



Online Learning Platform Database Design and Development

Dhvanilkumar Patel

Table of Contents

1.Introduction.....	2
2.Mission Statement	2
3.Mission Objectives	2
4.Database Design Overview	2
4.1 Why Data Dictionary is important?.....	3
4.2 Data Dictionary.....	3
5.Entity Relationships is important	5
5.1 Why Entity Relationships is important?	5
5.2 Relationships.....	5
5.3 Relationships Diagram	5
6.Dataentry in Database with fake data	6
7.Conclusion	8

1.Introduction

An online learning platform is a complex system that involve managing user, courses, lessons, video and assessment. Creating an efficient and scalable database to support this platform is important to make sure that seamless operations, maintaining data. This article outlines the database design required for an online learning platform which include essential tables, relationship and detailed data dictionary

2.Mission Statement

Our mission is to provide, engaging and comprehensive online learning experience that empowers individuals to develop new skills through our expert guidance and an interactive learning environment our learners achieve their goal.

3.Mission Objectives

Objective	Description
Accessibility	Make sure that education is accessible to everyone, everywhere.
Engagement	Provide interactive classes to increase student engagement and retention.
Skill Development	Focus on practical, career-oriented skills.
Scalability	Support a growing user base and seamless content delivery.
Personalization	Based on user performance and preferences, offer individualized learning experiences.

4.Database Design Overview

The database design supports various essential functions, such as user management, course creation, lesson and video organization, assessments, enrollments, and payments.

4.1 Why Data Dictionary is important?

A data dictionary is crucial because it provides clarity and consistency by defining data elements, their types, and allowed values, ensuring everyone understands and uses the data correctly. It helps maintain data integrity through standardization and validation rules, preventing errors and inconsistencies in data entry. Additionally, a data dictionary facilitates collaboration across teams by serving as a shared reference, making it easier for developers, analysts, and stakeholders to communicate and work with the data effectively.

4.2 Data Dictionary

1. Users Table

Column Name	Data Type	Description
user_id	INT, Primary Key	Unique ID for each user
name	VARCHAR(255)	User's full name
email	VARCHAR(255)	User's email, must be unique
password	VARCHAR(255)	User's encrypted password
created_at	TIMESTAMP	Timestamp when the user was created

2. Courses Table

Column Name	Data Type	Description
course_id	INT, Primary Key	Unique ID for each course
title	VARCHAR(255)	Course title
description	TEXT	Detailed course description
instructor_id	INT, Foreign Key	ID of the instructor (Users.user_id)
created_at	TIMESTAMP	Timestamp when the course was created

3. Enrollments Table

Tracks student enrollments in courses.

Column Name	Data Type	Description
enrollment_id	INT, Primary Key	Unique enrollment ID
student_id	INT, Foreign Key	ID of the student (Users.user_id)
course_id	INT, Foreign Key	ID of the course (Courses.course_id)

[Linked in](#)

enrollment_date	TIMESTAMP	Date and time of enrollment
-----------------	-----------	-----------------------------

4. Lessons Table

Each course contains multiple lessons, each with several videos and assessments.

Column Name	Data Type	Description
lesson_id	INT, Primary Key	Unique ID for each lesson
course_id	INT, Foreign Key	ID of the course (Courses.course_id)
title	VARCHAR(255)	Title of the lesson
description	TEXT	Lesson content description

5. Videos Table

Contains video information linked to each lesson.

Column Name	Data Type	Description
video_id	INT, Primary Key	Unique ID for each video
lesson_id	INT, Foreign Key	ID of the lesson (Lessons.lesson_id)
title	VARCHAR(255)	Title of the video
video_url	VARCHAR(255)	URL or path to the video file

6. Assessments Table

Stores quizzes and assignments for each lesson.

Column Name	Data Type	Description
assessment_id	INT, Primary Key	Unique ID for each assessment
lesson_id	INT, Foreign Key	ID of the lesson (Lessons.lesson_id)
title	VARCHAR(255)	Title of the assessment
total_marks	INT	Maximum marks for the assessment

7. Submissions Table

Tracks student submissions for assessments.

