FACTORS AFFECTING STUDENT DISSATISFACTION AT COLLEGE

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Abstract: The present study aimed to investigate the factors that contribute to dissatisfaction among college students. A survey was administered to students, aged 16 to 25, to collect data on various aspects of their college experience. The results of the study showed thatthe most important factor that affects dissatisfaction is the lack of a sense of belonging in the college community. This finding suggests that students who are not able to engage with others tend to feel isolated and more frustrated with college. The study also identified other important factors such as the workload, the approachability of teachers, the quality of teaching, and the overall environment of the college. Based on these results, it is recommended that colleges take steps to promote a sense of belonging among students, reduce the workload, andimprove the overall learning environment.

IndexTerms - college, dissatisfaction, decision tree.

I. INTRODUCTION

Higher education institutions are expected to provide students with opportunities for personal growth, intellectual development, and social engagement. However, for some students, college can be a source of dissatisfaction and frustration. In order to address this issue, it is important to understand the various factors that can contribute to student dissatisfaction at college. By understanding these factors and implementing strategies to address them, higher education institutions can work to improve student satisfaction and enhance the college experience for all students.

The purpose of this study is to examine the factors that most affect dissatisfaction in college students. To address this researchquestion, a survey will be administered to a sample of college students to gather data on their levels of dissatisfaction and their experienceswith various factors that may contribute to dissatisfaction. This data will be used to create a decision tree which will provide insights intothe factors that most affect dissatisfaction in college students and inform efforts to address this problem and improve the college experience.

Decision tree: A decision tree is a visual representation of a decision-making process, in which each internal node represents a feature or attribute, each branch represents a decision rule, and each leaf node represents an outcome. The topmost node in the tree is the root node, and the decision-making process begins at this point. Decision trees are useful for identifying the best strategy to achieve a particular goal,

and they are often used in operations research and decision analysis. Decision trees enabled us to model different choices and their possible consequences which helped us in identifying the factors affecting dissatisfaction at the college. Decision trees simplify complex decision- making processes by breaking them down into smaller, more manageable steps.

Entropy: Entropy in a decision tree is a measure of how pure or mixed a group of items is. It is used to decide which feature

to split on at each step of building the tree. The goal is to choose the feature that will make the data purer, or homogenous. This process continues until the tree is fully built or until certain criteria are met. Entropy helps the tree learn from the data and make accurate predictions. Entropy is being used to calculate the effectiveness of the decision tree and to identify the pattern and understand the structure of the dataset. By using entropy, the most useful features for predicting the target variable have been identified.

Information gain: Information gain in a decision tree measures how much the purity of the data increases when it is split on a particular factor. It is used to choose the best factor to split on at each step in the tree building process.

II. REVIEW OF LITERATURE

An important factor that contributes to dissatisfaction in college students is shown by the study is the lack of a sense of belonging in the college. This factor conveys that students who are not engaging with others tend to feel isolated and, by extension, more dissatisfied with college (Besse, 2016). This may be due to the formation of cliques which may exclude non-members. The sense of belonging has five aspects to it- social belonging, academic belonging and perceived institutional support (Ingram, 2012). The social and academic aspects have been explored in this study.

Another significant factor contributing to the dissatisfaction of students at college is the amount of work assigned by teachers. Too many assignments, presentations and academic reports take their toll on students' mental health. Many reported not having enough time for their hobbies or social activities (Pope, 2013). Teachers may assign such work within class hours to prevent burnout.

The lack of approachability in teachers plays a significant factor in the dissatisfaction of students. Students tend to seek help from teachers who they perceive as friendly and helpful, and who they believe have the knowledge and expertise to assist them with their specific issues. Students are more likely to approach teachers who they feel confident will be able to provide the help they need (Sabir, 2015).

Students who report positive academic experiences are more likely to report overall satisfaction with their college experience. In addition, social and extracurricular experiences, including involvement in student organisations and participation in campus events, have been found to positively impact student satisfaction (Siming, 2015).

