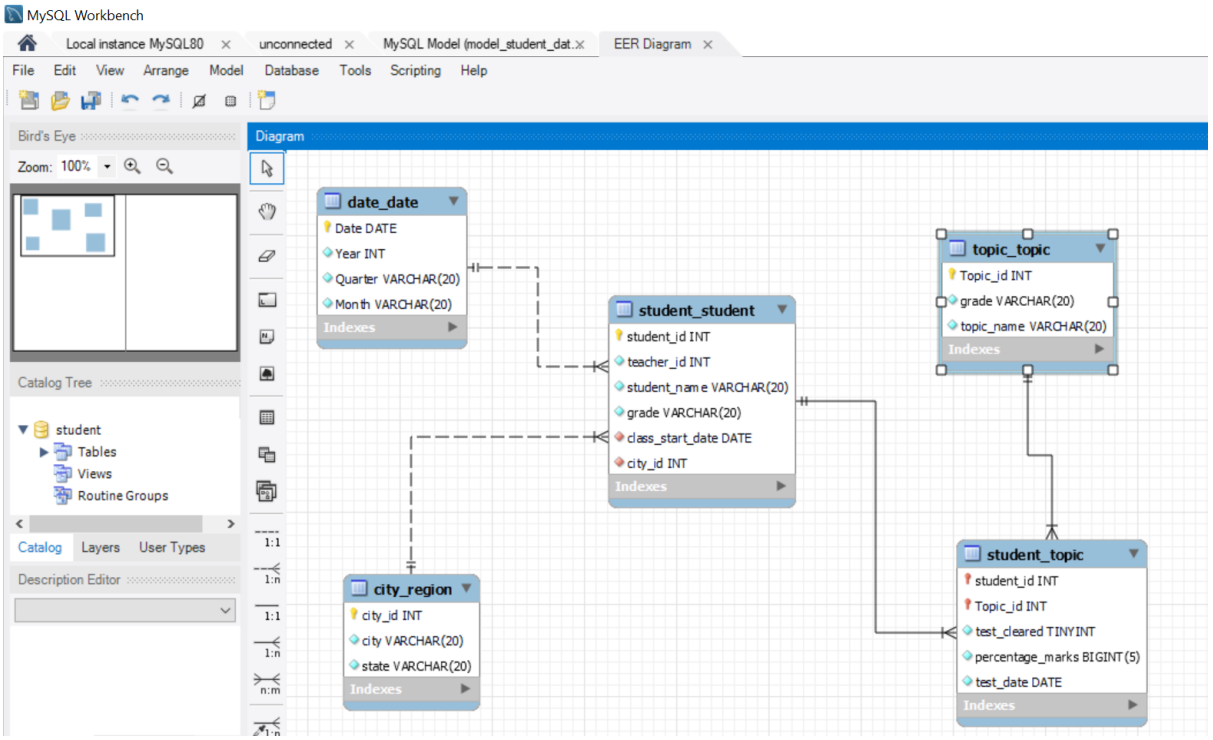
Physical Model:



TABLES

student_student:

