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# Application of AHP in Evaluating College Selection Criteria Among Undergraduate Students in Mumbai

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## Abstract

Students in Mumbai face a complex situation when it comes to choosing a college, as they have many different factors to consider. This choice is not just about picking a college; it involves looking at various important aspects like the college's academic reputation, its location, the costs involved and the facilities it offers. Each student has their own views and priorities, which can make the decision-making process quite challenging. This study explores how the Analytic Hierarchy Process (AHP) can be used as a method to evaluate these college selection criteria more systematically. AHP helps by breaking down the decision into a structured model where students can rank the importance of each factor. This way, the research identifies which factors are most influential in guiding students' choices and provides recommendations for colleges to better align their offerings with what students truly want. By using AHP, students can make more informed decisions that reflect their personal priorities and needs in their educational journey.

Keywords: AHP, College selection, undergraduate students.



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# Introduction:

The growing number of educational institutions in Mumbai has made it more difficult for students to choose the right college. With so many options available, students face a complex selection process that involves various factors, many of which are not easy to measure. These factors can be subjective, such as the reputation of a college, the quality of faculty or the campus environment. Because these criteria are often qualitative, it becomes challenging for students to evaluate their choices in a systematic way. The Analytic Hierarchy Process (AHP), developed by Thomas Saaty in the 1970 provides an effective solution to this challenge. AHP provides a structured way to make decisions by breaking down the selection process into smaller parts. Students can use this method to rank their preferences and weigh different factors according to their importance. AHP helps students select colleges that align with their goals and values, leading to a more fulfilling educational experience.

# **Objectives of the Study:**

- 1. To determine the primary factors influencing college selection among undergraduate students in Mumbai
- 2. To rank the identified criteria based on their importance
- 3. To establish a systematic and structured methodology using AHP
- 4. To Analyse Preferences Across Demographics
- 5. To offer colleges actionable insights into the preferences and priorities of undergraduate students

# Need of the Study:

Selecting the right college is a critical decision for undergraduate students, as it plays an important role in shaping their education and future career paths. In a dynamic city like Mumbai, where countless colleges offer a variety of courses, assessing and prioritizing selection criteria can be a daunting task. Key considerations such as academic reputation, faculty expertise, campus facilities, placement prospects, location, affordability and extracurricular opportunities add to the complexity of the decision-making process. Without a



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structured framework to evaluate these factors, students often face confusion and risk making suboptimal choices. The Analytic Hierarchy Process (AHP) provides an organized and systematic approach to simplify this process, enabling students to effectively compare and prioritize multiple criteria. This study aims to guide students and their families in navigating Mumbai's competitive educational environment while offering colleges valuable insights into student preferences. Additionally, it seeks to aid educational policymakers and administrators in improving the quality and accessibility of higher education. By integrating decision-making frameworks with practical applications in the educational sector, this research addresses a critical need and contributes valuable insights to Mumbai's undergraduate education system.

## **Literature Review:**

Haryadi Sarjono (2020) reviews literature from 2000 to 2020, focusing on real-world cases where AHP has been implemented in both manufacturing and non-manufacturing sectors. The findings reveal that AHP is widely utilized as a Multi-Criteria Decision-Making (MCDM) tool, effectively aiding decision-makers in addressing complex problems by structuring their choices based on multiple criteria. Sarjono categorizes the reviewed literature into two main groups: applications in manufacturing and non-manufacturing industries. The analysis highlights that while AHP is prevalent in operational management, its effectiveness can vary significantly based on industry context.

Xue (2016) examines the Analytic Hierarchy Process (AHP) as a structured method for assessing the quality of education for college students. The study outlines the basics of measuring the quality of student training and suggests a detailed system for assessment. By combining both qualitative and quantitative methods, the AHP model helps identify and prioritize key factors affecting education quality, like training programs and evaluation methods. The study highlights the importance of focusing on effective training and systematic evaluation to improve education quality and prepare skilled graduates for the workforce. This research provides useful ideas for better education assessment and training strategies in colleges.