III. METHODOLOGY

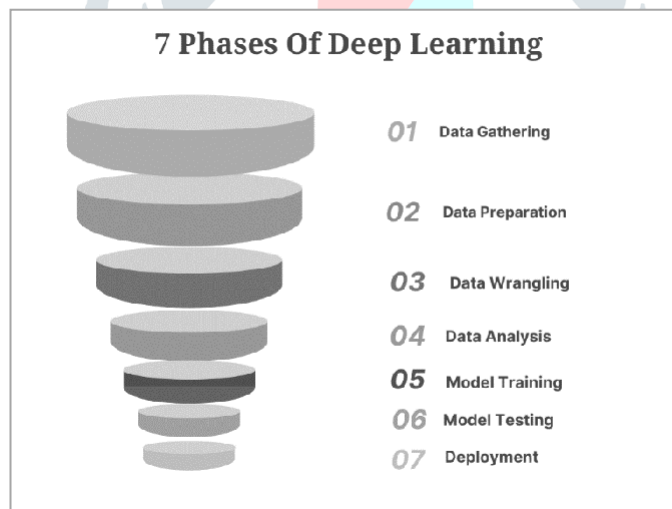This study has incorporated the 7 stages of deep learning. The stages are as follows-

Figure 1: Stages of deep learning

i.   Data Gathering: In this stage, data is collected from a dataset or from a sample population in the form of a survey. In this study, asurvey was conducted on college students studying in Mumbai using an online platform.

ii.   Data Preparation: In this step, data is organised and cleaned. In this study, feature selection was performed by choosing thefeatures on the basis of Information Gain (IG).

iii.   Data Wrangling: In this step, the errors in data are removed and complex datasets are merged. The user data in our study wasuntouched since our dataset was simple.

iv.   Data Analysis: The nature of the data collected in this study was discrete and nominal/ordinal.

v.   Model Training: In this step, a labelled dataset is used to train the model. The classification approach of machine learning hasbeen incorporated. The data has been trained using a decision tree (ID3 algorithm).

vi.   Model Testing: The results of the training are released and analysed.

vii.   Deployment: If the model performed well on the training data and satisfies the requirements, then it may be deployed in the realworld.

The survey questions administered are as

follows-Administration

Is the administration flexible? Y/N

Are the placements well-paying? ["Good", Average,

Poor]Are the rules strict? [Lenient, tolerable,

unbearable]

What are attendance norms like? [Lenient, tolerable, unbearable]

Do you feel college timings are too early, too late or is okay? [too early, too late,

satisfactory]How long are the hours at college? [<4, 4-6, 6-8, >8]

How late are you allowed to come to class? [0, 0-10,10-15, >15]

Infrastructure

Do you get a clean supply of drinking

water? Y/NIs there water in the

washrooms? Y/N

Overall hygiene of the college? [1-5]

How would you rate your canteen's food in terms of quality and cost?

[1-5]Are the labs equipped with necessary materials? Y/N

Is the library well-stocked with reference materials (books, theses

etc)? Y/NHow accessible is college by public transport? [1-5]

Faculty

How approachable is the

faculty? [1-5] How well do the

professors teach? [1-5]

Is the environment conducive to learning? (minimal distraction, interactive classmates, smart boards

etc) Y/NDo the teachers encourage questions/ discussions? [1-5]

Are external speakers invited to talk about industry-related subjects? Y/N

Do the teachers give a lot of homework? (assignments, presentations, projects, reports etc) [1-5]

Social

How much do you like the vibe at college? [Highly competitive, unbothered,

relaxed/comfortable]How connected do you feel with your classmates? [1-5]