Sno.	student_id	teacher_id	student_name	grade	class_start_date	city_id
1	1	1	Ansh	X	15/03/2017	1
2	2	1	Ami	X	15/03/2017	1
3	3	1	Pri	X	15/03/2017	1
4	4	1	Sia	X	15/03/2017	1
5	5	1	Asu	X	15/03/2017	1
6	6	1	Avi	X	15/03/2017	1
7	7	1	Anvi	X	15/03/2017	1
8	8	1	Bob	X	15/03/2017	2
9	9	1	Cam	X	15/03/2017	2
10	10	1	Elf	X	15/03/2017	2
11	11	2	Anshi	Y	25/03/2017	2
12	12	2	Mugy	Y	25/03/2017	2
13	13	2	Tom	Y	25/03/2017	3
14	14	2	Tim	Y	25/03/2017	3
15	15	2	Jeh	Y	25/03/2017	3
16	16	2	Sara	Y	25/03/2017	3
17	17	2	Sesh	Y	25/03/2017	3
18	18	2	Ankit	Y	25/03/2017	3
19	19	2	Anmol	Y	25/03/2017	3
20	20	2	Ayu	Y	25/03/2017	3
21	21	3	Geet	Z	25/03/2017	3
22	22	3	Maan	Z	04/04/2017	3
23	23	3	Vansh	Z	04/04/2017	3
24	24	3	Ankur	Z	04/04/2017	3
25	25	3	Pia	Z	04/04/2017	4
26	26	3	Priya	Z	04/04/2017	4
27	27	3	Parul	Z	15/04/2017	4
28	28	3	Pragya	Z	15/04/2017	4
29	29	3	Prom	Z	08/06/2017	4
30	30	3	Vaani	Z	04/06/2017	4
31	31	4	Neha	P	04/06/2017	4
32	32	4	Shanta	P	04/06/2017	4
33	33	4	Kavita	P	10/04/2017	6
34	34	4	Mansi	P	10/04/2017	7
35	35	4	Manas	P	10/04/2017	7
36	36	4	Rudra	P	10/04/2017	8
37	37	4	Ravi	P	10/04/2017	8
38	38	4	Raya	P	10/04/2017	8
39	39	4	Raghu	P	10/04/2017	8
40	40	4	Tiya	P	10/04/2017	8

41	41	5	Dabalu	Q	10/04/2017	5
42	42	5	Sagar	Q	10/04/2017	5
43	43	5	Suvi	Q	10/04/2017	5
44	44	5	Sonu	Q	10/04/2017	5
45	45	5	Anju	Q	10/04/2017	5
46	46	5	Atul	Q	10/04/2017	5
47	47	5	Swapnil	Q	10/04/2017	5
48	48	5	Manju	Q	10/04/2017	5
49	49	5	Richa	Q	10/04/2017	5
50	50	5	Amber	Q	10/04/2017	5

Student_topic:

S No.	student_id	Topic_id	test_cleared	percentage_marks	test_date
1	1	1	1	98	12/09/2017
2	1	2	1	95	12/09/2017
3	2	1	1	80	12/09/2017
4	2	2	0	30	12/09/2017
5	3	1	0	48	12/09/2017
6	3	2	0	45	12/09/2017
7	4	1	1	76	12/09/2017
8	4	2	1	89	12/09/2017
9	5	1	1	92	12/09/2017
10	5	2	1	90	12/09/2017
11	6	1	1	84	12/09/2017
12	6	2	1	83	12/09/2017
13	7	1	1	89	12/09/2017
14	7	2	1	98	12/09/2017
15	8	1	0	39	12/09/2017
16	8	2	1	75	12/09/2017
17	9	1	0	49	12/09/2017
18	9	2	0	31	12/09/2017
19	10	1	1	86	12/09/2017
20	10	2	1	69	12/09/2017
21	11	3	1	98	12/09/2017
22	11	4	1	95	12/09/2017
23	11	5	1	98	12/09/2017
24	12	3	1	80	12/09/2017
25	12	4	0	33	12/09/2017
26	12	5	1	94	12/09/2017
27	13	3	0	48	12/09/2017
28	13	4	0	43	12/09/2017
29	13	5	1	97	12/09/2017
30	14	3	1	76	12/09/2017
31	14	4	1	89	12/09/2017
32	14	5	1	99	12/09/2017
33	15	3	1	92	12/09/2017
34	15	4	1	90	12/09/2017
35	15	5	1	91	12/09/2017
36	16	3	1	80	12/09/2017
37	16	4	1	83	12/09/2017
38	16	5	1	98	12/09/2017
39	17	3	1	87	12/09/2017