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Negin Salimi (2015) presents a framework for aiding prospective students in selecting universities based on multiple criteria. The study employs the Fuzzy Analytic Hierarchy Process (FAHP) to address the uncertainty and subjectivity involved in evaluating factors such as academic reputation, faculty qualifications, research opportunities, location, and financial considerations. By collecting data through surveys from potential applicants and analysing it with FAHP, the authors derive priority weights for each criterion, ultimately generating a ranked list of universities tailored to individual preferences. The findings highlight the effectiveness of FAHP as a structured decision-making tool in educational contexts, providing valuable insights for students and implications for universities seeking to enhance their appeal.

# Methodology:

The methodology employed in this study involves several key steps:

**Criteria Identification:** Through literature review and focus group discussions with students, relevant criteria for college selection were identified. Commonly cited factors include: College reputation, Facilities and Placement, Easy Transportation and Fee structure.

# **Data Collection**

- Sample Size: 60 respondents from various colleges.
- **Instruments:** A well-organized questionnaire was created, featuring both closedended and open-ended questions to gather a variety of user feedback.
- Area of study: The study is conducted in Mumbai suburban area (Mulund to Powai).

# **Data Analysis**

The Analytic Hierarchy Process (AHP) serves as a strong framework for evaluating college selection criteria among undergraduate students in Mumbai. By employing this multi-criterion decision-making tool, we can systematically analyse the data collected from students to ascertain which factors most significantly influence their college choices. The Analytic Hierarchy Process (AHP), developed by Thomas L. Saaty, helps in making decisions by



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ranking different factors based on their importance. It simplifies complex choices by breaking them into smaller parts, making it easier to compare and decide which factors matter most.

In our analysis, key criteria such as academic reputation, facilities and placement, easy transportation and fees structure are considered in shaping student preferences. The AHP methodology involves constructing a hierarchical structure where the primary objective selecting the best college sits at the top level, followed by the identified criteria at the second level, and potential colleges at the third level. This hierarchical arrangement facilitates a clearer understanding of how each criterion impacts the overall decision.

A pairwise comparison matrix is used to determine the importance of each criterion, allowing students to express their preferences in a structured manner. Each criterion is compared against others using a scale of relative importance, which helps quantify subjective judgments.

#### Steps in AHP Method:



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**Step-I:** The problem is split into smaller parts using a decision tree. The different choices or alternatives are placed at the lowest level of this tree.

**Step-II:** The decision-maker at each level gives their preference by comparing different criteria and choices. They rate these comparisons on a scale from 1 to 9, where 1 means both options are equally important and 9 means one is strongly preferred over the other. Even numbers (2, 4, 6, 8) show a moderate preference. This method was created by Saaty in 1970.

The compensatory rule is applied in this step i.e. if one element is more important, the less important one gets a value that is the inverse of the preference. For example, if one element is rated 3 times more important, the other is given a value of 1/3. Values like 1/3 or 1/5 are used for less important elements. At this stage, a preference matrix is also created to organize these comparisons.

**Step-III:** In this step, the weight of each element is determined using a comparison matrix. First, we normalize the matrix by dividing each value in a column by the total of that column. This turns the values into proportions, making it easier to compare their importance. After that we find the average of each row in the normalized matrix. This average gives us the weight of each element, showing its overall importance compared to the others.

**Step-IV:** In this step, the consistency ratio is calculated to check that the comparisons are logical and consistent. Each alternative's score is determined by multiplying its performance on each criterion by the criterion's weight and summing the results. After that the consistency  $\begin{bmatrix} & & \\ & & & \\ & & \\ & & & \\ & & \\ & & & \\ & & \\ & & \\ & & \\ & & & \\ & & \\ & & & \\ & & & \\ & & \\ & & & \\ & &$ 

ratio is calculated by the formula  $C.R. = \left[\frac{Consistency Index (C.I.)}{Random Consistency Index (R.I.)}\right]$ . If this ratio

exceeds the threshold value commonly taken as 0.1, this indicates that the comparisons may be inconsistent and need to be reassessed and refined for greater accuracy.

**Step-V:** If the consistency ratio is less than the threshold value i.e. 0.1, then final weights reflect the relative importance of each element in the hierarchy. AHP ranks the final weights. The option with the highest score is the best choice, ensuring a structured and logical decision-making process.



