

# Research on Engineering Students behavioral analysis for focused aspirations



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**Abstract:** *Quality education and career of the students is the primary goal of higher educational institutions. One method to achieve this is through on-campus and off-campus placements, wherein the students and educational institutions surpasses the ambition of the students as it is not clearly defined, which leads to interest killing and lack of passion at workplace in future. In this paper, engineering students' data is analysed to present a behavioural model of students' aspirations. The proposed model is for analysing the factors such as demographics, gender, academic performance and curriculum awareness that regulate the students' behaviour on focussing on their ambition. The framework can be applied to extract valuable inferences that shows the impact of various parameters on students behaviour which can be of great help to institutions to guide and counsel the students.*

**Keywords:** *behavior analysis, predictive modeling*

## I. INTRODUCTION

Predictive Modelling in higher education is an innovative research area. The hidden dependencies and inferences enable the higher educational institutes in making better decisions and plans in directing and guiding students. These models can help both institutes and students to improve the system.

Literature study in this area reveals that many models or predictions are made after students' graduation and also on academic performances of students [1]. The students' performance is analyzed based on the degree aspirations, self-confidence, scoring.

The model presented in this study aims at:

- 1) Is the goal of a student more focussed in metro cities than in non-metro regions?
- 2) Students with more backlogs in previous semesters deviate from their ambition?
- 3) Students with low curriculum awareness lose interest in their course and hence that affects their ambition.
- 4) Female students have more focussed ambition than male students.

The goal of this model is to find critical factors that affect the ambition of students. The system also identifies the difference in students' behavior pattern in metro and

non-metro cities. It also classifies the ambitions of the students which can be helpful for the institutes to guide and counsel the students to achieve their ambition.

## II. PREDICTIVE MODELLING IN HIGHER EDUCATION

Higher Educational Institutes are using Predictive modelling as a tool to respond to many challenges faced in education industry [1].

### A. Advisor to students

Institutes have faculty advisors to counsel students. The challenge is students do not receive individual attention. Predictive modelling can help find the students who are in need of support and then faculties can assist them.

### B. Learning Gap

Basically used to identify students' learning gap and then customize the courseware to make them learn. This will quickly assist students to improve their pace of learning.

### C. Students retention

Institutional commitment to increase student retention.

### D. Allocation of resources

Proper allocation of resources to address the findings

## III. RELATED WORK

Annah V. Bergesai and et al [2] proposed a framework for academic factors such as first year aggregate credits and institutional factors such as university based residence, supplemental instructions, and financial aid increases the likelihood of graduating. In addition, factors such as admission point score and socio-economic status of the school where student did his/her high school should also be associated.

C Berdanier and et al [3] have done a survey on primary knowledge, skills, attributes that students perceive to be most important. Understanding of doctoral students about the current graduates curriculum for preparing them for success in the areas they identified. Joyce B. Main and et al [4] findings identified the influence of grading practices on engineering students' major choice. Providing students with content for grades may enable them to more accurately assess their own performance when making major choice decisions. M. U. Afganil and et al [5] provided a framework to know the level of the students' mathematical understanding ability. The method was qualitative description with 4 test items. The results demonstrated that most students were at the level of action conception.

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R. Esterhazy and et al [6] proposed a qualitative study of feedback mechanism informed by sociocultural notions in which students co-construct meaning from the teacher's feedback comments through interactions overtime. They contribute to a better understanding of what constitutes feedback processes viewed from an interactional perspective and to tailor our feedback practices to address the students' needs.

## IV. PROPOSED MODEL

The current educational system does not involve any prediction about the ambition of the students. There is no proper mechanism to refine the goal of the students based on their interest areas [7]. It does not identify the reason for the inability of students to focus on their goals. It also does not analyze the impact of backlogs on students' behavior [8]. Since the proposed model classifies the ambition of students on their interest areas, the institutes can provide guidance to them. It also helps the institutes to identify the interest killing factors amongst the students.

The test data was selected from various Engineering colleges of Mumbai and Dehradun as our research focusses on metro and non-metro cities. We have collected 500 samples from both the regions. We have chosen regression analysis model to make the inferences. The framework for the proposed analysis is as shown in fig. 1.