Do you have a crush on someone in college? Y/N

Are you in a relationship with someone in

college? Y/NDo you get ragged/bullied? Y/N

Personal

In general, how good is your mental

health? [1-5] On average, how much do

you procrastinate? [1-5]Do you usually

submit your work on time? Y/N Have you

ever had a KT? Y/N

How much time does it take you to reach college from your home/hostel? [<10, 10-30,30-60,60-

90,>90]How much do you enjoy your course? [1-5]

The above questions have been classified into "Administration", "Infrastructure", "Faculty", "Social" and "Personal". The first three categories are concerned with the college's administration, infrastructure and faculty respectively. The social aspect of the survey aims to assess the student's perception of the social situation of college. Lastly, the "Personal" aspect of this survey aims to gain an understanding ofthe kind of student the respondent is.

Information gain will be used for feature selection, following which, a decision tree will be constructed. The information gain value of thequestions asked will be used to filter out features that are less significant to the study.

To calculate information gain, entropy has to be calculated beforehand. Entropy measures the impurity in a group of observations. Theformula for the entropy of the total dataset (ST) is

$$E(S_T) = p(a) \cdot log_2(p(a)) - p(b) \cdot log_2(p(b))$$

$$(1)$$

where p(a) is the probability that the target variable is positive ie. "dissatisfied" and p(b) is the probability that the target variable isnegative ie. "satisfied".

The entropy for the individual attributes E(S) is then calculated using the following formula-

$$E(S) = \sum - p(i) \cdot log_2 p(i)$$

$$(2)$$

where p(i) is the probability of value i in the attribute.

The Information Gain (IG) is then calculated as follows:

$$IG(T, A) = Entropy(T) - \sum_{v \in A} \frac{|T_v|}{T} \cdot Entropy(T_v)$$

$$(3)$$

where T is the target variable, A is the variable being tested, v is the value of each value in the attribute A.The Information Gain (IG) of the features in this study are as follows:

feature	ig
How connected do you feel with your classmates?	0.12939
Do the teachers give a lot of homework? (assignments, presentations, projects, reports etc)	0.12832
How approachable is the faculty?	0.12386
How well do the professors teach?	0.1111
What is the vibe at college like?	0.10369
In general, how good is your mental health?	0.08168
Do the teachers encourage questions/ discussions?	0.08012
How late are you allowed to come to class?	0.07585
How much do you enjoy your course?	0.07508
Is the environment conducive to learning? (minimal distraction, interactive classmates, smart boards etc)	0.06237
Are the concepts/skills taught in this course	0.06006
Overall hygiene of the college?	0.05315
What are attendance norms like?	0.05253
Do you feel college timings are too early, too late or is okay?	0.05168
How accessible is college by public transport?	0.04333
How would you rate your canteen's food in terms of quality and cost?	0.04035
Stream	0.03941
Age	0.03882
Is the administration flexible?	0.03599
Are the rules strict?	0.03145
Do you get a clean supply of drinking water?	0.0297
Are the labs equipped with necessary materials?	0.0297
Is there water in the washrooms?	0.02337
Year	0.0219
On average, how much do you procrastinate?	0.01935
Gender	0.01749
How long are the hours at college?	0.0169
Placement salaries are-	0.01607
How much time does it take you to reach college from your home/hostel?	0.01607
Are you in relationship with someone at college?	0.01402
Do you usually submit your work on time?	0.0126
Are external speakers invited to talk about industry-related subjects?	0.00679
Do you have a crush on someone in college?	0.00579
Is the library well-stocked with reference materials (books, theses etc)?	0.00155
Do you get ragged/bullied?	0.00125
Have you ever had a KT?	1.09E-05