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Rating	Explanation
1	Equal importance
3	slightly more important than other
5	Strongly more important than other
7	Very strongly more important than other
9	Extremely important compared to other
2, 4, 6, 8	Intermediate Values of importance

 Table 1: 1 to 9 Scale in AHP

# **Result and Discussion:**

#### Pairwise comparison matrix:

	College	Facilities and	Easy	Fees	
	reputation	Placement	Transportation	Structure	
College reputation	1	4	5	8	
Facilities and Placement	1⁄4	1	3	3	
Easy Transportation	1/5	1/3	1	1	
Fees Structure	1/8	1/3	1	1	



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	College	Facilities and	Easy	Fees
	reputation	Placement	Transportation	Structure
College reputation	1	4.0000	5.00	8.0000
Facilities and Placement	0.2500	1	3	3.00
Easy Transportation	0.2000	0.3333	1	1.0000
Fees Structure	0.1250	0.3333	1.0000	1
Sum	1.5750	5.6667	10.0000	13.0000

#### Normalised Pairwise Matrix:

	College	Facilities	Easy Transportation	Fees Structure	Criteria
	reputation	and			Weight
		Placement			(Average)
College reputation	0.6349	0.7059	0.5000	0.6154	0.6140
Facilities and Placement	0.1587	0.1765	0.3000	0.2308	0.2165
Easy Transportation	0.1270	0.0588	0.1000	0.0769	0.0907
Fees Structure	0.0794	0.0588	0.1000	0.0769	0.0788
Sum	1.0000	1.0000	1.0000	1.0000	



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## **Calculation of Consistency:**

Criteria Weights	0.6140	0.2165	0.0907	0.0788
	College reputation	Facilities and Placement	Easy Transportation	Fees
College reputation	1*0.6140	4*0.2165	5*0.0907	8*0.0788
Facilities and Placement	1/4*0.6140	1*0.2165	3*0.0907	3*0.0788
Easy Transportation	1/5*0.6140	1/3*0.2165	1*0.0907	1*0.0788
Fees Structure	1/8*0.6140	1/3*0.2165	1*0.0907	1*0.0788

Criteria Weights	0.6140	0.2165	0.0907	0.0788	
	College reputation	Facilities and Placement	Easy Transportation	Fees Structure	Weighted Sum
College reputation	0.614	0.866	0.4535	0.6304	2.5639
Facilities and Placement	0.1535	0.2165	0.2721	0.2364	0.8785
Easy Transportation	0.1228	0.0722	0.0907	0.0788	0.3645
Fees Structure	0.0768	0.0722	0.0907	0.0788	0.3184

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	Weighted Sum Value	Criteria Weight	Ratio
College reputation	2.5639	0.6140	4.1757
Facilities and Placement	0.8785	0.2165	4.0577
Easy Transportation	0.3645	0.0907	4.0184
Fees Structure	0.3184	0.0788	4.0408
	$\lambda_{ m max}$	·	4.0732

Here  $\lambda_{\max} = \left[\frac{4.1757 + 4.0577 + 4.0184 + 4.0408}{4}\right] = 4.0732$ 

Therefore, Consistency index (CI) is C.I. =  $\left[\frac{(\lambda_{max} - n)}{(n-1)}\right]$ , where n is number of compared factors.

$$= \left[\frac{(4.0732 - 4)}{(4 - 1)}\right]$$
$$= \left[\frac{0.0732}{3}\right]$$

= 0.0244

Now, C.R. = 
$$\left[\frac{\text{Consistency Index (C.I.)}}{\text{Random Consistency Index (R.I.)}}\right]$$
  
= =  $\left[\frac{0.0244}{0.9}\right]$   
= 0.0271

Standard value of consistency ratio = 0.1

Thus, calculated consistency ratio = 0.0271 < 0.1 = Standard value of consistency ratio.

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It means the weights defined for each criterion are acceptable.

Note that- Here the random consistency index is taken from the following standard table of AHP:

Random Index (RI)															
n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57	1.58

Based on the findings, we can conclude that the most important criterion is college reputation. In the context of evaluating college selection criteria among undergraduate students in Mumbai, college reputation emerges as the most important factor due to its far-reaching influence on various aspects of a student's educational and professional journey.

A college's reputation is often seen as an indicator of academic excellence, reflecting the institution's ability to provide high-quality education, experienced faculty and a strong curriculum. Students and parents associate reputed colleges with better learning outcomes and enhanced career prospects, as these institutions typically maintain strong industry connections, leading to higher placement rates and lucrative job opportunities. Furthermore, attending a reputed college carries significant social value, enhancing a student's personal and professional network due to the presence of talented peers and a well-established alumni base.