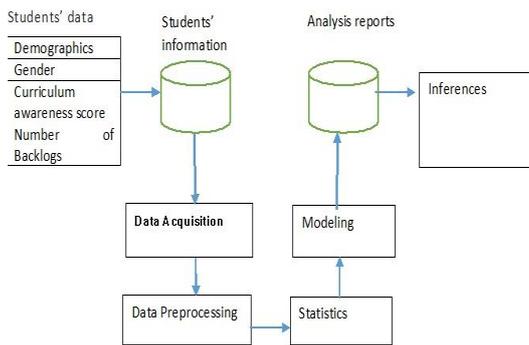


Fig. 1. Proposed Model for behaviour analysis

Initially, the students' data was acquired from Engineering institutes of Mumbai and Dehradun in India. The data is pre-processed and then, cleaned data is considered for analysis. After that, the statistical data is analysed and dependencies between datasets are obtained. Based on the relationship the model was built and was incorporated on the dataset. In analysis process, the framework was used to extract valuable inferences that have a strong impact on students' behaviour.

### 4.1 HYPOTHESES

Our next task was to define the hypotheses for our research based on the results obtained by researchers on similar factors. The inferences were drawn on the following null hypotheses:

- 1) Ho: 85 % of female students have an ambition in lines with their area of study [9] [10].

- 2) Ho: Students with more than 1 backlog deviate from their ambition [11] [12].
- 3) Ho: Students having focussed ambition is more in metro than in non-metro cities.
- 4) Ho: Students with a curriculum awareness score of 3 or less are more likely to deviate from their ambition.

## V. RESULTS AND DISCUSSION

### A. Our task was to analyze the first hypothesis based on gender. The results are demonstrated in fig.2 and fig. 3.

Out of the total sample distribution, 47 % of females ideally wish to pursue a career in their area of study as shown in fig. 2 which is not the case with male students. Male distribution pie chart shows that the 35% male students wish to pursue a career in their area of study as shown in fig. 3. There is a large number of males who have an ambition for entrepreneurship and also for higher studies. The inclination of females is more towards job and higher studies whereas for males it is towards job, higher studies and entrepreneurship.

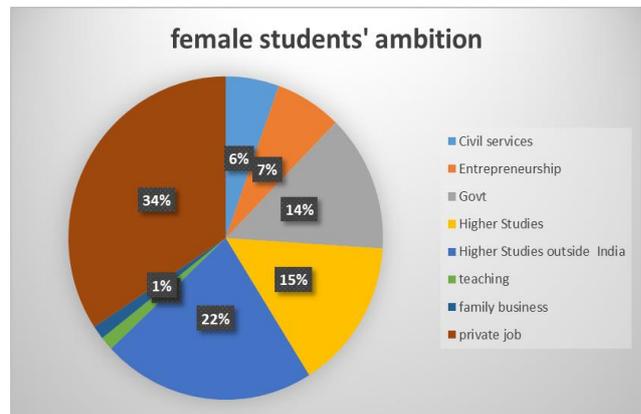


Fig. 2. Analysis of Distribution of female students

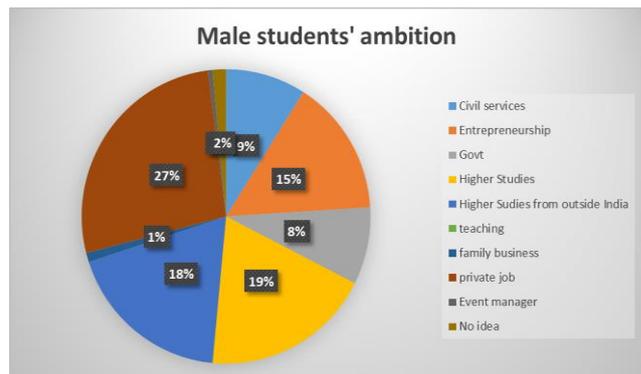


Fig. 3. Analysis of Distribution of male students

### B. Impact of backlogs on deviation from ambition

Fig. 4 shows the distribution of students with zero backlogs and fig. 5 shows the distribution with more than 1 backlogs.