40	17	4	1	93	12/09/2017
41	17	5	1	97	12/09/2017
42	18	3	0	39	12/09/2017
43	18	4	1	75	12/09/2017
44	18	5	1	98	12/09/2017
45	19	3	0	49	12/09/2017
46	19	4	0	31	12/09/2017
47	19	5	1	98	12/09/2017
48	20	3	1	86	12/09/2017
49	20	4	1	69	12/09/2017
50	20	5	1	98	12/09/2017
51	21	6	1	92	12/09/2017
52	21	7	1	90	12/09/2017
53	21	8	1	98	12/09/2017
54	22	6	1	84	12/09/2017
55	22	7	0	33	12/09/2017
56	22	8	1	95	12/09/2017
57	23	6	0	48	12/09/2017
58	23	7	0	43	12/09/2017
59	23	8	1	96	12/09/2017
60	24	6	1	76	12/09/2017
61	24	7	1	88	12/09/2017
62	24	8	1	99	12/09/2017
63	25	6	1	92	12/09/2017
64	25	7	1	93	12/09/2017
65	25	8	1	96	12/09/2017
66	26	6	1	82	12/09/2017
67	26	7	1	86	12/09/2017
68	26	8	1	98	12/09/2017
69	27	6	1	86	12/09/2017
70	27	7	1	99	12/09/2017
71	27	8	1	96	12/09/2017
72	28	6	0	39	12/09/2017
73	28	7	1	75	12/09/2017
74	28	8	1	96	12/09/2017
75	29	6	0	49	12/09/2017
76	29	7	0	37	12/09/2017
77	29	8	1	92	12/09/2017
78	30	6	1	86	12/09/2017
79	30	7	1	70	12/09/2017
80	30	8	1	98	12/09/2017
81	31	9	1	99	12/09/2017
82	31	10	1	91	12/09/2017
83	32	9	1	84	12/09/2017
84	32	10	0	35	12/09/2017
85	33	9	0	47	12/09/2017

86	33	10	0	48	12/09/2017
87	34	9	1	76	12/09/2017
88	34	10	1	88	12/09/2017
89	35	9	1	95	12/09/2017
90	35	10	1	91	12/09/2017
91	36	9	1	83	12/09/2017
92	36	10	1	80	12/09/2017
93	37	9	1	86	12/09/2017
94	37	10	1	92	12/09/2017
95	38	9	0	38	12/09/2017
96	38	10	1	78	12/09/2017
97	39	9	0	34	12/09/2017
98	39	10	0	43	12/09/2017
99	40	9	1	87	12/09/2017
100	40	10	1	79	12/09/2017
101	41	11	1	93	12/09/2017
102	41	12	1	91	12/09/2017
103	41	13	1	89	12/09/2017
104	42	11	1	84	12/09/2017
105	42	12	0	33	12/09/2017
106	42	13	1	94	12/09/2017
107	43	11	0	46	12/09/2017
108	43	12	0	44	12/09/2017
109	43	13	1	93	12/09/2017
110	44	11	1	77	12/09/2017
111	44	12	1	87	12/09/2017
112	44	13	1	95	12/09/2017
113	45	11	1	93	12/09/2017
114	45	12	1	90	12/09/2017
115	45	13	1	95	12/09/2017
116	46	11	1	81	12/09/2017
117	46	12	1	84	12/09/2017
118	46	13	1	96	12/09/2017
119	47	11	1	82	12/09/2017
120	47	12	1	97	12/09/2017
121	47	13	1	93	12/09/2017
122	48	11	0	32	12/09/2017
123	48	12	1	75	12/09/2017
124	48	13	1	95	12/09/2017
125	49	11	0	43	12/09/2017
126	49	12	0	32	12/09/2017
127	49	13	1	91	12/09/2017
128	50	11	1	85	12/09/2017
129	50	12	1	70	12/09/2017
130	50	13	1	98	12/09/2017

topic_topic:

S No.	Topic_id	grade	topic_name
1	1	X	English
2	2	X	Biology
3	3	Y	Accounts
4	4	Y	Maths
5	5	Y	Computers
6	6	Z	Phy_edu
7	7	Z	Humanities
8	8	Z	History
9	9	P	Sanskrit
10	10	P	Arts
11	11	Q	Civics
12	12	Q	Economics
13	13	Q	Geography

date_date:

SNO.	Date	Year	Quarter	Month
1	15/03/2017	2017	First	March
2	25/03/2017	2017	First	March
3	04/04/2017	2017	Second	April
4	10/04/2017	2017	Second	April
5	15/04/2017	2017	Second	April
6	04/06/2017	2017	Third	July
7	08/06/2017	2017	Third	July

City_region:

SNO.	city_id	city	state
1	1	Dehradun	Uttk.
2	2	Haridwar	Uttk.
3	3	Kanpur	U.P.
4	4	Lucknow	U.P.

5	5	Noida	U.P.
6	6	Agra	U.P.
7	7	Gwalior	M.P.
8	8	Indore	M.P.

1. **List the top 5 cities in terms of number of students.**

-

```
select city from (
select distinct c.city,c.state,count(distinct s.student_id) as no_of_students_per_city,
dense_rank() over (partition by city order by count(distinct s.student_id)  desc) as rn from city_region c inner join student_student s
on c.city_id=s.city_id
 group by 1,2
 order by no_of_students_per_city desc) a where a.rn<=5  ;
```

Result Grid | Filter Rows: | Exp

city
Kanpur
Noida
Lucknow
Dehradun
Haridwar
Indore
Gwalior
Agra

Display the names of cities, states and number of students in each city.

```
select distinct c.city,c.state,count(distinct s.student_id) as no_of_students_per_city
from city_region c inner join student_student s  on c.city_id=s.city_id
group by 1,2 order by no_of_students_per_city desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

city	state	no_of_students_per_city
Kanpur	U.P.	12
Noida	U.P.	10
Lucknow	U.P.	8
Dehradun	Uttk.	7
Haridwar	Uttk.	5
Indore	M.P.	5
Gwalior	M.P.	2
Agra	U.P.	1

2. **Show the distribution of students across grades. Display the grade and number of students in each grade, % students in each grade**

```
23  select count(student_id) as no_of_students, grade,
24  count(student_id) / (select count(student_id) from student_student) * 100
25  as per_of_students   from student_student
26  group by grade;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

no_of_students	grade	per_of_students
10	X	20.0000
10	Y	20.0000
10	Z	20.0000
10	P	20.0000
10	Q	20.0000

3. **List our most successful quarter in terms of new students added in the year 2017.**

```
31 •  select d.quarter
32      from student_student s join date_date d on s.class_start_date=d.Date
33    group by 1 order by count(s.student_id) desc  limit 1;
34
```

esult Grid | Filter Rows: | Export: | Wrap Cell Content: | Fetch rows:

quarter
Second

Display all quarters, count and % students who started class in each quarter

```
30
31 •  select d.quarter,count(s.student_id) as no_of_students_quarter,
32    count(s.student_id)/ (select count(student_id) from student_student) * 100
33    as per_of_students  from student_student s join date_date d on s.class_start_date=d.Date
34    group by 1 order by no_of_students_quarter desc;
35
```

tesult Grid | Filter Rows: | Export: | Wrap Cell Content:

quarter	no_of_students_quarter	per_of_students
Second	25	50.0000
First	21	42.0000
Third	4	8.0000