Fig.2. Information Gain of each feature

The X-axis is the features and the Y-axis is the corresponding information gain value of the features. The following graph discusses the information gain of the features of the collected data.
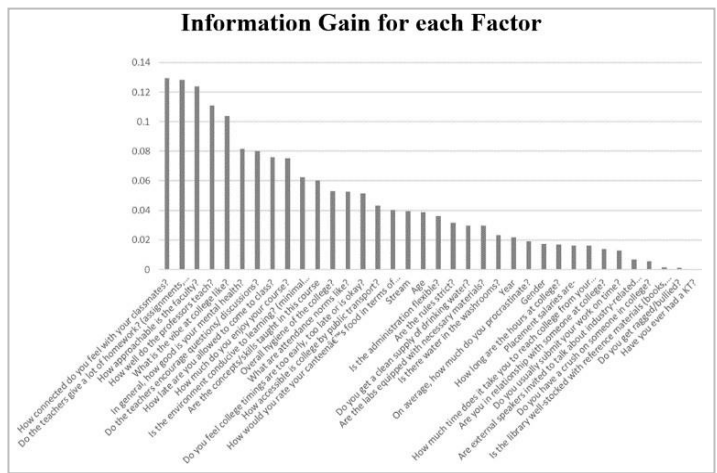
Fig.3. Graphical representation of information gain for each feature

IV. RESULTS

The Information Gain from the above features are as follows-

The information gain of the factor of belonging in a classroom setting ("how connected do you feel with your classmates") is the highest of all the factors in the dataset with an IG value of 0.129. Other factors with high information gain include the amount of work assigned by professors (IG=0.128), the approachability of the faculty (IG=0.123), how well the professors teach (IG=0.111) and the general atmosphere or "vibe" of the college (IG=0.103).
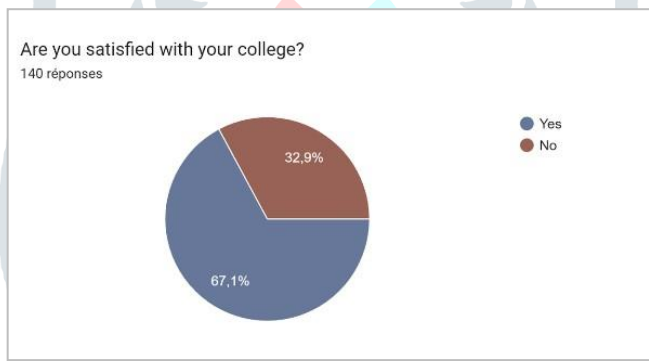

Fig.4. Distribution of target variable

52.9% of the respondents were male, 46.4% were female, 0.7% were non-binary. The ages of the respondents ranged between 16 and 25, 71.4% were 20 years old. 72.1% were pursuing Science as a stream, 14.3% were pursuing Commerce and 13.6% were Arts students.

The survey statistics of the features with highest information gain are as follows-
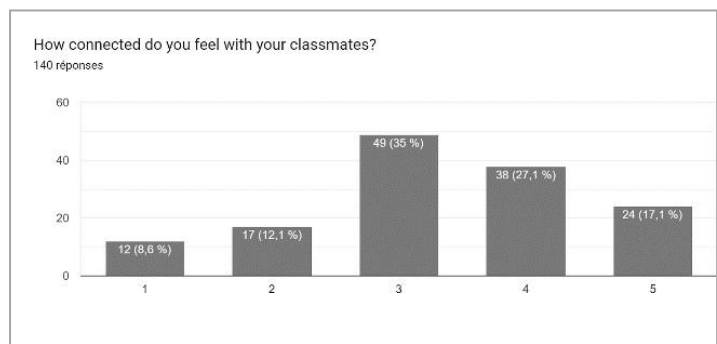

