

# Design to Improve the Freshman Admissions Process

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**Abstract**— Universities are under increasing pressure to decrease operation costs to reduce increasing tuition and to maintain or improve enrollment rates. These two conflicting pressures come to ahead with the University Admissions Department, which must meet target enrollment rates within their budget.

The admissions department at George Mason University must currently hire outside application readers in order for admissions counselors to complete all fundamental admissions tasks by their deadlines. The hours worked by outside readers accounts for approximately 8% of hours worked by the freshman admissions staff during the reading season.

One way of reducing labor costs is by reducing or reorganizing the staff to be comprised of fewer high salary employees. Lower wage employees are less skilled and are limited to performing specific tasks. The goal of this paper is to design the process and analyze the feasibility of reorganizing the admissions staff. To lower system costs and make the process feasible, reorganization must occur without decreasing enrollment rates or increasing the time students wait for service.

The design alternatives tested were: (1) the current process, (2) Decreasing the number of counselors and increasing the number of outside readers, (3) Removing outside readers, adding fellows, and specializing tasks between fellows and counselors. and (4) Keeping outside readers and specializing tasks between fellows and counselors

The utility of each alternative from first to last are: 0, 0.290, 2, and 0.376. Alternative 3, removing outside readers, adding fellows, and specializing tasks between fellows and counselors, is recommended, as it shows the greatest improvement of the admissions process out of the alternatives.

**Index Terms**— college admissions, queuing (*key words*)

## I. THE GEORGE MASON RECRUITING PROCESS

At George Mason University, the freshman admissions team consists of 18 people – including 3 outside application readers that assist January through March for 10 hours a week, and 3 fellows who assist full time for 9 months out of the year.

The counselors and fellows spend nine weeks (from the end of August to the beginning of November) in the fall traveling to recruit students. They divide the team by region and attend events. The counselors often work overtime – between 50 and 60 hours on average - during this season.

Counselors rotate responsibility for hosting the information panels. Tours are held twice a day, five days a week, throughout the year, except in April, when they are held 3

times a day. Contact information is collected from these events and combined with information from College Board [1], college networking websites such as Cappex [1], and from the programs – such as organized student-to-student phone calls - run by the admissions counselors. On average, the annual list of prospects consists of around 300,000 – combined from the various sources.

After the travel season in November, counselors must read applications while managing other tasks up until the end of March/Early April. Three outside readers assist during this phase. Applications are divided relatively evenly between the counselors, who are asked to read at least 30 a day – each taking 5-10 minutes on average to process. Any counselors unable to manage their application may proxy them to another employee. Yield and retention events begin in April, after the reading period is complete. [1]

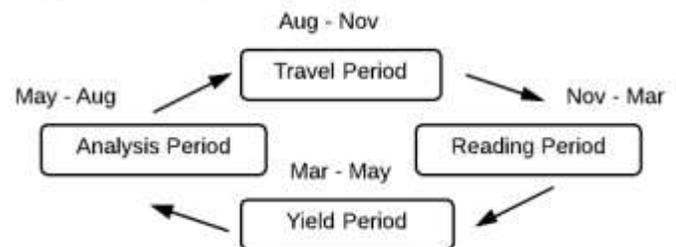


Fig. 1. Overview of Admissions Year

## II. STAKEHOLDER ANALYSIS

### A. Students

The goal of students is to identify the best fitting university for their needs and goals, while staying within their budget.

### B. Admissions Department

The admissions department aims to increase the number of applications and enrollments by out-recruiting competing universities, while staying within their time constraints and budget.

### C. University

Universities desire to have higher quality students to improve university standing and to make a profit.

### D. Stakeholder Tensions

Universities must balance tuition rates with operating expenses in order to ensure a profit. There is limited capital for them fund the admissions department, which must meet target enrollment rates by completing tasks within their schedule. To do this, they must persuade students to apply to their university,

which requires a time investment into a student-recruiter relationship, incurring a labor cost. Students have a budget for tuition, so there is a limit to how much universities can raise tuition rates in order to offset operating costs. Students have limited capital/time to spend researching, visiting, and applying to schools so they often rely on the student-recruiter connection when deciding which school to attend.

### III. STATEMENT OF NEED

#### A. Problem Statement

These University Admissions Department must reduce operating costs and meet target enrollment rates within their time constraints and without sacrificing service quality to students.

