Database Schema Documentation for `navigated_learning`

Navigated Learning Backend

November 22, 2025

Contents

1 Overview

This document describes the database schema for the `navigated_learning` MySQL database. It lists all tables, their columns, primary keys, foreign keys and key relationships between tables.

Unless otherwise specified, the storage engine is InnoDB and the character set is `utf8mb4`.

2 Core User Tables

2.1 `teacher`

Table 1: Columns of table `teacher`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Unique teacher identifier
registered_date	DATETIME	DEFAULT CURRENT_TIMESTAMP	Registration timestamp
name	VARCHAR(250)	NULL allowed	Teacher full name
username	VARCHAR(50)	NULL allowed	Login username
password	VARCHAR(50)	NULL allowed	Login password (plaintext or hashed)

2.2 `ta`

Table 2: Columns of table `ta`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Unique TA identifier
registered_date	DATETIME	DEFAULT CURRENT_TIMESTAMP	Registration timestamp
name	VARCHAR(250)	NULL allowed	TA full name
username	VARCHAR(50)	NULL allowed	Login username
password	VARCHAR(50)	NULL allowed	Login password

2.3 `learner`

Table 3: Columns of table `learner`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Unique learner identifier
registered_date	DATETIME	DEFAULT CURRENT_TIMESTAMP	Registration timestamp
name	VARCHAR(250)	NULL allowed	Learner full name
cgpa	DECIMAL(20,10)	NULL allowed	Cumulative GPA or similar metric

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Column	Type	Constraints	Description
username	VARCHAR(50)	NULL allowed	Login username
password	VARCHAR(50)	NULL allowed	Login password
ta_id	INT	FK to `ta.id`, NULL allowed	Assigned TA (optional)

2.4 `user`

Table 4: Columns of table `user`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Unique user identifier
registered_date	DATETIME	DEFAULT CURRENT_TIMESTAMP	Registration timestamp
name	VARCHAR(250)	NULL allowed	Person's name
username	VARCHAR(50)	NULL allowed	Login username
password	VARCHAR(50)	NULL allowed	Login password
teacher_id	INT	FK to `teacher.id`, NULL	If user is a teacher
learner_id	INT	FK to `learner.id`, NULL	If user is a learner
ta_id	INT	FK to `ta.id`, NULL	If user is a TA

3 Course and Content Tables

3.1 `course`

Table 5: Columns of table `course`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Course identifier
name	VARCHAR(250)	NULL allowed	Course title
description	JSON	NULL allowed	Structured description of the course
initial_position	JSON	NULL allowed	Initial position in 2D/embedding space
teacher_id	INT	FK to `teacher.id`, NULL	Primary teacher
teacher_id_1	INT	FK to `teacher.id`, NULL	Secondary teacher (optional)

Column	Type	Constraints	Description
teacher_id_2	INT	FK to teacher.id, NULL	Tertiary teacher (optional)

3.2 `module`

Table 6: Columns of table `module`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Module identifier
name	VARCHAR(250)	NULL allowed	Module title
course_id	INT	FK to course.id	Parent course

3.3 `resource`

Table 7: Columns of table `resource`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Resource identifier
name	VARCHAR(2048)	NULL allowed	Resource title/name
description	JSON	NULL allowed	Rich description of the resource
keywords	JSON	NULL allowed	Array of keywords
polyline	JSON	NULL allowed	Polyline/path encoding
x_coordinate	DECIMAL(20,10)	NULL allowed	X coordinate in embedding space
y_coordinate	DECIMAL(20,10)	NULL allowed	Y coordinate in embedding space
course_id	INT	FK to course.id	Related course
module_id	INT	NULL allowed	Related module (if applicable)
submodule_id	INT	NULL allowed	Submodule index
index	INT	NULL allowed	Ordering index
type	INT	NULL allowed	Resource type code
link	VARCHAR(2046)	NULL allowed	External link/URL
module	VARCHAR(2048)	NULL allowed	Module label/name
beta	INT	NULL allowed	Extra numeric field (e.g., weight)