Fig.5. Distribution of how connected students feels with their classmates (1=lowest, 5=highest)
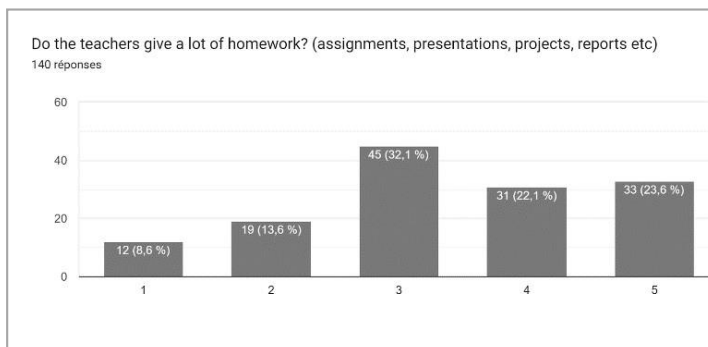
Fig.6. Distribution of Homework Amount Among College Students (1=lowest, 5=highest)
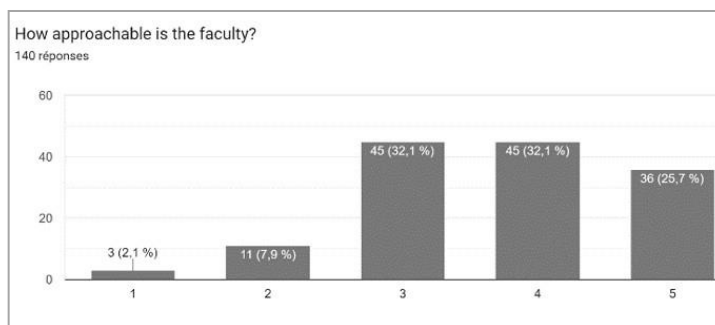

Fig.7. Distribution of faculty approachability (1=lowest, 5=highest)
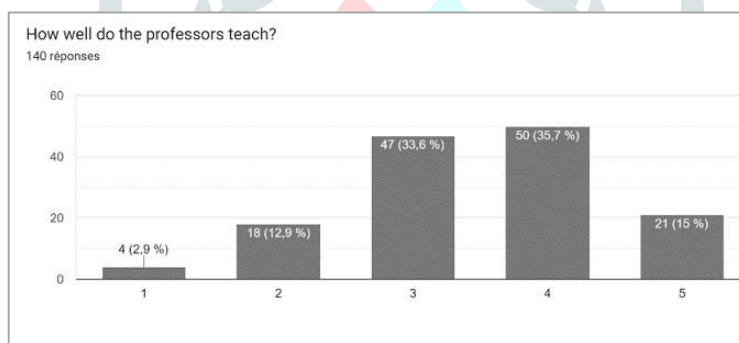
Fig.8. Distribution of how well the professors teach (1=lowest, 5=highest)
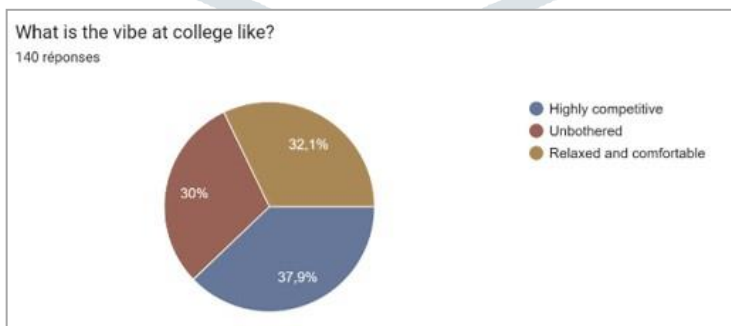
Fig.9. Distribution of the vibe at college- highly competitive, unbothered or relaxed and comfortable

      The factors with the least information gain include whether the student has had a KT (IG=0.00001), whether the student is ragged or bullied (IG=0.001) and how well-stocked the library is (IG=0.001).

The study will consider only those features with IG>=0.040. A decision tree of the 16 features with IGs above 0.040 has been constructed on the next page.

      The features that have been included are the sense of belonging, the amount of work assigned by professors, the approachability of the faculty, how well the professors teach, the general atmosphere or "vibe" of the college, the student's mental health, whether teachers

encourage questions, how late a student is allowed to come to class, how much the student enjoys their course, whether the environment is conducive to learning, whether the skills or concepts taught in class are in demand, overall hygiene of the college, the strictness of the attendance norms, how early or late the student's classes begin, how accessible the college is by public transport and the quality/cost of the food available in the canteen.