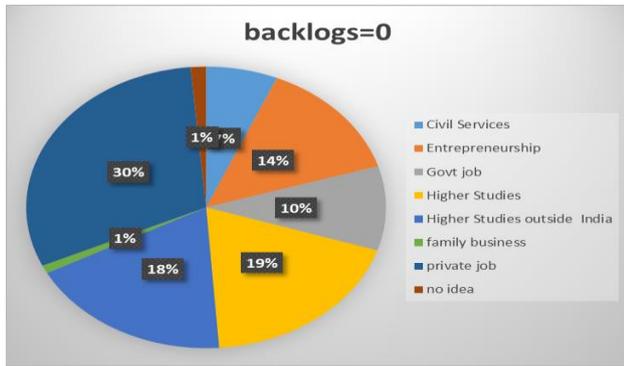


Fig. 4. Analysis of Distribution of students with academic advantage

As observed in fig. 4, students with academic advantage have an even distribution of aspirations as compared to students with less academic advantage as in fig. 5. It is also evident from fig. 5 that students are more focussed on seeking a job and lack motivation for higher studies.

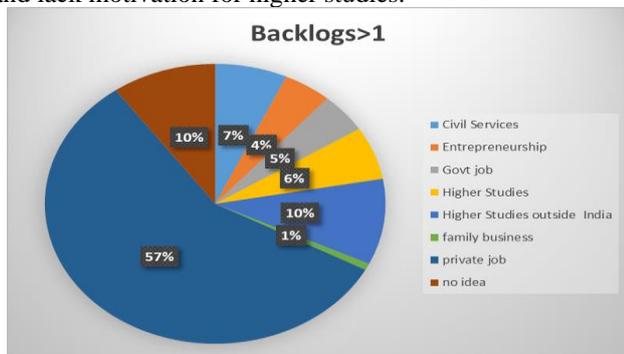


Fig. 5. Analysis of Distribution of students with less academic advantage

From above it is concluded that the students with less academic advantage need guidance and motivation to be more focused about their ambition. Students with academic advantage need proper guidance and grooming to fulfil their ambition as they are highly motivated.

**C. Impact of demographics on students' behavior**

Our findings for classifying ambition on the basis of demographics is as shown in fig. 6 and fig. 7.

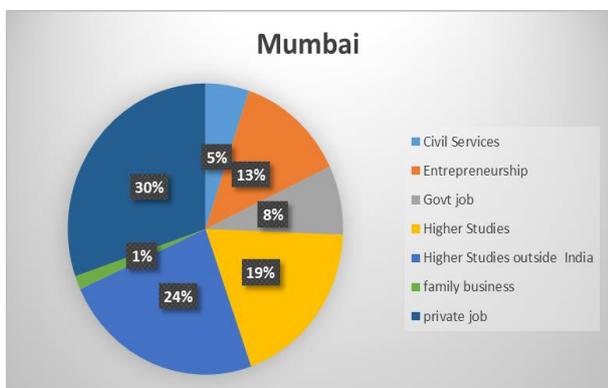


Fig. 6. Analysis of Distribution of students from metro city Mumbai

From fig. 6 we can conclude that students from metro cities are more towards higher studies that is close to 43%, for private jobs it is 30% and very few for government jobs and

civil services.

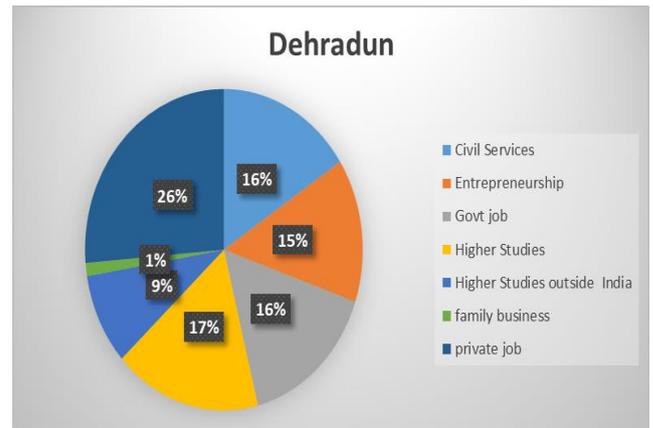


Fig. 7. Analysis of Distribution of students from non metro city Dehradun

From non-metro cities analysis as shown in fig. 7, it is observed that students aspire to have a job and are also keen in civil services. 26% of students are towards higher studies. From the observations, we can conclude that students from non-metro should be more exposed to industries of their domain and also should be guided for civil services preparations.