3.4 `topic`

Table 8: Columns of table `topic`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Topic identifier
name	VARCHAR(250)	NULL allowed	Topic name
description	JSON	NULL allowed	Topic description
keywords	JSON	NULL allowed	Array of keywords
polyline	JSON	NULL allowed	Polyline representation
x_coordinate	DECIMAL(20,10)	NULL allowed	X position
y_coordinate	DECIMAL(20,10)	NULL allowed	Y position
course_id	INT	FK to `course.id`	Parent course
embedding	JSON	NULL allowed	Embedding vector (JSON)
module_id	INT	FK to `module.id`	Parent module

3.5 `description`

Table 9: Columns of table `description`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Description identifier
description	TEXT	NOT NULL	Textual description
ta_id	INT	FK to `ta.id`, NULL	TA associated (optional)
course_id	INT	FK to `course.id`, NULL	Course associated (optional)

4 Enrollment and Activity

4.1 `enroll`

Table 10: Columns of table `enroll`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Enrollment identifier
learner_id	INT	FK to `learner.id`	Enrolled learner
course_id	INT	FK to `course.id`	Enrolled course
x_coordinate	DECIMAL(20,10)	NULL allowed	Learner X coordinate
y_coordinate	DECIMAL(20,10)	NULL allowed	Learner Y coordinate
polyline	JSON	NULL allowed	Path/progression representation
accessible_resources	JSON	NULL allowed	Array of resource IDs accessible
ta_id	INT	FK to `ta.id`	Assigned TA

4.2 `activity`

Table 11: Columns of table `activity`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Activity record ID
time	DATETIME	DEFAULT CURRENT_TIMESTAMP	Timestamp of activity
type_id	INT	NULL allowed	Type code
type	VARCHAR(250)	NULL allowed	Type label (e.g., "view")
link	VARCHAR(250)	NULL allowed	Associated link (if any)
name	VARCHAR(250)	NULL allowed	Activity name/label
enroll_id	INT	FK to `enroll.id`	Enrollment involved
resource_id	INT	FK to `resource.id`	Resource involved
contribution_id	INT	FK to `contribution.id`	Contribution involved
x_coordinate	DECIMAL(20,10)	NULL allowed	X coordinate
y_coordinate	DECIMAL(20,10)	NULL allowed	Y coordinate

4.3 `contribution`

Table 12: Columns of table `contribution`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Contribution ID
enroll_id	INT	FK to `enroll.id`	Related enrollment
submitted_on	DATETIME	DEFAULT CURRENT_TIMESTAMP	Submission timestamp
contribution_content	TEXT	NULL allowed	Raw content text
description	JSON	NULL allowed	Structured metadata
prev_polyline	JSON	NULL allowed	Previous path polyline
polyline	JSON	NULL allowed	New path polyline
x_coordinate	DECIMAL(20,10)	NULL allowed	X coordinate
y_coordinate	DECIMAL(20,10)	NULL allowed	Y coordinate
contribution_polyline	JSON	NULL allowed	Extra polyline field
grade	DECIMAL(20,10)	NULL allowed	Grade awarded
is_graded	BOOLEAN	DEFAULT FALSE	Whether graded

4.4 `summary_coordinates`

Table 13: Columns of table `summary_coordinates`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Summary record ID

Column	Type	Constraints	Description
enroll_id	INT	FK to enroll.id, NOT NULL	Related enrollment
course_id	INT	FK to course.id, NOT NULL	Related course
summary	JSON	NULL allowed	Summary content (JSON)
polyline	VARCHAR(1024)	NULL allowed	Path representation
x_coordinate	DECIMAL(10,6)	NULL allowed	X coordinate
y_coordinate	DECIMAL(10,6)	NULL allowed	Y coordinate

5 TA-Specific Tables

5.1 tad

Table 14: Columns of table tad

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	TAD identifier
ta_id	INT	FK to ta.id	TA owner
description	JSON	NULL allowed	Description content
keywords	JSON	NULL allowed	Keywords list
polyline	JSON	NULL allowed	Geometry/path
x_coordinate	DECIMAL(20,10)	NULL allowed	X coordinate
y_coordinate	DECIMAL(20,10)	NULL allowed	Y coordinate
course_id	INT	FK to course.id	Related course
embedding	JSON	NULL allowed	Embedding vector

