Proposal to Change Layout and Processes in the Midville Academy Cafeteria: Reducing Long Lines, Confusion, Congestion, Discomfort, and Safety Hazards

Introduction

Due to the increased enrollment, Midville Academy has expressed concern regarding overcrowding in the cafeteria. As a result of the long wait lines, students cannot get their food and eat them in the allocated time. Overcrowding also causes confusion, congestion, discomfort, and safety hazards. Students and parents want the situation improved.

To solve this problem, Midville Academy has decided to use the donated funds from several community businesses to expand the cafeteria into the adjacent outdoor area. The Academy wants to know two expanded cafeteria layouts – one by changing a lot and another by changing less of the current situation. Changes should maintain a comfortable and open atmosphere in the expanded cafeteria. In addition, the Academy wants to know the best expansion layout, as well as improved processes of getting lunches to achieve more efficiency and safety. The Academy also wants to know the reduction in the waiting time in lines, the amount of trash, and the number of dirty trays left for the custodians to clean up after each lunch period.

Consultant Experts Inc. (CEI) will examine the current layout and processes by collecting data on site. CEI will also conduct surveys and interviews. CEI will analyze the data, survey statistics and interview results to develop improved processes and two expanded cafeteria layouts. CEI will measure the effectiveness of these changes by conducting simulations. CEI will compare the simulation results for the reduction in line waiting times, amount of trash, and number of dirty trays left. Based on the analysis, CEI will outline the advantages and disadvantages of each layout, and propose on a recommendation on the best layout to implement. This proposal presents CEI's plan for solving the overcrowding issue, including a detailed project definition, an action plan, and a project schedule.

Background

Currently, Midville Academy has about 900 students, and will close enrollment between 950 and 1000 students. There are 225 students who use the cafeteria in each of the 4 lunch periods. Students can choose to eat their lunch in the cafeteria or in the adjacent outdoor area if the weather is warm and dry. However, the 4000 sq-ft cafeteria and 2000 sq-ft outdoor area were designed to accommodate only up to 160 students at a time.

The existing processes in the cafeteria aim for students to get food either from the salad bar or buffet station, eat their food, and drop-off dirty trays within 24 minutes. If students want to purchase hot lunch, they line up near the doorway to the outdoor eating area, and then walk along in a buffet style line to select their food. Students receive the food on ceramic dishes and silverware placed on a plastic tray. Then they pay at the cash register at the end of the buffet line and find a place to eat. If students want to get salad, they pay at the cash register near the doorway to the outdoor eating area. After they pay for the salad bar, they walk to the salad bar, show a receipt to the attendant who stands next to the salad bar, get their food, and find a place to sit. At the end of each lunch period, students bring the trays with the plates and

silverware to the drop-off area. Then they either stack the trays at the drop-off window or hand them to the kitchen staff person waiting to receive them.

The current layout and processes are inefficient in handling the increased enrollment since the cafeteria opened. This inefficiency causes overcrowding, which leads to the following negative effects:

Long Lines
There are long lines to get food. Students and cafeteria staff cited that students wait up to 15 minutes to get their food, which leaves them only 9 minutes to sit down, eat, and throw their trash. Many students cannot get their food and eat it in allocated time. The Academy will not adjust the length or frequency of the lunch hours to solve the problem because the Academy does not want to change the academic schedule.

Confusion, Congestion, and Discomfort
There are confusion, congestion, and discomfort in the cafeteria. The long lines for the salad bar cash register and buffet station often get mixed up because the lines have no permanent signs. The lines also cause congestion because they block the doorway to the outside eating area. The drop-off area is congested too because students leaving the drop-off area have to walk across the same path as the students entering the drop-off area. Overcrowding also causes discomfort in seating arrangements. Although the Academy has added more tables and sitting space in the cafeteria, walking around the tables has also become difficult with the additional chairs at the ends of the tables.

Safety Hazards
Safety hazards have also become an issue as the amount of trash left in the cafeteria has increased. Moreover, when the lunch period is over, the tray drop-off area becomes so congested with students coming and going to drop off dirty trays and silverware that a lot of students leave their dirty trays on the tables for the custodial staff to clean up while the next group of students is arriving.

Goals and objectives

The primary goal of this project is to change the layout and processes of the expanded cafeteria to solve the overcrowding issue. In this way, students will have sufficient time to buy and eat their lunch, as well as drop-off dirty trays. Students will also be able to eat in an open and comfortable atmosphere. To achieve this goal, CEI will integrate the cafeteria with the outdoor area and design two improved layouts. One layout will show extensive changes, while the other will have minimal changes. CEI will analyze the two layouts and propose a recommendation on the best expansion layout. CEI will also optimize the cafeteria processes. All changes must reduce the long lines, confusion, congestion, discomfort, and safety hazards in the current cafeteria.

