**MODEL JUSTIFICATION FOR FINAL PROJECT FOR MIS 64018 – QUANTIATIVE MANAGEMENT**

This presentation is for the final project for MIS 64018 – Quantitative Management - Fall 2020.

The objective of the project is to formulate and solve a mathematical optimization problem involving the formation of Groups.

We have been tasked with the objective of forming groups for a class of 12students. They should be 4 groups with 3students each.

The primary objective is to ensure that we maximize the chance that each group will do well on the class project.

For this project, we will be looking at students in a master’s program. The following factors will affect the group’s success in the project are:

Student’s GPA; Relevant Background and Computer skills.

Justification for choosing these factors are:

GPA as a representation of a student’s intellectual ability

Relevant background represents domain knowledge/experience which impacts on student’s performance in a masters’ degree program

Computer Skills – Computer literacy is very essential in our world today, it is a critical requirement for success in any advanced educational program.

Student’s names are fictitious and values for each of the above success factors have been randomly generated.

A look at the dataset that has been developed

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No | Student name | GPA | Relevant Background | Computer skills | Total Score |
| 1 | Joe | 3.5 | 8 | 9 | 20.5 |
| 2 | Michael | 3.7 | 6 | 5 | 14.7 |
| 3 | David | 4 | 4 | 7 | 15 |
| 4 | Prince | 3.3 | 6 | 10 | 19.3 |
| 5 | Melissa | 3.8 | 5 | 5 | 13.8 |
| 6 | Joan | 3.7 | 6 | 6 | 15.7 |
| 7 | Ada | 3.4 | 4 | 9 | 16.4 |
| 8 | Nikky | 3.9 | 6 | 9 | 18.9 |
| 9 | Satin | 3.2 | 9 | 7 | 19.2 |
| 10 | Byron | 3.6 | 7 | 7 | 17.6 |
| 11 | Bruce | 3.1 | 9 | 6 | 18.1 |
| 12 | William | 3.7 | 5 | 8 | 16.7 |

Formulating the linear program to solve this problem:

Objective function – Maximize each group’s total score. this is a summation of each students’ total score in each group.

The obj function adds up the student’s total score in the groups that they have been fitted into. The obj is to maximize this total.

max: 20.5 x11 +20.5 x12 continously until we have exhausted the 12 students in each of the 4 groups

Decision variables

1. There are 48 decision variables. 4 variables for each student. This is represented by Xij

X repr the student, I repr the student’s number and J the group number. Xij can only have values of zero or one.

1 if the student is in the group and 0 if the student is not

1. We have 19 constraints

each student can only be in 1 group – this is represented by 12 constraint for each student

Each group can only have 3 students -represented by 4 constraints for the 4 groups

Total GPA score in each group is greater than or equal to 9.5

Total Relevant Background score in each group is greater than or equal to 17

Total computer skills score for each group is greater than or equal to 20

Results.

Obj function – total score of 205.9

Students have been fitted into 4 groups as follows

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Group1 | Group 2 | Group 3 | Group 4 |
|  | 1 | 4 | 6 | 2 |
|  | 8 | 9 | 7 | 3 |
|  | 10 | 11 | 12 | 5 |
|  |  |  |  |  |