5.2 tat

Table 15: Columns of table tat

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	TAT identifier
ta_id	INT	FK to ta.id	TA identifier
course_id	INT	FK to course.id	Course identifier
x_coordinate	DECIMAL(20,10)	NULL allowed	X coordinate
y_coordinate	DECIMAL(20,10)	NULL allowed	Y coordinate
polyline	JSON	NULL allowed	Path representation

6 Exit and Quiz Tables

6.1 exit_point

Table 16: Columns of table `exit_point`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Exit point identifier
course_id	INT	FK to `course.id`	Course identifier
description	JSON	NULL allowed	Exit point description
polyline	VARCHAR(1024)	NULL allowed	Polyline/path
x	DECIMAL(10,6)	NULL allowed	X coordinate
y	DECIMAL(10,6)	NULL allowed	Y coordinate

6.2 `quiz`

Table 17: Columns of table `quiz`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Quiz identifier
title	VARCHAR(255)	NOT NULL	Quiz title
description	TEXT	NULL allowed	Quiz description
total_questions	INT	NOT NULL	Total number of questions

6.3 `question`

Table 18: Columns of table `question`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	Question identifier
quiz_id	INT	FK to `quiz.id`	Parent quiz
question_text	TEXT	NOT NULL	Question text
option_a	VARCHAR(255)	NULL allowed	Option A
option_b	VARCHAR(255)	NULL allowed	Option B
option_c	VARCHAR(255)	NULL allowed	Option C
option_d	VARCHAR(255)	NULL allowed	Option D
correct_answer	CHAR(1)	NOT NULL	Correct option (A–D)
polyline	JSON	NULL allowed	Optional polyline

6.4 `user_quiz`

Table 19: Columns of table `user_quiz`

Column	Type	Constraints	Description
id	INT	PK, AUTO_INCREMENT	User quiz attempt ID

Column	Type	Constraints	Description
user_id	INT	NOT NULL	User identifier (not FK in schema)
quiz_id	INT	FK to `quiz.id`, NOT NULL	Quiz identifier
score	DECIMAL(5,2)	NULL allowed	Score obtained
status	ENUM('completed','in-progress')	NOT NULL	Status of attempt
attempt_date	DATETIME	DEFAULT CURRENT_TIMESTAMP	Attempt timestamp

7 Foreign Key Relationships

Table 20: Foreign key relationships

From (table.column)	To (table.column)	On Delete / Update
course.teacher_id	teacher.id	RESTRICT / RESTRICT
course.teacher_id_1	teacher.id	RESTRICT / RESTRICT
course.teacher_id_2	teacher.id	RESTRICT / RESTRICT
user.teacher_id	teacher.id	RESTRICT / RESTRICT
user.learner_id	learner.id	RESTRICT / RESTRICT
user.ta_id	ta.id	RESTRICT / RESTRICT
learner.ta_id	ta.id	RESTRICT / RESTRICT
module.course_id	course.id	CASCADE / CASCADE
resource.course_id	course.id	CASCADE / CASCADE
topic.course_id	course.id	CASCADE / CASCADE
topic.module_id	module.id	CASCADE / CASCADE
description.ta_id	ta.id	CASCADE / RESTRICT
description.course_id	course.id	CASCADE / RESTRICT
enroll.learner_id	learner.id	RESTRICT / RESTRICT
enroll.course_id	course.id	RESTRICT / RESTRICT

From (table.column)	To (table.column)	On Delete / Update
enroll.ta_id	ta.id	CASCADE / CASCADE
contribution.enroll_id	enroll.id	CASCADE / CASCADE
activity.enroll_id	enroll.id	CASCADE / CASCADE
activity.resource_id	resource.id	CASCADE / CASCADE
activity.contribution_id	contribution.id	CASCADE / CASCADE
summary_coordinates.enroll_id	enroll.id	CASCADE / CASCADE
summary_coordinates.course_id	course.id	CASCADE / CASCADE
tad.ta_id	ta.id	CASCADE / CASCADE
tad.course_id	course.id	CASCADE / CASCADE
tat.ta_id	ta.id	CASCADE / CASCADE
tat.course_id	course.id	CASCADE / CASCADE
exit_point.course_id	course.id	CASCADE / CASCADE
question.quiz_id	quiz.id	CASCADE / CASCADE
user_quiz.quiz_id	quiz.id	CASCADE / CASCADE