

Research Article

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## Determination of quality of life in IIT Delhi Hostels

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### Abstract

#### Keywords

Hostels,  
HDI,  
quality of hostel.

This research paper provides information about the quality of all 13 student hostels, built in IIT Delhi, by using the information found in the survey filled by their residents of IIT Delhi. Similar to Human Development Index (HDI) of a country, we have formulated the quality of hostel life keeping four dimensions, namely Academic Culture, Health, Resources Available and Extra Curricular Culture, as the main contributor to the quality of living. The final index is termed as Hostel Quality Index (HQI). In short, HQI is a statistical tool used to measure hostel's overall quality in terms of four dimensions mentioned earlier.

### Introduction

This report provides information about the quality of all 13 student hostels, built in IIT Delhi, by using the information found in the survey filled by their residents. Similar to Human Development Index (HDI) of any country, we tried to formulate the quality of hostel keeping 4 dimensions, namely Academic Culture, Health, Resources Available and Extra Currics Culture, as the main contributor to the quality of living. The final index is termed as **Hostel Quality Index (HQI)**. In short, HQI is a statistical tool used to measure hostel's overall quality in terms of four dimensions mentioned earlier. Before elaborating any further we must first need to give some basic information about hostels in IIT.

**Hostel** is an establishment which provides basic facilities for a specific group of people (students in our case). There are 13 hostels in IIT of which 2 are for female students and other 11 are for male students. Each hostel in the institute is self-contained with amenities such as a reading room, an indoor games room, a lounge and a dining hall with the mess.

The second term we must define is 'Quality'. The term quality in HQI is mainly an essential or distinctive characteristic or attribute of life which students are experiencing in their respective hostel. It tells us about how well any hostel is serving to its residents in terms of different facilities, food and environment.

As we know, in a hostel there is heterogeneous mixture of the student. There are students of different interests, year, home state, etc. So, it is very natural that their opinions on any particular topic will also differ. With HQI, we can get an approximate idea of their common opinion. Overall, HQI is a measure of what students feel of their hostel facilities. It also tells us about the conditions in which they are living, whether their surrounding is beneficial or not for their development. With HQI, we can also compare two hostels in terms of their quality. Hostel quality index is a collection of opinions about the different topics and decision which show the complete picture of any hostel and helps us to decide what is good or bad in hostels so that we can improve in lacking areas.

In this report, we have decided some indicators for each dimensions and devised a formula to calculate a number indicating the quality level in each hostel.

**Hostel Facilities:**

The quality of food & water, cleanliness of the space we occupy daily contribute significantly in our well being. For the student fraternity availability of resources such as spacious rooms and internet facilities contribute significantly to their efficiency.

Students having access to better hostel facilities. That’s why it is chosen as one of the dimension while evaluating HQI.

The hostel facilities will be denoted by the Facilities Index (F)

We asked 5 questions to collect data for Hostel Facilities in each hostel. These are:

1. Rate your mess facilities {(Quality of food & water), (Availability of microwave, toaster), etc} - Scale of 10.

The tables below explains the calculation for Mess Hall Resource Index:

2. Cleanliness in common areas (Tv room, Common room, Visitor’s Room & Guard Desk Area) - Scale of 10.
3. Cleanliness of washrooms - Scale of 10.
4. Wifi facilities availability in rooms - Scale of 10.
5. Do you think that your hostel rooms are small according to your need? Congestion problems?

In order to get relevant informations from the data obtained we have defined 3 parameters in FACILITIES INDEX namely

- A. Mess-Hall-Resource Index
- B. Cleanliness index
- C. Additional Resource Index

**Mess-Hall-Resource Index:**

Question A-1 deals with the Mess-Hall-Resource Index. For calculating the Mess-Hall-Resource Index we calculated the average of the mess facilities of different hostels on a scale of 10.