Project Scope

The scope of this project will include examining two possible expanded cafeteria layouts and optimizing processes of purchasing food, eating them, and disposing trash and dirty trays. It will also include analyzing the effectiveness of the two layouts and improved processes. This project will not include determining the cost of changing the layout; and changing the cafeteria menu, entrances and exits to the cafeteria, frequency and length of lunch periods, and dimensions of kitchen area.

Implementation Plan

CEI plans on executing the project according to the plan listed below:

Collecting Data for Current Layout
CEI will collect data for the current layout. Two CEI employees will use measuring tapes to measure the length and breadth of the cafeteria, the outdoor area, and the rectangular tables. The length is multiplied by the breadth to compute the area. CEI will also use measuring tape to measure the radius of the round tables, which will then be squared and multiplied by pi to obtain the area. In addition, CEI will measure the breadth of walkways and wheelchairs. Walkways have to be wide enough for wheelchair access and meeting the fire codes requirement.

Collecting for Current Processes
CEI will collect data for the current processes by performing time studies. Three CEI employees will visit the Academy for five days. Each day, each employee will observe processes at the hot food station, salad bar, or tray drop-off area during the four lunch periods. They will use stopwatches to quantify each customer's service time and waiting time in the line. They will then calculate the average service times and waiting times, and average number of customers that use the hot food station, the salad bar and the tray drop-off area. At the end of each lunch period, a CEI employee will count the number of trays stacked up on the drop-off area. Another employee will count the number of dirty trays left by students on the tables. The last employee will estimate the percentage that the two trash cans are filled with trash.

Analyzing Demands for Hot Food Station and Salad Bar
To quantify the demand for the hot food station and salad bar, the Academy will submit records for the past two years that show the number of students who buy lunch and the kinds of foods they buy. CEI will then use Minitab Statistics to determine the average number of students that bring their lunches, buy hot food, or buy salad each day. CEI will also calculate the daily percentage utilization of the hot food station and the salad bar, and compare them for possible correlations with other factors like service times, length of lines, days, or weather.

Surveying Cafeteria Staff and Students
CEI will survey all cafeteria staff and students to better understand the cause of congestion, confusion, and discomfort. CEI will submit a draft survey to Midville Academy. The draft will consist of 30 multiple choice questions that require cafeteria staff and students to choose either strongly agree, agree, disagree, or strongly disagree. The questions will ask them to rate their satisfaction on the hot food station, salad bar, and tray drop-off area processes; tables, chairs, line and sign arrangements; overall atmosphere; and possible reasons of congestion, confusion, and discomfort. In addition, there is also an open-ended question asking the people surveyed for additional comments.

Once the Academy has approved the draft survey, CEI will submit to the Academy the printed survey forms. CEI will need the Academy's help in distributing the forms to the cafeteria staff and students, and collecting the completed forms. CEI will then obtain the completed survey forms from the Academy, and compile the statistics using Microsoft Excel and Minitab Statistics.

Interviewing Assistant Principal, Athletic Director and Hall Monitor
Two CEI employees will visit the Academy and interview Assistant Principal, Athletic Director, and Hall Monitor separately. Each interview will last for 30 minutes and consist of several open-ended questions on the current processes, causes of the problem, and possible solutions. This information will allow CEI to better understand the current situation.

Analyzing of Current Layout and Processes
CEI will analyze the data collected, survey statistics, and interview results according to principles of lean manufacturing and good ergonomics. Based the analysis, CEI will create two layouts of tables, chairs, food service stations and lines, cash registers, dirty tray drop-off area, trash cans and vending machines in the expanded cafeteria. One layout will show extensive changes, while the other will have minimal changes. Next, CEI will shorten the time to get food and drop-off trays, determine the optimal number of cafeteria staff and custodians, and minimize waste to reduce the amount of trash and number of dirty trays left for custodians to pick up.

Simulation
CEI will use ProModel to conduct three types of simulations: the current layout and processes, the layout with minimal changes and improved processes, as well as the layout with extensive changes and improved processes. Each type of simulation will compute the amount of waiting time in lines, amount of trash, and number of dirty trays left for the custodians to clean up after each lunch period.