Column Name	Data Type	Description
submission_id	INT, Primary Key	Unique ID for each submission
assessment_id	INT, Foreign Key	ID of the assessment (Assessments.assessment_id)
student_id	INT, Foreign Key	ID of the student (Users.user_id)

[Linked in](#)

score	INT	Marks scored by the student
submission_date	TIMESTAMP	Date and time of the submission

5.Entity Relationships is important

5.1 Why Entity Relationships is important?

Entity-Relationship (ER) modeling is important because it provides a clear visual representation of the data and how different entities within a system are related. It helps in understanding the structure of a database by defining entities, their attributes, and the relationships between them, which in turn aids in logical database design. ER modeling ensures that the data is organized in a way that minimizes redundancy, optimizes performance, and supports data integrity, making it a key step in building efficient and scalable systems.

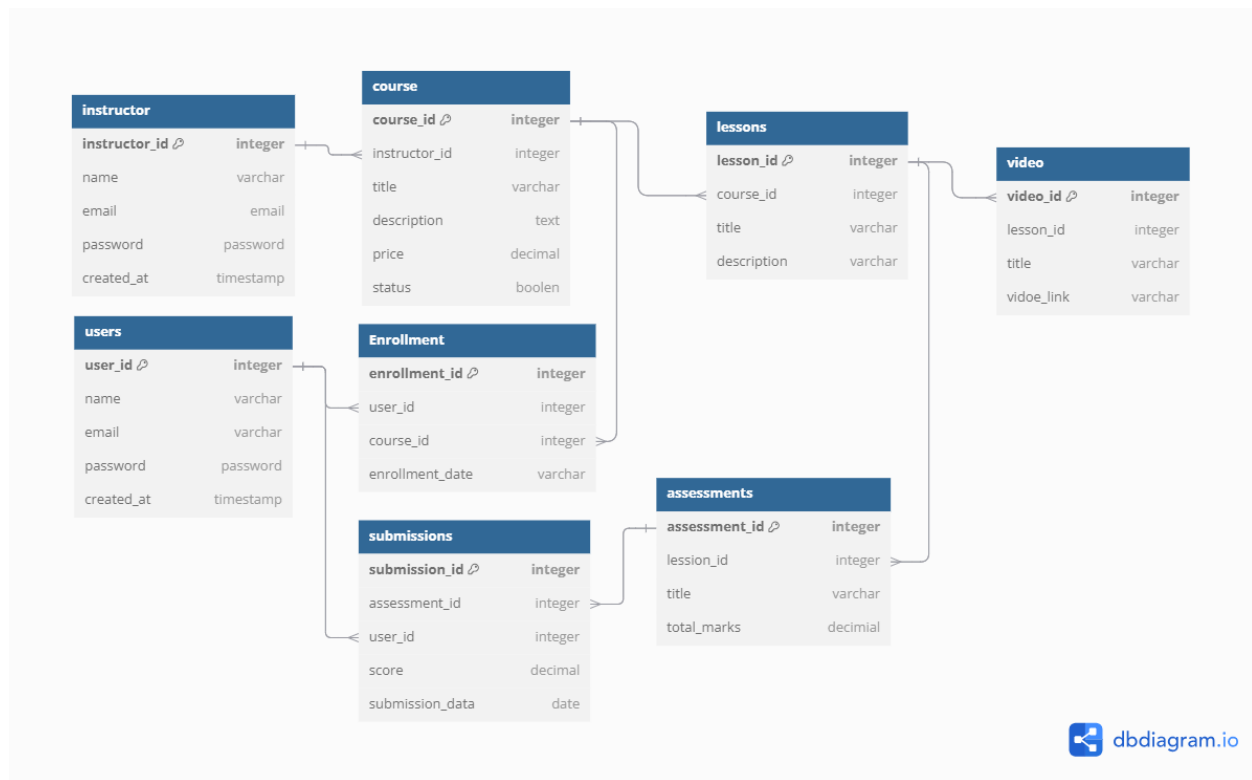
5.2 Relationships

1. **Users ↔ Courses:** Instructors create multiple courses, but each course has only one instructor, forming a one-to-many relationship.
2. **Students ↔ Courses:** Students can enroll in multiple courses, and courses can have many students. This many-to-many relationship is handled through the Enrollments table.
3. **Courses ↔ Lessons:** Each course contains multiple lessons, forming a one-to-many relationship.
4. **Lessons ↔ Videos:** Each lesson can contain multiple videos, establishing a one-to-many relationship.
5. **Lessons ↔ Assessments:** Each lesson can have multiple assessments, creating a one-to-many relationship.
6. **Students ↔ Assessments:** Students submit multiple assessments, and each assessment can be taken by multiple students, forming a many-to-many relationship via the Submissions table.