4. How many topics are available in each grade? Display grade, number of topics in each grade

```
32 •  select count(Topic_id) as no_of_topics, grade from topic_topic group by 2;
33
```

esult Grid | Filter Rows: | Export: | Wrap Cell Content:

no_of_topics	grade
2	X
3	Y
3	Z
2	P
3	Q

5.What percentage of students completed all topics in the grade? Display grade, number of topics(incl topics that have never been completed), number of students who have completed all the topics in the grade. A topic is completed when the 'test cleared' flag is TRUE.

```
42
43 •  with cte as
44    (select s.student_id, sum(s.test_cleared) as rb ,t.grade from
45    student_topic s join topic_topic t using(Topic_id) group by s.student_id),
46
47    ctee as
48    (select  t.grade,count(distinct t.Topic_id) as total_topics,count(s.student_id) as no_of_students
49     from topic_topic t join student_topic s
50     using(Topic_id) group by 1)
51
52    select  count(distinct student_id) as no_of_students_passed,c.grade, count(distinct student_id)/(select count(student_id)
53    from student_student) * 100 as per_of_students from cte c inner join ctee b on c.rb=b.total_topics
54    group by c.grade;
55
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

no_of_students_passed	grade	per_of_students
6	P	12.0000
8	Q	16.0000
6	X	12.0000
8	Y	16.0000
8	Z	16.0000

6. Identify topics that have least scores.

```
101     select percentage_marks,Topic_id from student_topic
102     where percentage_marks= (select min(percentage_marks) from student_topic );
103
104
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

percentage_marks	Topic_id
30	2

Display all topic names, mean, mode

```
with cte as
(select topic_id,percentage_marks,cnt from (

 select count(student_id) as cnt ,percentage_marks,Topic_id
  from student_topic
group by percentage_marks, Topic_id
ORDER BY topic_id, cnt desc
)   a

where (a.cnt,Topic_id) in  (select max(cnt) ,Topic_id from student_topic group by Topic_id)
```

```
),

ctee as
( select  s.Topic_id,t.topic_name, avg(s.percentage_marks) over(partition by s.Topic_id) as mean
from topic_topic t join student_topic s using(Topic_id)
group by 1,2
)

select
c.topic_id,b.topic_name,c.percentage_marks as mode,c.cnt as frequency,b.mean
from cte c join ctee b on c.Topic_id=b.Topic_id
group by c.Topic_id
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

topic_id	topic_name	mode	frequency	mean
1	English	98	1	98.0000
2	Biology	95	1	95.0000
3	Accounts	80	2	98.0000
4	Maths	95	1	95.0000
5	Computers	98	5	98.0000
6	Phy_edu	92	2	92.0000
7	Humanities	90	1	90.0000
8	History	96	4	98.0000
9	Sanskrit	99	1	99.0000
10	Arts	91	2	91.0000
11	Civics	93	2	93.0000
12	Economics	91	1	91.0000
13	Geography	95	3	89.0000

25th percentile marks for each.

