Improving Educational Opportunities at the Boys and Girls Club of Boston

Design Team
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Abstract
The goal of this project is to improve the educational opportunities for students at the Boys and Girls Club of Boston (BGCB). The clubs seek to have all members maximize their educational potential by providing homework rooms with tutors and mentors of all ages. One challenge is the difficulty of keeping track of which students are actually attending homework clubs. Without this information, it is difficult to maintain a strong culture of education. This group seeks to provide the Boys and Girls Club of Boston with an effective and efficient method of tracking that will induce high compliance rates from the students while minimizing the time spent by the staff. Based on collected data, this project has the potential to have numerous alternative solutions. The optimal solution will limit the need for additional resources and required faculty time. Furthermore, it will explore the possibility of expanding this project to include an optimized schedule and facility layout that will provide the best opportunity and experience for the students to thrive while optimizing the use of limited resources and facilities at the club.

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The Need for Project

BGCB does not consistently track student attendance in homework rooms, resulting in inaccurate historical data. The current system requires excessive time and attention from BGCB staff workers, resulting in decreased time spent helping students. The Boys and Girls Club of Boston lacked consistency in tracking students going in and out of homework rooms. There was not enough data being kept to monitor trend patterns. Without historical data on students, the Boys and Girls Club of Boston could not conclude whether specific students attended homework rooms. This lack of information interferes with academic performance metrics and does not allow the homework rooms to operate at an optimal level.

Knowing the consequences of an improperly run homework room, the Boys and Girls Club of Boston reached out for help in tracking students. Not only will they be able to encourage more students to attend, the staff will gain a greater understanding of peak hours. Financially, this gives them the power to save costs by having a proper amount of staff members on duty during high capacity hours. In addition, the system will allow the faculty to use their time more efficiently, which ultimately equates to more time spent with students.

The Design Project Objectives and Requirements

This project aims to provide an effective solution to the tracking issues of homework rooms in BGCB is experiencing while ultimately justifying the cost of scanners. This project also seeks to optimize the Yawkey club using industrial engineering tools to improve educational opportunities for students.

**Design Objectives**

The primary objective of this project is to implement an interim standardized attendance-tracking procedure at BGCB to justify the purchase of scanners for BGCB clubs. Scanners would further improve tracking by decreasing time spent by students and staff workers on attendance-tracking procedures. Scanners would not be purchased until after the duration of this project. This project will also optimize operation at the Yawkey club operation using simulation, facility layouts, and schedule optimization to improve educational opportunities for students.

**Design Requirements**

BGCB has financial and technological limitations. Since BGCB is a non-profit organization, designs must be affordable and usable in all the clubs.

The design must limit the interference of staff time during the peak operating hours. Staff members have explained to the team that spending time with the students during homework time is their greatest priority. Time spent tracking attendance is a direct reduction of time spent interacting with students.
The design must be efficient by allowing all staff members to seamlessly operate it. In order to save time and cost, the team has emulated the guidelines set forth by the established back-end database to make the interface as user-friendly as possible. The design must also accommodate staff with very basic technological experience.

With an established tracking procedure implemented, the Boys and Girls Club of Boston will also be able to improve the operations of other activities. The schedule created for students during their stay at a Boys and Girls Club has not been optimized. In addition to providing an efficient tracking system, the team can further help the organization by creating a schedule that will allow students to receive more consistent exposure to enrichment activities that will improve their education.

### Design Concepts Considered

#### PAWS

The team looked at a tracking method used at one of the clubs called PAWS. In the PAWS approach, students enter the homework room and take a slip of paper that is in the shape of a paw. Before they leave, they write their name, age, and the date on the paper and give it to a staff member. The staff then compiles the names and enters them manually into BGCB’s attendance database, known as KidTrax.

#### Modified Attendance Sheets

The current attendance sheets are not uniform, varying from site to site. They are heavily reliant on students as they function as a resource by filling out attendance sheets on their own when they enter the homework room. It is time consuming for the students as they must write their name, age, subject, time of day, and other information. Data collected could also lead to inaccuracies and longer process times due to poor legibility and inconsistency of student participation. A modified attendance sheet could be used across all the sites to simplify attendance. By introducing an alphabetical check-off system, students would simply locate their name and check their name off instead of writing many pieces of information. Such a system also decreases time spent searching for names and translating illegible student handwriting.

#### Hybrid Excel System

The team considered a hybrid system that would combine an electronic method with an attendance sheet. Students between the ages
of 13 and 18 are capable of signing themselves directly into an Excel document which will then allow each education director to upload to the KidTrax database without additional work. Staff members are not comfortable holding students of 6 to 12 years to the same level of responsibility and therefore a PAWS or attendance sheet will be used for them.

**Recommended Design Concept**

The final design satisfies the primary concerns brought up by members of BGCB. It is not intrusive, simple to maintain, and provides the greatest cost-benefit relationship.

**Excel-Based Attendance System**

Using an Excel macro, the team modified an Excel spreadsheet to generate attendance sheets based on a roster downloaded from the KidTrax master database every day. One of the major issues that the staff was concerned with was the constant addition of new members. New students are admitted throughout the year, so the class roster will always be in a state of flux. But by using the constantly updated KidTrax database as the source of information, the staff will have all of the names they need for that day. In addition, the team believes that the Boys and Girls Club of Boston will see how purchasing and using electronic scanners would be even more valuable by eliminating the necessary time spent uploading information back into the KidTrax database.

**Scheduling**

The team obtained a rotational schedule (Figure 3) and arrival data from the membership desks that use scanners when students enter the club (not the homework room). Using this, a simulation was built in Arena to mimic a typical Friday at the Yawkey club. Arrival data was entered into a data analyzer to determine distribution patterns. Further analysis showed that the current schedule was sporadic in consistency and not all activities were utilized. For example, 13-18 year olds never went to the tech, recreation, and pool activities but were scheduled for music and dance seven times a week (Figure 4). Understanding the importance of equal exposure to all activities, the team created a schedule that will allow students to enjoy more activities on a daily basis. This is congruent with the goal of improving educational opportunities as studies have shown that standardized testing scores improve when students are exposed to more frequent levels of academia, specifically art and music.
Financial Issues

The product requires no direct cost to implement throughout BGCB. Hidden costs are reduced due to the minimal time it takes to learn and operate the Excel-based system. As noted in the design requirements, all costs to BGCB must be minimal because they are a non-profit organization. This is a non-issue pertaining to the tenure of this project because there are no associated costs with implementing the Excel-based system in each club and hidden costs are reduced due to the little time it takes a user to learn and operate the system. A cost-benefit analysis was conducted in order to economically justify the use of scanners. However, any potential purchase of scanners for BGCB will not occur until after the project. There is also no established timetable for the incorporation of the updated schedule, but there is the potential need to increase funding in order to offset increased resource utilization in art and music rooms.

Recommended Improvements

Ultimately, the team recommends the use of scanners throughout BGCB. In addition, incorporating an evenly distributed schedule will expose students to more activities to enhance their education. The tools that the team has provided will help convince the BGCB management team to invest in scanners. Utilizing scanners to keep track of students at homework rooms will be the simplest and most cost-efficient solution in the long run. Education directors will no longer be held responsible for uploading attendance data into their online database. The combination of less stress and increased focus the education directors can reserve for their students is more than sufficient justification to implement scanners.

Though it is not the primary objective, the team also recommends that BGCB use the data from simulations to adjust their scheduling and room capacities to better suit each activity and prevent bottlenecks. A schedule that allows for more consistent exposure to existing activities will improve resource utilization and provide students an increased opportunity for academic success.