#### B. Statement of Need

There is a need to improve the admissions process to decrease costs while maintaining enrollment rates and quality. To do this, the staff must be right-sized to meet throughput and budget goals. A process with lower wage employees means that employees are less skilled and are limited to performing specific tasks – outside readers have the lowest wages but they specialize in application review. All tasks must be allocated while maintaining or reducing waiting time. A reduction in waiting time and labor costs without reduced enrollment rates is the win-win scenario. This would reduce operating expenses for the admissions department, aid in the prevention of increased tuition rates, and ensure recruiters are able to fulfill their duties of connecting with students in a timely fashion.

### IV. DESIGN ALTERNATIVES

#### 1) Current process

- 12 members of the staff are admissions counselors that are available to complete all tasks
- 3 members of the staff are admissions fellows that are available to complete all tasks
- 3 members of the staff are outside readers that assist in application review

#### 2) Decreasing the number of counselors and increasing the number of outside readers

- 9 members of the staff are admissions counselors that are available to complete all tasks
- 3 members of the staff are admissions fellows that are available to complete all tasks
- 6 members of the staff are outside readers that assist in application review

#### 3) Removing outside readers, adding fellows, and specializing tasks between fellows and counselors

- Outside readers are removed
- 5 members of the staff are admissions fellows that are available to manage on campus events, mass-mailings, and application reading
- 12 members of the staff are admissions counselors that are available to complete all other tasks and assist with application review

#### 4) Keeping outside readers and specializing tasks between fellows and counselors

- 3 members of the staff are outside readers that assist in application review
- 3 members of the staff are admissions fellows that are available to manage on campus events, mass-mailings, and application reading
- 12 members of the staff are admissions counselors that are available to complete all other tasks

### V. METHOD OF ANALYSIS

There are three phases of the method of analysis, depicted in Fig. 2. In phase I, data was collected from interviews with twelve of the fifteen admissions counselors on the freshman admissions team, which included: student attendance to events, average processing time per student for each process, and the manner in which employees are assigned to tasks. This information was combined with data from the 2001–2012 budget executive summaries on application/acceptance/and enrollment rates. This provided the inputs and parameters of the next phase, a queuing model. The queuing model simulates average waiting times and enrollment rates for each alternative. Results from the model are analyzed using a utility function based on a value hierarchy of time and quality. Quality is based on enrollment rates, as getting students to enroll is the goal of admissions counselors. Time is based on the average total time students spent waiting for an employee to process them at each task. [2]

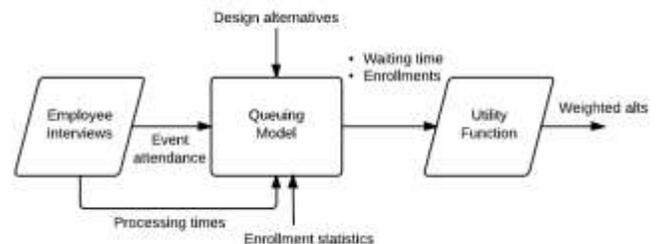


Fig. 2. Method of Analysis

#### A. Assumptions

##### 1) Distributions

Normal distributions were used to model student entries into the system. Exponential distributions were used to model processing times for each sub-process shown in figure 3.

##### 2) Average entries for events

The mean number of entries for each type of event was determined from the interviews conducted with the admissions employees. Different regions vary in attendance rates for each event. The estimated averages for each region were averaged together for entries into the model. This should not impact results, as the travel season and allocation of employees to different regions is outside of the problem being addressed. Entries were modeled as batches, based on a set schedule of when events are held. Actual times between arrivals at events were not available. Entries events included: tours, info sessions, high school visits, college fairs, and 101 visits. Some prospects do not enter the system through attending an event.

The estimated average size of the annual prospect pool was determined from the admissions interviews and compared with total entries created from the events. A single entry point was used to generate entries for all unaccounted prospects from other sources.

### 3) Application/acceptance/enrollment rates

Application, acceptance, and enrollment numbers were determined based on the averages for each from the 2001-2012 budget executive summaries. The averages for each were compared to determine the probability of an application, acceptance, and enrollment rate.