**D. Curriculum awareness plays a crucial role in deciding the ambition of the students**

We asked students to score themselves on a scale of 0-5 about their level of understanding of the curriculum that they are studying. The results that we obtained are analyzed in fig. 8 and fig. 9.

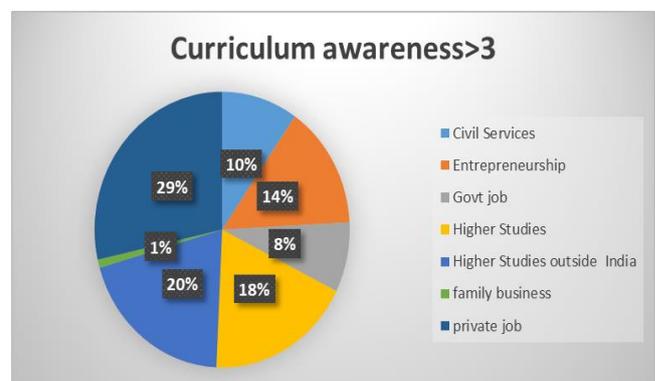
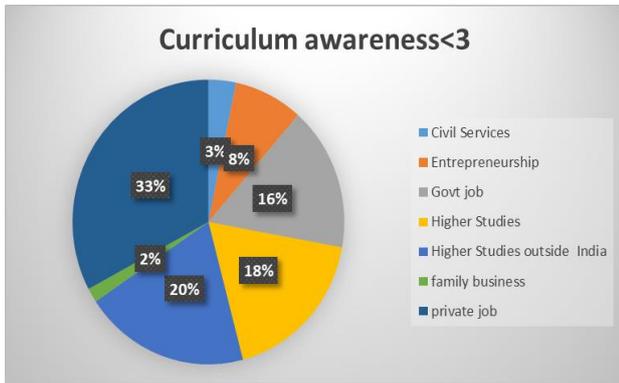


Fig. 8. Analysis of Distribution of students with high level of curriculum awareness

We have taken a marginal score of 3 to classify the analysis into two categories. The analysis shows that students who are aware of their curriculum have a good spread of ambition with more focus on jobs, higher studies, entrepreneurship, civil services.



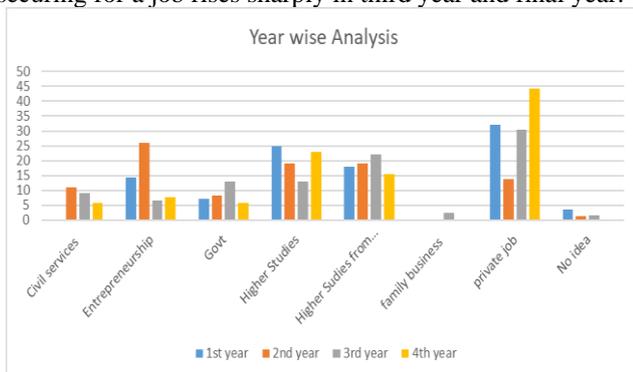
**Fig. 9. Analysis of Distribution of students with low level of curriculum awareness**

The other side of the analysis with students who are less aware of their curriculum have major focus on job, higher studies, and a good number of students for government jobs also. We can see that less students have opted for entrepreneurship, civil services.

While concluding this we suggest the institutes to make curriculum awareness as an important tool as it results in decent spread of students who are more focused towards their ambition.

### E. Year wise analysis

We have also tried to depict the year wise behavioral analysis of students from first year till final year as shown in fig. 10. The analysis shows that the demand for higher studies is consistent amongst all the students. The ambition for securing for a job rises sharply in third year and final year.



**Fig. 10. Year wise analysis of students' aspirations**

We also observed that the aspirations in first year and second year students are very high as seen in the analysis, a good participation in all categories. But, as the year of study goes on increasing the students are more towards higher studies and securing a job.

We suggest motivating the students from first year itself so that their aspirations are high and spread across all the categories till final year. The outcome that we are expecting is a good mix of students having successful careers in different categories mentioned and not only focusing on job and higher studies [13].