Reputed colleges are also more likely to offer superior resources, including state-of-the-art facilities, well-equipped libraries and funding for extracurricular activities, which contribute to a holistic learning experience. Moreover, the brand value of a reputed college often justifies the investment in higher tuition fees, as it is perceived to deliver a higher return on investment through better job placements and career advancement opportunities. In a global city like Mumbai, a reputed institution can open doors to internships, international collaborations, and advanced studies, providing students with a competitive edge in both local and global markets. Given its overarching impact on other criteria such as placement opportunities, faculty quality, and facilities, college reputation is a pivotal criterion when applying the Analytic Hierarchy Process (AHP) to guide students in making informed decisions about their higher education.



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Facilities and placement services hold significant importance, albeit secondary to other factors. physical infrastructure, technological resources and learning environments that a college offers, which are crucial for providing a conducive educational experience. Well-equipped laboratories, libraries, and recreational areas can enhance student learning and engagement, making them vital considerations for prospective students. Effective placement cells that facilitate internships and job placements can significantly influence students' decisions, as they seek institutions that offer strong connections with industries and high employment rates.

Now ease of transportation is often given the third preference. While students prioritize factors like the quality of education, college reputation, and affordability, transportation remains an important yet secondary consideration. In a bustling city like Mumbai, where daily commutes can be time-consuming and challenging, students value proximity to public transport hubs such as train stations, metro lines, and bus stops. However, the significance of transportation is weighed only after ensuring the institution meets their academic and financial expectations. This prioritization suggests that while students are willing to travel further for a reputed college or affordable fees, the convenience and accessibility of transportation can still play a deciding role when other criteria are similar. By ranking transportation third, students demonstrate a balance between ambition and practicality, ensuring that commuting challenges do not outweigh the benefits of their academic choices.

In evaluating college selection criteria, fee structure is given fourth preference. Students typically focus on the value a college provides in terms of education and opportunities before weighing financial considerations. Giving the fee structure the fourth preference suggests that many students view it as a manageable concern, especially when higher-ranked criteria are satisfied. However, affordability can still influence decisions when colleges offer similar academic and logistical advantages. This ranking indicates that while cost matters, students are often willing to prioritize other factors that align with their academic and career goals.

Thus, AHP method not only helps in identifying the most significant factors influencing a student's choice but also quantifies these preferences into weighted scores. As students compare each criterion against others, they can derive priority weights that reflect their personal values



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and goals. Overall, AHP serves as an effective decision support tool that empowers students to make choices that best suit their needs in an increasingly complex educational landscape.

# Integration with Sustainable Development Goals (SDGs) for Viksit Bharat@2047:

In the context of India's commitment to the Sustainable Development Goals (SDGs) by 2047, the application of AHP in college selection can be aligned with several key goals. Higher Educational Institutions (HEIs) play an important role in realizing this goal by providing access to quality education and promoting lifelong learning opportunities. By utilizing AHP, students from diverse backgrounds can make informed choices that consider socio-economic factors, thereby reducing inequalities in access to higher education. The selection of colleges based on AHP can also factor in the employability of graduates, aligning educational choices with labour market needs. This contributes to sustained economic growth.

# **Conclusion:**

The Analytic Hierarchy Process (AHP) is a useful tool for making decisions, helping individuals and organizations solve complicated problems by dividing them into simpler parts. It is especially useful when there are many options to choose from and several criteria to consider. AHP works by organizing these criteria into a hierarchy, allowing decision-makers to evaluate each option against the others systematically. This method not only makes it easier to compare different choices but also helps prioritize them based on their importance. One of the key benefits of AHP is that it combines both quantitative data and qualitative judgments, making it versatile across various fields like business, healthcare and education. By using AHP, teams can reach more informed decisions that align with their goals, ultimately leading to better outcomes and resource allocation.

## **Future Research Directions:**

The application of AHP in evaluating college selection criteria among undergraduate students in Mumbai demonstrates its effectiveness as a decision-making tool. By providing a structured



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approach to assess multiple factors, AHP empowers students to make informed choices about their educational futures. Future research could explore integrating AHP with other methods like Fuzzy Logic to accommodate uncertainties inherent in subjective judgments

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