5.3 Relationships Diagram

Entity relationship diagram show the relationship between the tables, how tables are interconnected with primary and foreign key

[Linked in](#)



6.Dataentry in Database with fake data

MySQL Workbench

Local - Warning - not supported

File Edit View Query Database Server Tools Scripting Help

Navigator

Filter objects

SCHMAS

- company
 - Tables
 - departments
 - employees
 - employeesprojects
 - projects
 - Views
 - Stored Procedures
 - Functions
- learning
 - Tables
 - assessment_mst
 - Columns
 - Indexes
 - Foreign Keys
 - Triggers
 - course_mst
 - instructor_mst
 - lesson_mst
 - users_mst

Administration Schemas

Information

Table: course_mst

Columns:

- course_id int AI PK
- instructor_id int
- title varchar(100)
- description varchar(250)
- price double

1 • SELECT * FROM learning.course_mst;

Result Grid

course_id	instructor_id	title	description	price
1	1	Flutter	Flutter Mobile Application Developer	500
2	2	Laravel	Laravel Web Development	100
3	1	Data Science	Advance Datascience	450

course_mst 1 x

Output

Apply Revert Context Help Snippets

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

ENG IIS 10:29 AM 2024-10-04

Linked in

MySQL Workbench

Local - Warning - not supported

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

Filter objects

company

- Tables
 - departments
 - employees
 - employeesprojects
 - projects
- Views
- Stored Procedures
- Functions

learning

- Tables
 - assessment_mst
 - columns
 - indexes
 - foreignkeys
 - triggers
 - course_mst
 - instructor_mst
 - lesson_mst
 - users_mst

Administration Schemas

Information

Table: instructor_mst

Columns:

- idinstructor_id int AI P
- name varchar
- email varchar
- password varchar
- created_at varchar

Result Grid

Filter Rows:

Limit to 1000 rows

1 • SELECT * FROM learning.instructor_mst;

	idinstructor_id	name	email	password	created_at
1	1	ravi	ravi2542@gmail.com	12345	2019-08-29
2	2	Ronak	ronakparchai25@gmail.com	DD112518@	2021-09-10
•	NULL	NULL	NULL	NULL	NULL

structor_mst1 x

Apply Revert Context Help Snippets

Object Info Session

Output

ENG US 10:29 AM 2024-10-04

MySQL Workbench

Local - Warning - not supported

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

Filter objects

company

- Tables
 - departments
 - employees
 - employeesprojects
 - projects
- Views
- Stored Procedures
- Functions

learning

- Tables
 - assessment_mst
 - columns
 - indexes
 - foreignkeys
 - triggers
 - course_mst
 - instructor_mst
 - lesson_mst
 - users_mst

Administration Schemas

Information

Table: instructor_mst

Columns:

- idinstructor_id int AI P
- name varchar
- email varchar
- password varchar
- created_at varchar

Result Grid

Filter Rows:

Limit to 1000 rows

1 • SELECT * FROM learning.lesson_mst;

	lesson_id	course_id	title	description
1	1	1	basic of Flutter	Basic Flutter to Advance
2	2	1	Data Grid	Flutter Data Grid
•	NULL	NULL	NULL	NULL

lesson_mst1 x

Apply Revert Context Help Snippets

Object Info Session

Output

ENG US 10:29 AM 2024-10-04

[Linked in](#)

7.Conclusion

This database design is structured to handle the core functionalities of an online learning platform. It supports multiple instructors creating courses, students enrolling in and progressing through these courses, and the platform tracking assessments and submissions while maintaining scalability and data integrity. The relationships between the tables ensure flexibility in managing user interactions and course content. By carefully designing and managing these relationships, the database can serve as a solid foundation for a dynamic and engaging learning environment.