Analysis of Two Expansion Layouts
CEI will outline the advantages and disadvantages of the two improved layouts based on the simulation results. CEI will compare the amount of waiting time in lines, amount of

trash, and number of dirty trays to determine the effectiveness of the changes in reducing long lines, confusion, congestion, discomfort, and safety hazard. Then, CEI will recommend the most effective layout for the Academy's cafeteria expansion plan.

Deliverables

On project completion, Midville Academy will receive the following documents which will reduce long lines, confusion, congestion, discomfort, and safety hazard in the expanded cafeteria:

- A written report on the survey statistics and interview results.
- A written report on the analysis of demands for hot food station and salad bar.
- A pictorial representation of the current layout and two expanded cafeteria layouts – one that shows extensive changes and another with minimal changes.
- A written report on the current and optimized processes of purchasing hot and cold lunches, eating them, and disposing trash and dirty trays.
- A written training guide for the cafeteria staff on the optimized processes.
- A written report on the simulation results including statistics such as the reduction in the waiting time in lines, amount of trash, and number of dirty trays left for custodians to clean up after each lunch period
- A written report on the advantages and disadvantages of each layout and the recommended layout.

Project Timeline

To complete this project by May 16, 2008 as planned, CEI will perform the following key tasks during the timeframes listed below.

Task	**Timeframe**
Receive project approval	By March 14
Collect data for current layout	March 17
Collect data for current processes	March 17 – March 22
Receive demand records	By March 17
Analyze demand records	March 18 – March 22
Develop survey	March 17 – March 22
Receive approval for survey	By March 27
Survey cafeteria staff and students	March 28 – March 31
Receive completed survey forms	By April 1
Interview key school staff	April 1
Compile survey and interview results	April 2 – April 8
Analyze data, demand, survey, and interview results	April 9 – April 16
Perform simulations	April 16 – April 28
Analyze two expansion layouts	April 16 – April 28
Submit deliverables	By May 16

Investment Considerations

CEI will perform the project described in this proposal for $25,000 payable according to the following payment schedule:

$ 3,000 due on project approval
$ 7,000 due on completion of data collection for current processes
$ 10,000 due on completion of simulations
$ 5,000 due on project completion

The breakdown of payment by labor allocation is as follows:

$ 5,000 for project management
$ 5,000 for data collection, surveys and interviews
$ 5,000 for data, demand, survey and interview results analysis
$ 10,000 for simulation and simulation results analysis

If at any time during the project, Midville Academy requests changes to the project scope or deliverables, the Academy and CEI will discuss how these changes might affect the fees. If changes occur, CEI will document them for the Academy's approval.

Statement of Qualifications

CEI has been especially acknowledged for outstanding achievements in process analysis, facility planning, simulation, and statistical analysis. CEI has redesigned the computer labs in Anderson Elementary to minimize waiting times and maximize percent utilization. We collected data on site; conducted 1000 surveys and interviews; and analyzed service rate, arrival rate, and layouts using Minitab Statistics. At the project's conclusion, we provided observations of the current situation and a recommendation for the future layout. We performed simulations in ProModel and concluded that our recommendations would reduce wait times by 40% and increase percent utilization by 30%. We also produced a blueprint for a new layout and an implementation plan to realize the recommendation. The entire project took less than six weeks.

In addition, CEI has completed a 12-week project with Main Street Eats restaurant in optimizing its operational processes. Just like Midville Academy, Main Street Eats restaurant offers counter ordering and service. CEI analyzed all operational areas of the restaurant, including warehousing, food preparation, distribution, finance, and purchasing. CEI performed data collection, surveys, interviews, cost research, statistical analysis using Stat::Fit, and simulations using Promodel. When the project was completed, CEI provided observations of the current processes, the implications facing the restaurant in each particular area, and recommendations on the future processes and appropriate spend. Our recommendations identified nearly $2.5 million in savings for the client in the first year alone.

Conclusion

The current layout and processes in the Midville Academy Cafeteria are inefficient in handling the increased enrollment and overcrowding issue. As a result, Midville Academy plans to expand the cafeteria into the adjacent outdoor area. Midville Academy also wants to change the layout and processes of the expanded cafeteria to reduce long lines, confusion, congestion, discomfort, and safety hazards. To achieve these goals, CEI will examine the current layout and processes by collecting and analyzing data from the cafeteria, staff, and students. Based on the analysis, CEI will optimize processes and create two improved layouts. CEI will then perform simulations to measure the effectiveness of changes. On project completion, Midville Academy will receive detailed report of the current and improved situations, a recommendation of which layout to choose, and supporting documentation for the proposed changes.