Then, Mess-Hall-Resource Index

Hostel	Mess-Hall-Resource Index	Rate your mess facilities (Quality of Food, Availability of microwave, refrigerator, toaster etc)
Aravali	0.536	5.36
Girnar	0.445	4.45
Himadri	0.7	7
Jwalamukhi	0.6	6
Kailash	0.8	8
Karakoram	0.607	6.07
Kumaon	0.608	6.08
Nilgiri	0.673	6.73
Satpura	0.766	7.66
Shivalik	0.623	6.23
Udayigiri	0.6125	6.125
Vindhyanchal	0.566	5.66
Zanskar	0.535	5.35

**Cleanliness index:**

The 2nd and 3rd question (A-2 and A-3) deals with the Cleanliness Index. For calculating the Mess-Hall-Resource Index we calculated the average of the mess facilities of different hostels on a scale of 10.

Then, Cleanliness Index (of a hostel)

$$= \left[ \frac{\text{Cleanliness of common Areas} - 0}{10 - 0} \right] * \left[ \frac{\text{Cleanliness of Washrooms} - 0}{10 - 0} \right]^{0.5}$$

Hostel	Cleanliness Index	Rated cleanliness in common areas (tv room, common room) [on a scale of 10]	Rated the cleanliness of washrooms [on a scale of 10]
Aravali	0.713485809	7.18	7.09
Girnar	0.526953508	5.34	5.2
Himadri	0.642261629	7.5	5.5
Jwalamukhi	0.6	8	4.5
Kailash	0.689347518	7.2	6.6
Karakoram	0.646625085	7.63	5.48
Kumaon	0.591104898	7.45	4.69
Nilgiri	0.686367249	7	6.73
Satpura	0.581331231	7.07	4.78
Shivalik	0.673698746	7.38	6.15
Udaigiri	0.589756306	6.625	5.25
Vindhyanchal	0.629444199	7	5.66
Zanskar	0.530262199	5.535	5.08

**Additional Resource Index:**

**Internet Accessibility Index:**

Question A-4 (Wifi facilities availability in rooms - Scale of 10) deals with this aspect.

Every student room has LAN facility in IIT Delhi. Moreover in a few hostels wifi services have also been provided to most rooms. Wifi service is always

preferred over LAN service because provides the freedom of mobility (one can move the laptop)

So, while calculating Internet Accessibility index we have given LAN services ratings of 10/10 in every hostel.

$$\text{Internet Accessibility Index} = \left[ \frac{\text{Wifi Availability} + \text{LAN Availability}}{2 - 0} \right] / (10 - 0)$$

Hostel	Wifi Availability	LAN Availability	Internet Availability (LAN + Wifi)
Aravali	9.09	10	0.9545
Girnar	0.22	10	0.511
Himadri	10	10	1
Jwalamukhi	10	10	1
Kailash	1.6	10	0.58
Karakoram	6.85	10	0.8425
Kumaon	0.17	10	0.5085
Nilgiri	9.6	10	0.98
Satpura	0	10	0.5
Shivalik	0	10	0.5
Udaigiri	0	10	0.5
Vindhyanchal	0	10	0.5
Zanskar	0.14	10	0.507

**Comfortable Space index:**

Question A-5 (Do you think that your hostel rooms are small according to your need? Congestion problems) deals with the Comfortable Space Index .

It basically tries to measure weather the rooms (in hostels) allotted to students have enough space. Problems of congestion have been widely reported amongst students.

In many hostels rooms designed for 1 (or 2) student is being used to occupy 2 (or 3) students. The idea of comfort in hostel rooms is very significant as the

students have to spend their whole year living in the room allotted.