```sql
select * from(

select percentage_marks as percentile_25, Topic_id ,
ntile(3) over (partition by Topic_id order by percentage_marks desc)as rn from student_topic
) a where a.rn=3
```

Result Grid | Filter Rows:

percentile_25th	Topic_id	rn
49	1	3
48	1	3
39	1	3
45	2	3
31	2	3
30	2	3
49	3	3
48	3	3
39	3	3
43	4	3
33	4	3
31	4	3
97	5	3
94	5	3
91	5	3

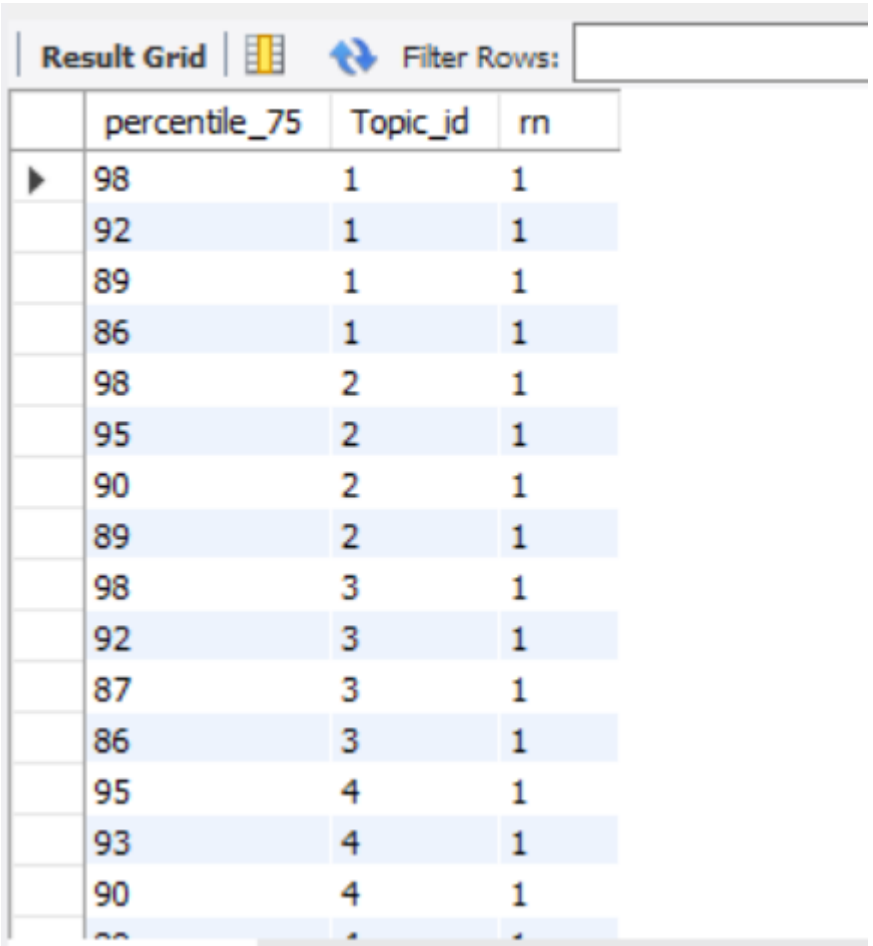
Result Grid | Filter Rows:

percentile_25th	Topic_id	rn
49	6	3
48	6	3
39	6	3
43	7	3
37	7	3
33	7	3
96	8	3
95	8	3
92	8	3
47	9	3
38	9	3
34	9	3
48	10	3
43	10	3
35	10	3
46	11	3
43	11	3
32	11	3
44	12	3
33	12	3
32	12	3
93	13	3
91	13	3
89	13	3

75th percentile marks for each.

```
select * from(

select percentage_marks as percentile_75, Topic_id ,
ntile(3) over (partition by Topic_id order by percentage_marks desc)as rn from student_topic
) a where a.rn=1
```



percentile_75	Topic_id	rn
98	1	1
92	1	1
89	1	1
86	1	1
98	2	1
95	2	1
90	2	1
89	2	1
98	3	1
92	3	1
87	3	1
86	3	1
95	4	1
93	4	1
90	4	1

percentile_75	Topic_id	rn
89	4	1
99	5	1
98	5	1
98	5	1
98	5	1
92	6	1
92	6	1
86	6	1
86	6	1
99	7	1
93	7	1
90	7	1
88	7	1
99	8	1
98	8	1

percentile_75	Topic_id	rn
98	8	1
98	8	1
99	9	1
95	9	1
87	9	1
86	9	1
92	10	1
91	10	1
91	10	1
88	10	1
93	11	1
93	11	1
85	11	1
84	11	1
97	12	1
91	12	1
90	12	1
87	12	1
98	13	1
96	13	1
95	13	1
95	13	1

7. Any other insights that can be drawn with the above information

On the basis of the above analysis of the questions we can figure out :

> This ensures to achieve the highest level of quality in the education system .It tracks subjects having least scores and identify issues in traditional teaching methods and take actions to improve the understanding.

> The students who haven't completed all topics in their respective grades should be motivated. This approach helps educators identify areas of improvement, personalize learning experiences, and provide targeted support to struggling students.
Furthermore, student performance analysis and prediction can also aid in decision-making processes for school administrators and policymakers, helping them allocate resources more effectively