### 4) Staff Employees

The titles of admissions counselors might vary, but it was determined from employee interviews that their functions were similar, so they were all categorized under the umbrella term, “admissions counselors”. Admissions counselors were assumed to have an annual salary of \$37,413, based on the 2011 salary for administrative counselors. Admissions fellows were assumed to have an annual salary of \$32,240, which was the 2011 salary for administrative assistants. Outside readers were assumed to have an hourly wage of \$14.90, which is equivalent to the wage of a document specialist. [3]

## B. Queuing model in Arena

A queuing model of George Mason’s admissions process, described in section I, was used to simulate each alternative. It begins with the first contact with a student and ends with the student’s enrollment decision. The model aims to help determine the effect of the division of tasks on processing and waiting times at each sub-process and on the overall system. This information can be used as an aid to determine the most time effective allocation of employees, which can impact labor cost – reflected by the type and number of staff.

Ten queues are used, which represent vital sub-processes within the admissions process. All queues are “seize delay release” actions. Five queues were included that represent recruiting events in which admissions counselors process initial prospect entry into the system: tours, information sessions, high school visits, college fairs, and one-on-one sessions. These queues are in parallel and funnel into a series of other queues. Chronologically, they are: counselors mass mailing and emailing prospects, counselors holding recruitment programs, university reviewing applications, counselors mass mailing and emailing accepted students, and counselors holding retainment events. Figure 3 shows a flow diagram of the model.

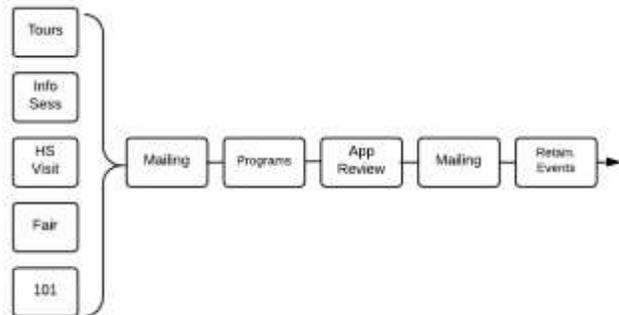


Fig. 3. Model Flow Diagram

Assign blocks were used to assign a 0 or a 1 to indicate prospect decisions to apply, the admissions acceptance decisions, and the students’ decision to enroll. The probabilities of these decisions were determined based on historical data in the budget executive summaries. A discontinuous distribution is used to assign either a 0 or a 1. The entity then moves to a decision block which separates the entities to either continue through the system or exit.

Table I lists the variables used to calculate the average processing time. These values are calculated internally and output by arena.

Table I

Wait Times	
$W_{avg}$	Average total waiting time per student
$W_F$	Average fair waiting time per student
$W_H$	Average high school visit waiting time per student
$W_O$	Average one-on-one session waiting time per student
$W_I$	Average info session waiting time per student
$W_T$	Average tour waiting time per student
$W_R$	Average retainment event waiting time per student
$W_P$	Average program waiting time per student
$W_{M1}$	Average mailing prospect waiting time per student
$W_A$	Average application review waiting time per student
$W_{M2}$	Average mailing accepted waiting time per student

$$P_{avg} = \frac{(W_F + W_R + W_O + W_I + W_T)}{5} + W_R + W_P + W_{M1} + W_A + W_{M2} \quad (2)$$

Table II  
Labor Cost

$L_{Tot}$	Total labor cost
$S_C$	Annual salary of admissions counselor (\$37,413)
$S_F$	Annual salary of admissions fellow (\$32,240)
$S_O$	Annual salary of outside reader (\$14.90/hour)
$N_C$	Number of admissions counselors
$N_F$	Number of admissions fellows
$N_O$	Number of outside readers

$$L_{tot} = S_C \times N_C + S_F \times N_F + S_O \times N_O \quad (3)$$

## VI. RESULTS

### A. Model Results

Table III  
Annual Labor Cost

Alt	Total labor cost	Change from Baseline
1 (Baseline)	\$559,086	-
2	\$460,257	-17.7%
3	\$497,917	-10.9%
4	\$559,086	0%

Alternative 2 - decreasing the number of counselors and increasing the number of outside readers - has the lowest

annual labor cost, at \$460,257. Alternative 3 removing outside readers, adding fellows, and specializing tasks between fellows and counselors had the next lowest annual labor cost, at \$497,917. Alternatives 4 - keeping outside readers and specializing tasks between fellows and counselors - and 1 - the current process - have the highest annual labor costs and are equivalent, at \$559,086. Alternatives 2 and 3 show a prospective annual savings over the current process of \$98,829 (17.7%) and \$61,169 (10.9%), respectively.