A decision tree can be constructed based on these parameters.

Fig.10. Decision Tree constructed from the above aforementioned factors

DISCUSSION

The decision tree constructed is as follows. It helps us gain further insights into the factors affecting student dissatisfaction. Also, it helps us predict the whether a student is dissatisfied, given the values of the feature variables.

Since sense of belonging has the highest IG value of 0.129, it is the most important factor contributing to those that affect dissatisfaction at college. The tree is first split by the sense of belonging feature. When the sense of belonging of the student is 1 (least connected), then whether the skills taught in the course are in demand are checked.

- If the skills taught are obsolete (survey score = 1 or 2), then the student is likely to be dissatisfied.
- In the case of the skills being in high demand (survey score = 4 or 5), the attendance norms are then checked. If the attendance norms are tolerable, then the student is likely to be dissatisfied.

If the sense of belonging is 2, how much the student enjoys their course is checked. If the student does not enjoy their course, they are likely to be dissatisfied.
- If the course is moderately enjoyed (survey score = 3), the accessibility of the college is checked. If the accessibility of the college is low (survey score= 1 or 2), the student is more likely to be dissatisfied.
- If the course is highly enjoyed (survey score = 4), the college timings are checked. If the college begins too early, the student is likely to be dissatisfied.

If the sense of belonging is 3, the overall college atmosphere "vibe" is checked.
- If the vibe is "unbothered", then the amount of work given are checked. If the amount of work given is high and/or the attendance norms are strict, students tend to be dissatisfied.
- If the vibe is "relaxed and comfortable", how well the faculty teaches is checked. If the faculty's teaching is rated low (survey score = 2), the student is inclined towards dissatisfaction.
- If the vibe is "highly competitive", the amount of work given is checked. If the work given is moderate (survey score= 3 or 4) the attendance norms of the college and the faculty's approachability are checked. If the attendance norms are unreasonably strict or the faculty is less approachable (survey score=4), the student is likely to be dissatisfied.

If the sense of belonging is 4, the amount of work given is checked.
- If there is moderate work assigned (survey score=2), then the overall hygiene of the college is checked. If this is low, the student has a higher chance of dissatisfaction.
- If the amount of work survey score = 3, the attendance norms are checked. Unreasonable attendance norms contribute to student dissatisfaction.
- If the amount of work survey score = 4, how late the student can come to class is checked. If they can come 0 minutes late, they are likelier to be dissatisfied.
- If the amount of work survey score = 5, the canteen food quality is checked. If the quality/cost survey score is less than 2, they are likelier to be dissatisfied.
- If the sense of belonging is 5, then the amount of time a student is allowed to come late is checked. If the student is not allowed to come late ie. 0 minutes, there is a higher probability that the student is dissatisfied.

Limitations of the study:
The sample size was limited to the students who study in Mumbai. Certain factors may be specific to this region, culture and environment. The research did not delve into the socioeconomic aspect of the students' backgrounds, which may have contributed further insight into this study. Further research on this aspect may lead to more informative results.
This study has used a decision tree to model the factors affecting dissatisfaction at college. A limitation of decision trees is overfitting ie. the condition when the model completely fits the training data but fails to generalize the testing unseen data. Post-pruning may be performed to combat overfitting.

V. CONCLUSION

This study found that the most important factor contributing to dissatisfaction in college students is the lack of a sense of belonging in the college. Other important factors include the workload, approachability of teachers, effectiveness of teaching, mental health, and the overall learning environment. These findings suggest that creating a sense of community and promoting a positive and supportive learning environment can help to reduce dissatisfaction among college students. Further research is needed to fully understand the complex interplay between these factors and to develop targeted interventions to address student dissatisfaction.

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