## VI. CONCLUSION

The analysis presented in this paper leads to many conclusions such as female students aspire to have a career in their domain whereas male students have a widespread of

aspirations. We also found that demographics play a major role in students' behavior. Metro students are more exposed towards industries and higher studies but not towards civil services because of lack of exposure, so the measures to be taken accordingly to enhance the behavioral pattern amongst students of different demographics. We also studied the impact of curriculum awareness on students' behavior. Students with a sound awareness of curriculum aspire to secure jobs, higher studies, entrepreneurship and civil services which is not the case with students having low level of awareness. There is a strong impact of backlogs on students' behavior as it demotivates them to pursue their higher studies and appear for competitive examinations. These inferences can be useful to the institutes to guide and motivate their students as per their aspirations and help them achieve a career according to their area of interest. In future we can also consider various psychological factors [14] to derive more inferences.

## REFERENCES

- Michelle Burke, Amelia Parnell, Alexis Wesaw, and Kevin Kruger (2014), "Predictive Analysis of Student Data", NASPA
- Annah V. Bengesai & Vinodhani Paideya (2018), "An Analysis of Academic and Institutional Factors Affecting Graduation Among Engineering Students at a South African University," African Journal of Research in Mathematics, Science and Technology Education, 22:2, 137-148, DOI: 10.1080/18117295.2018.1456770.
- Ms. Catherine G., P. Berdanier, West Lafayette (2014), "Survey Analysis of Engineering Graduate Students' Perceptions of the Skills Necessary for Career Success in Industry and Academia", 121<sup>st</sup> ASEE Annual Conference & Exposition.
- Joyce Main, Kevin Mumford, Matthew Holland (2015), "Examining the Influence of Engineering Students' Course Grades on Major Choice and Major Switching Behavior", International Journal of Engineering Education Vol. 31, No. 6(A), pp. 1468-1475.
- M W Afgani<sup>1</sup>, D Suryadi<sup>2</sup> and J A Dahlan<sup>2</sup> (2017), "Analysis of Undergraduate Students' Mathematical Understanding Ability of the Limit of Function Based on APOS Theory Perspective"
- Rachelle Esterhazy & Crina Damşa (2017), "Unpacking the feedback process: an analysis of undergraduate students' interactional meaning-making of feedback comments", Pages 260-274, doi.org/10.1080/03075079.2017.1359249,
- Dr. Robert Joseph, Michael PE (2014), "Failure Analysis for Engineering Technology Students", 121<sup>st</sup> ASEE Annual Conference & Exposition.
- Shukla and A. Alim,(2018) "Big data analytics approach using indexing and ranking for excellence in higher education," International Journal of Computer Applications, vol. 180, no. 35, pp. 8-22. [Online]. Available: <http://www.ijcaonline.org/archives/volume180/number35/29288-2018916878>
- K. Kularbphetpong (2018) "Analysis of students' behavior based on educational data mining," in Applied Computational Intelligence and Mathematical Methods, Eds. Cham: Springer International Publishing, pp. 167-172.
- R. S. Baker (2014), "Educational data mining: An advance for intelligent systems in education," IEEE Intelligent Systems, vol. 29, no. 3, pp. 78-82.
- G. Sharma and S. K. Vishwakarma (2017), "Analysis and prediction of students academic performance in university courses," International Journal of Computer Applications, vol. 160, no. 4, pp. 40-44, Feb 2017. [Online]. Available: <http://www.ijcaonline.org/archives/volume-160/number4/27065-2017913045>
- Smith, Vernon C.; Lange, Adam; Huston, Daniel R (2012), "Predictive Modeling to Forecast Student Outcomes and Drive Effective Interventions in Online Community College Courses," Journal of Asynchronous Learning Networks, v16 n3 p51-61.

13. Ibitoye, Ayodeji & Borokini, Bunmi & Alabi, Jesujoba. (2019). Knowledge Based Performance Evaluation and Predictive Model for Undergraduate Students. 10.9734/AJRCOS/2018/44462.
14. Antonio, A.L., (2004), "The influence of friendship groups on intellectual self-confidence and educational aspirations in college", J. Higher Educ., 75: 446-471.