the two Finch Robots the school received in preparation to their larger batch. Students would eagerly come down during their lunches, study halls, and stay after school to have the opportunity to “play” with the robots. Additionally, students who finished work early immediately asked if they could program the robots. The Finch Robot program was turning into a student driven project.

As the high school students learned the ins and outs of working with the Finch Robots, Kesselman and Swift were in the second phase of their plan to make their project come to fruition. They put together a proposal for a mini grant from the Egg Harbor Township Educational Foundation to help financially support the dissemination of the robots to all the buildings in the district.
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Ultimately, they were granted a Mini Grant for such at the attending Board of Education Meeting on January 28, 2014 at which they received their award and further support from administration. The basics of the program that Kesselman and Swift had developed were as follows:

- Gain support and buy-in from technology teachers district wide (accomplished in October District-Wide Technology Teacher In-Service)
- Gain financial support – Egg Harbor Township Education Association Mini Grant
- Train and prepare high school Computer Science students to serve as Finch Programming Tutors
- Coordinate with other building technology educators to create a rotating schedule to visit each of our six K-8 schools throughout the month of March
- Set up a student schedule so that a different groups of 15-20 students would be traveling to each school
- Provide opportunities for all level of high school computer science students to participate, including setting up the elementary labs with software, direct tutoring during the events, and recording/archiving the event.
- Develop a schedule for student transportation, accommodating for different school opening and closing times, planning for substitute teacher coverage, conjoined classes for days with no substitute, develop meaningful activities for students on days they were not attending the visitations, and take students to elementary schools to serve as instructors for younger students

The month of March arrived and a gigantic box of Finch robots was delivered. Accompanied by their high school computer science student tutors, the Finches began their district wide tour. As each school was visited, the number of students participating climbed and far exceeded expectations. (see graph below)

The Finch Robot Project in the Egg Harbor Township School District was truly an inspiring initiative. It was an experience that the high school students thoroughly enjoyed and the excitement of the elementary students to interact with the robots was evident. The many building and district administrators were highly supportive of purchasing Finch Robots and incorporating their high quality, free educational materials into our K-12 district wide STEM curriculum. All technology teachers in the district participated in a survey of their experience and their students’ experiences to provide feedback on the Finch Robot Program.

Early results are in and it appears the Egg Harbor Township Finch Robot Project was a hit. For the current 2014-15 school years, the Egg Harbor Township school district ordered 76 robots (for a more detailed breakdown see chart below). In addition, the computer science program at the high school continues to blossom as two more sections (one Honors and one College Prep) of Intro to Computer Science along with one Advanced Placement section were added to the department offerings. Total enrollment numbers for computer science courses at Egg Harbor Township High school have increased significantly with enrollment in College Prep Intro to Computer Science increasing by slightly more than 50% (2014-15 50 students vs 2013-14 33 students), enrollment in Honors Intro to CS courses increasing by 67% (2014-15 72 students vs 2013-14 43 students),
and enrollment in AP CS increasing by 70% (2014-15 **29 students** vs 2013-2014 **17 students**). Whether it was 8th grade students experiencing computer science for the first time or high school students having the opportunity to showcase their skills in an interactive manner, interest in CS has peaked at Egg Harbor Township. The Finch Robot Project and other initiatives have encouraged new students to delve in to computer science while influencing those already enrolled to continue their exploration of all that computer science has to offer. This project and other initiatives affected all students but perhaps the largest impact was on the incoming freshmen class with 74 enrolling in computer science courses more than tripling the previous year’s count of 20 freshmen.

This is just the beginning for the Egg Harbor Township Computer Science Teachers. Data has been generated with Kesselmen and Swift hoping to track the impact on enrollment in their courses over the next few years. Kesselmen and Swift know a one-time event is not enough to obtain the necessary recognition and involvement in Computer Science however the Finch Robot Project was impactful. The two are currently planning their next project! They hope to gain enough traction to have their school district consider the formation of a Technology Academy.
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### FINCH ROBOT ORDERS AFTER FINCH ROBOT PROJECT

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th># of Finch Robots</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLAYBAUGH COMPLEX</td>
<td>6 FINCH ROBOTS</td>
</tr>
<tr>
<td>Grades Pre-K through 3rd</td>
<td></td>
</tr>
<tr>
<td>DAVENPORT COMPLEX</td>
<td>12 FINCH ROBOTS</td>
</tr>
<tr>
<td>Grades Pre-K through 3rd</td>
<td></td>
</tr>
<tr>
<td>SWIFT SCHOOL</td>
<td>12 FINCH ROBOTS</td>
</tr>
<tr>
<td>2ND &amp; 3RD Grade</td>
<td></td>
</tr>
<tr>
<td>MILLER SCHOOL</td>
<td>10 FINCH ROBOTS</td>
</tr>
<tr>
<td>4TH &amp; 5TH Grade</td>
<td></td>
</tr>
<tr>
<td>FERNWOOD MIDDLE SCHOOL</td>
<td>10 FINCH ROBOTS</td>
</tr>
<tr>
<td>6TH-8TH Grade</td>
<td></td>
</tr>
<tr>
<td>ALDER MIDDLE SCHOOL</td>
<td>10 FINCH ROBOTS</td>
</tr>
<tr>
<td>6TH-8TH Grade</td>
<td></td>
</tr>
<tr>
<td>HIGH SCHOOL</td>
<td>18 FINCH ROBOTS</td>
</tr>
<tr>
<td>9TH-12TH Grade</td>
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</tr>
</tbody>
</table>

**TOTAL 76**

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**SCHOOLS VISITED**

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