From the data received, YES to congested space meant 0 points, NO congestion (i.e spacious space) was taken as 10 points and MAYBE (as the answer) to be 4 points. Then the average was calculated for different hostels, which is indicated in the table below

$$\text{Then, Comfortable Space Index (of a hostel) = } \frac{[(\text{Spacious Rooms Average} - 0)]}{[(10-0)]}$$

Hostel	Spacious Rooms Average (On a scale of 10)	Comfortable Space Index
Aravali	2.63	0.263
Girnar	3.82	0.382
Himadri	2	0.2
Jwalamukhi	2.5	0.25
Kailash	1.37	0.137
Karakoram	3.39	0.339
Kumaon	4.13	0.413
Nilgiri	4.8	0.48
Satpura	5.92	0.592
Shivalik	5.84	0.584
Udaigiri	5.12	0.512
Vindhyanchal	1	0.1
Zanskar	2.5	0.25

Now, Additional Resource Index = [Internet Accessibility Index\* Comfortable Space index] ^ 0.5

The Additional Resource Index depends on both Internet Accessibility Index and Comfortable Space Index.

So, we have taken their geometric mean of Internet Accessibility Index and Comfortable Space index

The table below represents the calculations:

Hostel	Internet Accessibility Index	Comfortable Space Index	Additional Resource Index
Aravali	0.9545	0.263	0.501032434
Girnar	0.511	0.382	0.441816704
Himadri	1	0.2	0.447213595
Jwalamukhi	1	0.25	0.5
Kailash	0.58	0.137	0.281886502
Karakoram	0.8425	0.339	0.534422586
Kumaon	0.5085	0.413	0.458269026
Nilgiri	0.98	0.48	0.685857128
Satpura	0.5	0.592	0.54405882
Shivalik	0.5	0.584	0.540370243
Udaigiri	0.5	0.512	0.505964426
Vindhyanchal	0.5	0.1	0.223606798
Zanskar	0.507	0.25	0.356019662

Finally after calculating the three factors affecting FACILITIES INDEX , we are ready to calculate the FACILITIES INDEX (F):

So, we take the geometric mean of all the three factors - Mess-Hall-Resource Index , Cleanliness index and Additional Resource Index.

Geometric Mean is taken instead of arithmetic mean so that if a hostel lacks in one of the quality factors severely then it cannot be fully compensated by great quality in other factor (Geometric Mean does allow a little compensation)

Hostel	Mess-Hall-Resource Index	Cleanliness Index	Additional Resource Index	FACILITIES INDEX (F)
Aravali	0.536	0.713485809	0.501032434	0.579
Girnar	0.445	0.526953508	0.441816704	0.473
Himadri	0.7	0.642261629	0.447213595	0.589
Jwalamukhi	0.6	0.6	0.5	0.568
Kailash	0.8	0.689347518	0.281886502	0.541
Karakoram	0.607	0.646625085	0.534422586	0.597
Kumaon	0.608	0.591104898	0.458269026	0.551
Nilgiri	0.673	0.686367249	0.685857128	0.684
Satpura	0.766	0.581331231	0.54405882	0.626
Shivalik	0.623	0.673698746	0.540370243	0.612
Udaigiri	0.6125	0.589756306	0.505964426	0.570
Vindhyanchal	0.566	0.629444199	0.223606798	0.434
Zanskar	0.535	0.530262199	0.356019662	0.469

From the table, it is clear that the best Facility Index is of Nilgiri Hostel (0.684) and the worst Facility index is of Vindhyanchal Hostel (0.434).

**Academics:**

Academics contributes majorly to the daily routine of the students. This will in turn decides the kind of environment students are living in. A healthy academic culture in hostel determines how well a student can study or prepares for his classes. Students good in academics have better future possibilities than others. That’s why it is chosen as one of the dimension while evaluating HQL. The index is named as Academic Culture Index (ACI)

We asked 5 questions to collect data for academic environment in each hostel. These are:

1. What is your CG?
2. Are you involved in any institute funded/independent technical clubs? (Ex Robotics)

3. Have you received any award/certificates in technical projects/published papers? (Open house, Tryst etc. )
4. Have you received semester merit award? (Top 7%)
5. Do you have an academic culture in your hostel? (Non minor& major times)

For our first question, we grouped the student in 6 categories which are - below 5.0, 5.0 - 6.0,....., above 9. Marks are given to each student according to the group they are falling in. A student with CG below 5 will be given ‘0’ score. Student in next category i.e., 5.0 - 6.0 CG will gain .2 marks. 3rd Category will get .4 marks and so on. The average score of each hostel is then calculated, which is given below. This number is called CG Index (CGI).