Table IV  
Queuing Model Results (hours)

Alt	Wait Time (Time)	Change from Avg Baseline	Enrollments (Quality)	Change from Avg Baseline
1	11.38±9.09	-	1,945±44	-
2	9.65±1.87	-15.2%	1,939±95	-0.03%
3	5.42±0.72	-52.4%	2,000±74	+2.8%
4	9.14±0.61	-19.7%	1,953±86	+0.4%

From lowest to highest waiting times, the alternatives were ranked: (3), (4), (2), and (1-baseline). Alternatives 2, 3, and 4 show decreased waiting time over the current process by 15.2% and 52.4%, and 19.7%. Alternative 3 was the only alternative that showed a statistically significant enrollment rate from the baseline, with a significance level of 0.1. It showed an increased enrollment rate of 2.8%.

B. Utility Analysis

In order to select the best staff composition and allocation for the admissions process, two factors were analyzed: time (waiting time) and quality (number of enrollments). They were given weights of 0.2 and 0.8 – determined through conversation with the associate admissions director. Enrollment rates were determined to be four times more important than waiting times, due to the impact on revenue. Table V shows the normalized results and utility for each alternative, ranked from highest utility to lowest. The enrollment change from the baseline for alternatives 2 and 4 were disregarded, as they were not statistically significant.

Table V  
Normalized Results and Utility

Alt	Time (0.2)	Quality (0.8)	Utility
3	1	1	2
4	0.376	0	0.376
2	0.290	0	0.290
1	0	0	0

Alternatives’ utilities, ranked from highest to lowest are: 3,4,2,1. Alternative 3 has more than five times the utility of the next best option, alternative 4. This shows that removing outside readers and adding fellows in addition to specialization would improve the utility of the process more than just specialization. The waiting time and enrollment rates of this alternative showed an improvement from the current process

by -52.4% and +2.8%. Figure 4 shows the utility of each alternative plotted against their costs.

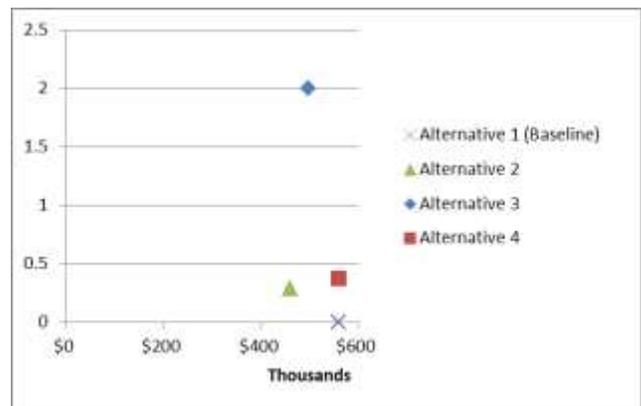


Fig. 4. Utility vs. Cost

Alternative 4 and the baseline have the same cost, and alternative 4 has only a slightly improved utility. While alternative 2 has the lowest cost, its utility is lower than that of alternative 4 and shows only slight improvement over the baseline. Alternative 3 shows reduced costs and significantly higher utility over the other alternatives.

VII. RECOMMENDATIONS

Currently, all members of the staff assist with the completion of all tasks. To reduce student waiting time, improve enrollment rates, and lower cost, it is recommended that the George Mason University Admissions Department remove outside readers from the staff and add two fellows. It is also recommended that fellows be assigned to manage on campus events, mass-mailings, and application reading (assisted by outside readers), while admissions counselors manage other tasks.

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REFERENCES

- [1] George Mason University Admissions Department. Interview by Mary Barthelson. Personal Interview. Fairfax, February 3, 2014
- [2] *George Mason University Total Budget, Executive Summary*. George Mason University, n.d. Accessed 30, 2014. <http://budget.gmu.edu/11budexecsumm.pdf>.
- [3] Collegiate Times. "Collegiate Times." Accessed March 30, 2014. [http://database.collegemedia.com/databases/salaries/salary.html?schools=10&yr=2011&fname=&depart=Admissions&submit\\_fm=Submit](http://database.collegemedia.com/databases/salaries/salary.html?schools=10&yr=2011&fname=&depart=Admissions&submit_fm=Submit)