Hostel	CG Index
Aravali	0.60
Girnar	0.63
Himadri	0.60
Jwalamukhi	0.74
Kailash	0.68
Karakoram	0.53
Kumaon	0.60
Nilgiri	0.50
Satpura	0.60
Shivalik	0.56
Udaigiri	0.71
Vindhyanchal	0.63
Zanskar	0.55



For question no. 2,3 and 5 we marked Yes as 1 and No as 0. Question 4 isn't included while calculating the score because it's very close to zero for every hostel. Average score for each question is calculated. The final score of the three question for each hostel is

calculated by taking geometric mean. The geometric mean ensures that no score will compensate the other. The geometric mean score is called Project Index (PI). The scores are given below.

<b>Hostel</b>	<b>Average in Q2</b>	<b>Average in Q3</b>	<b>Average in Q5</b>	<b>Project Index</b>
Aravali	0.47	0.10	0.50	0.28
Girnar	0.35	0.20	0.30	0.27
Himadri	0.13	0.12	0.61	0.21
Jwalamukhi	0.36	0.15	0.54	0.30
Kailash	0.18	0.12	0.65	0.24
Karakoram	0.31	0.16	0.34	0.25
Kumaon	0.13	0.04	0.47	0.13
Nilgiri	0.15	0.07	0.26	0.13
Satpura	0.42	0.21	0.10	0.20
Shivalik	0.23	0.11	0.30	0.19
Udaigiri	0.14	0.06	0.35	0.14
Vindhyanchal	0.12	0.04	0.25	0.10
Zanskar	0.30	0.01	0.29	0.09

After this, we have taken the geometric mean of the CGI and PI. These are given below.

Hostel	CGI	PI	ACI
Aravali	0.60	0.28	0.409
Girnar	0.63	0.27	0.412
Himadri	0.60	0.21	0.354
Jwalamukhi	0.74	0.30	<b>0.471</b>
Kailash	0.68	0.24	0.403
Karakoram	0.53	0.25	0.364
Kumaon	0.60	0.13	0.279
Nilgiri	0.50	0.13	0.254
Satpura	0.60	0.20	0.364
Shivalik	0.56	0.19	0.326
Udaigiri	0.71	0.14	0.315
Vindhyanchal	0.63	0.10	0.250
Zanskar	0.55	0.09	<b>0.222</b>

### Extra Curriculars:

In order to obtain the extra currics index, we asked them 4 questions. Since this is a section which cannot be analysed just by considering one parameter, we tried to ask them about their involvement in different sectors for example sports, social clubs and street play etc. Minimum count across all formulation was taken to be 0 as it is easily possible for someone to not be involved much in this area. The strategy behind designing of questions was to give them enough options to look for their inclination in extra curricular activities.

Following were the questions asked:

- How many POR(s) have you held till date?
- <2
  - 2-3
  - >3

This index gives us a rough idea about nature of hostel. If it is too low, it reflects that the hostel does not have a dominance in pushing juniors to enroll for POR. In IIT hostel politics is very prevalent. If this index comes up to be very high then, it reflects a culture of promoting POR.

### Index 1:

#### Proposed formulation of index: $n-0/(5-0)$

Here, maximum count of PORs have been taken to be 5. This is based on the fact that a student has to complete 8 semesters out of which they cannot take any POR in first 2 which leaves us with 6 semesters. Considering the examples, 5 is the optimum number for POR.

How many times have you been involved in Rendezvous (the cultural fest of IIT Delhi)?

- a. <2
- b. 2-3
- c. >3

RENDEZVOUS is another sector where students enroll a lot, from activity head to coordinators. The basic strategy behind designing of this question was also the same, seeing the involvement of hostel in RENDEZVOUS. Just that here we tried to look for another area than POR.

### Index 2:

#### Proposed formulation of index: $n-0/( *4 + *3 -0) = n-0/(3.38 -0)$

Here, a segregation has been done between Btech and Dual degree students. In a batch of 800, roughly 300 students have integrated programme which gives them 2 more semesters. This distinction has been taken into account by different limits of involvement in RENDEZVOUS.

How many times have you participated in inter hostel events? ( street, stage, dance, sports, debating etc )

- a. <2
- b. 2-3
- c. >3

Inter hostel events take place in even semesters and they are planned for most of the activities in the institute. This question will also account for students who have not participated for inter iit but are regular in sports activities.

### Index 3:

#### Proposed formulation of index: $n-0/( *5 + *4 -0)=n-0/(4.375-0)$

Here also, the distinction of Btech and Dual has been taken into consideration. One extra year gives one more chance to Dual degree students and hence the proposed index.

How many times have you participated in inter Iit events?

- a. <2
- b. 2-3
- c. >3

Sports is one of the sectors where most of the students have been associated with atleast once in the IIT life. And so it is highly probable that a student might lack interest in social activities like NSS but he/she will be interested in sports. Best way to see this would be inter IIT. A high index would reflect higher involvement in Inter IIT meet. This index indicates much more, if a senior in hostel is gold medalist, there are very high chances that his/her juniors will be a part of it. This is similar to trickle down effect.

### Index 4:

#### Proposed formulation of index: $n-0/( *5 + *4 -0)=n-0/(4.375-0)$

Inter IIT happens once every year and does not restrain first year students to participate in it. So, roughly 37% students have 5 chances to attend it whereas 62% have 4 chances.

Hostel	Index 1	Index 2	Index 3	Index 4	Geometric mean
Aravali	0.2	0.29	0.39	0.39	<b>0.31</b>
Girnar	0.356	0.365	0.32	0.22	<b>0.31</b>
Himadri	0.325	0.517	0.39	0.226	<b>0.35</b>
Jwalamukhi	0.2	0.29	0.22	0.228	<b>0.23</b>
Kailash	0.38	0.44	0.27	0.214	<b>0.31</b>
Karakoram	0.542	0.359	0.273	0.256	<b>0.34</b>
Kumaon	0.318	0.353	0.29	0.228	<b>0.29</b>
Nilgiri	0.26	0.32	0.31	0.228	<b>0.28</b>
Satpura	0.435	0.325	0.26	0.228	<b>0.30</b>
Shivalik	0.430	0.45	0.307	0.249	<b>0.35</b>
Udaigiri	0.2	0.406	0.348	0.228	<b>0.28</b>
Vindhyanchal	0.28	0.41	0.296	0.228	<b>0.30</b>
Zanskar	0.238	0.36	0.318	0.239	<b>0.28</b>

According to the calculation shown above, two hostels i.e. Himadri and Shivalik show to have higher index comparatively whereas Jwala was the least.

**Health Index:**

Health is a very important factor in determining the quality of life of students in the campus. To calculate health index, we gathered data based on following five important factors.

**Q1:** Frequency of Hospital Visits in a Year -

- 0 visits - scored at 1
- 1-2 visits - scored at 0.5
- >= 3 visits - scored zero(0)

Based on averaged score for a particular hostel Index-Q1 was calculated.

- Q2:** Healthcare services being offered in hostels for prevention of diseases such as fumigation and drinking RO water
- None- scored at 0
  - Basic - scored at 0.33

- Good- scored at 0.66
- Excellent - scored at 1

Average Score for a particular hostel was calculated to determine Index-Q2

**Q3:** Substance abuse has been on rise in university campuses. This affects the health of individuals significantly. Public opinion was gathered as what percentage of hostel population is involved in substance abuse. It was categorized as [ <10%(valued at 0.5) , 11-30 %(valued at 0.15) , >30%( valued at 0.65)] . Average of (0.5,0.15, and 0.65) was calculated to fit the public opinion as exactly what percentage of population is under the spell of substance abuse.

**Q4:** Data on Body Mass Index (BMI) was gathered because BMI is an important indicator of physical fitness and health. BMI was grouped as-

- Underweight- scored 0.5
- Overweight- scored 0.5
- Obese - scored 0
- Normal - scored 1

Average mean was calculated for a hostel to determine Index-Q3

**Q5:** Healthy nutritious diet is very much needed to maintain a good quality of health. We are already provided with a well balanced food menu in hostel messes. Yet due to some reasons we skip certain meals in our daily routine and this affects our health. People were asked if they skip meals in hostel messes. If an individual misses any one of the meals their score was

deducted by 0.33 from a total score of 1 which in case no meal is skipped. 2 times of 0.33 was deducted in case of skipping 2 meals and a perfect zero for missing all three meals. Average of this score determines Index-Q5

Overall Health Index was calculated by taking geometric mean of all indexes. We assumed equal weightage of every index.

Hostel	Index-Q1	Index-Q2	Index-Q3	Index-Q4	Index-Q5	Health Index(Geometric-Mean)
Aravali	<b>0.75</b>	0.83	0.125	1	0.83	0.57813
Girnar	0.386	0.434	0.239	0.829	0.69	0.469
Himadri	0.25	0.495	0.125	1	0.83	0.418
Jwalamukhi	1	0.33	0.2	1	0.66	0.5343
Kailash	0.6	0.462	0.2	0.6	0.66	0.466
KaraKoram	0.290	0.47	0.438	0.67	0.745	0.4952
Kumaon	0.39	0.46	0.19	0.87	0.76	0.4683

**Calculation of HQI**

Hostel	Hostel Facilities	Academics	Extra Currics	Health	Geometric Mean
Aravali	0.579	0.409	0.31	0.578	0.42
Girnar	0.473	0.412	0.31	0.469	0.39
Himadri	0.589	0.354	<b>0.35</b>	<b>0.418</b>	0.42
Jwalamukhi	0.568	<b>0.471</b>	0.23	0.5343	0.39
Kailash	0.541	0.403	0.31	0.466	0.41
Karakoram	0.597	0.364	0.34	0.4952	<b>0.43</b>
Kumaon	0.551	0.279	0.29	0.468	0.35
Nilgiri	<b>0.684</b>	0.254	0.28	0.5867	0.37
Satpura	0.626	0.364	0.30	0.5098	0.41
Shivalik	0.612	0.326	<b>0.35</b>	<b>0.54625</b>	0.41
Udaigiri	0.570	0.315	0.28	0.48193	0.37
Vindhyanchal	<b>0.434</b>	0.250	0.30	0.47897	0.32
Zanskar	0.469	<b>0.222</b>	0.28		<b>0.31</b>

Based on the information above, Karakoram comes out to be the hostel with highest quality of life index whereas Zanskar comes to be the one with least HQI.

## Conclusion

Firstly we started with the hostel facilities. Hostel facilities were further categorized into mess, cleanliness and additional indexes which included internet and comfortable space indexes. In this, aravali came to be the cleanest hostel and aravali and himadri has the best internet facilities. When we took the geometric mean of these indexes we got the result that the best Hostel Facility Index is of Nilgiri Hostel (0.684) and the worst Facility index is of Vindhyanchal Hostel(0.434).

The most important parameter for a student is of the academics. In this parameter we took CG index and

the parameter index (which included various important parameters of academic part). After calculating these two parameters we took the geometric mean of the two and got to the conclusion that Jwalamukhi has the best Academic Culture Index (ACI) i.e. 0.471 whereas Zanskar has the lowest ACI i.e. 0.222.

Then we came to the extracurricular part where we got the result that Himadri and Shivalik have highest index i.e. 0.35 whereas Jwala has the least i.e. 0.23.

So when we combined these 3 parts to get the Hostel Quality index we got the result that Karakoram has the best quality of life (0.43) among all the hostels whereas Zanskar has the least (0.31).

## References

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