Online education platform Database

Database Specification: Purpose, Business Problems Addressed and Business Rules

Minjie Xu

Database Purpose:

The purpose of this database is to maintain the data used to track and report on completion of course, feedback, quiz score and certificate receive rate. The database will be used by the administrators of online education platform and its marketing department as well.

Business Problems Addressed:

The online education platform charges for instructors who wants open course to the public. The targeted customers are learner from the continental United States. Every learner pays enrollment fee directly to the instructor and studies on his or her own pace. The fast he or she learns, the less he or she pays. Each course has the same enrollment fee for $30 per month. The enrollment fee should be charged before the start of a study period.

* Allow administrative, marketing staff of online education platform to generate descriptive reports.
* Provide information to ameliorate course content design based on feedback and quiz results. If certain course has low quiz pass rate or low completion rate, it could be taken as less appropriate and expected to be removed.
* Supply insight to drive targeted marketing initiatives (e.g., to cater to specific market segments such as professional, study experiences, location, age-based populations)
* Allow marketing staff to anticipate ad effect via different mediums based on market segments.
* Allow marketing staff to analyze and refine sales objectives.

Business Rules:

* Each Learner may enroll in multiple courses. The enrollment date should be late than the course firstly offered time on the platform.
* Each Instructor may create one or more Course.
* Each administrator may provide support of multiple contents.
* Each course may have multiple content.
* Each course has maximum 50 students enrolled at any time, to control the teaching quality.
* Each Course may have many quizzes, and a quiz with bigger Quiz ID of the same course should be taken after the completion of quizzes with smaller Quiz ID.
* Each learner can only receive one Certificate on each Course and the date of receiving certificate should be the same as the date of completion the quiz with the biggest Quiz ID of that course.

Design Requirements

* Use Crow’s Foot Notation
* Specify the primary key fields in each table by placing PK beside the fields.
* Use column data encryption to protect some information like CardNumber.
* Create a table-level constraint based on function to execute business rules.
* Draw a line between the fields of each table to show the relationships between each table. This line should be pointed directly to the fields in each table that are used to form the relationship.
* Specify which table is on the one side of the relationship by placing a one next to the field(s) where the line starts.
* Specify which table is on the many side of the relationship by placing a crow’s feet symbol next to the field(s) where the line ends.

Design Decisions

|  |  |  |
| --- | --- | --- |
| Entity Name | Why Entity included | How Entity is Related to Other Entities |
| Administrator | The Administrator entity stands for the platform who in charge of service providing, communication, etc... As the platform always focus on business development, it will try best to obtain information about marketing, customers (learners) and partner (instructor) for marketing development and sales analysis. | The Administrator entity is related to the Content (many-to-many relationship) through intermedium Support entity as providing communications and services. Administrator also has an Account to view all Account information. Administrator has the right to decide whether to accept course content based on marketing response and the feedback. |
| Support | As the Administrator is responsible for many operation and marketing tasks, it is necessary to specify task targets (instructor or learner) through an associated (intermedium) entity: Support | Support is directly related to the Administrator entity and Content as well, so that the Administrator can contact the Learner and the Instructor if needed. Each Support is provided by specified Administrator. |
| Account | The Account entity works as a table to record information of customer (Learner) and partner (Instructor). Besides, it allows the Administrator to register their own information and authorities to retrieve and analysis the data they need. | The Account entity is directly and respectively related to the Learner, the Instructor and the Administrator. The three related entities are also corresponding to the 3 account types. |
| Learner | The Learner entity is one of the primary entities in the database and it will records learners’ information like name, contact, age, location, type and the courses chosen to enroll as well. That information will be retrieved to carry on marketing analysis and improve sales of the platform. The Learner also can go through all procedure from browsing course content to receiving certificates. Experience of each step will affect their response or evaluation of the platform, which can be a start point for the platform to ameliorate services and the selection of course content. | The Learner can browse any course content to decide whether to enroll which course through the Enrollment entity. As for questions, quizzes or questions submitted by the Learner, the Learner can also receive the Feedback from the Instructor. After finishing each stage of the Course, the Learner should take the Quiz by order. When all the requirements of course are meet, the Learner can receive Certificate. |
| Enrollment | This entity contains all enrollment information on the platform of every learner and every course. We can also see the date of every enrollment item from this entity. | This enrollment entity is related to Learner entity and Course entity. We can find all the courses that a learner is enrolled as well as all learners of one specific course. |
| Payenroll | Each Learner should pay before enrollment. The entity of Payenroll will store pay information such as CardNumber and LastPayDate. | The Payenroll has one to one relationship with Enrollment so they share same EnrollmentID. Since the learner would pay the enrollment fee directly to the Instructor, the Instructor should connect to the Payenroll as one to many relationship. |
| Instructor | The Instructor is the partners of the platform. The quality of teaching and the course content they provided somehow decide the sales of Course. The platform can decide to continue cooperation with an Instructor or not based on the marketing responses | Each Instructor has an Account for the platform to manage information. The Instructor also need to write Feedback for the Learner’s assignment or questions. Each Course is created by the Instructor and the Instructor will use The Quizzes subsystem to provide each quiz taken by the Learner. The Instructor also receive enrollment fee through relationship with the Payenroll. During those tasks, if the Instructor need supports from the platform, they can contact the Administrator through the Content and the Support entities. |
| Course | One of the primary purposes of the database is to collect information about specific populations and their interests on different course subject as well as the progress for the course, such as average quiz score, duration of the completion. | The Course entity is related to Instructor, Content and Quiz. An instructor can create many courses and arrange course contents as well as work load. The Course entity connect to the Learner through Enrollment. There is also a one-to-many relationship between Course and Quiz. |
| Content | The Content (workload) somehow affects the completion of course. Also, the platform (administrator/marketing staff) can decide to accept or reject any content based on feedback of learner and the marketing response as well. | A content can be anything related to a course such as reading (textbook), video, assignment and lab. Contents are supported by administrators who in charge of service, communication (among instructor, learner and platform) and marketing research. One administrator can support multiple contents. |
| Feedback | Feedback is an essential part of education programs. It helps learners to maximize their potential at different stages of learning, raise their awareness of strengths and areas for improvement, and identify actions to be taken to improve performance. Feedback is part of the overall dialogue or interaction between instructor and learner. | The Feedback is directly related to the Learner and the Instructor in terms of assignments and questions. Feedbacks can also reflect the performance of Learner and the Instructor’s real ability on education. |
| Quiz | The practice Quiz provides an entire exam’s worth of questions, enabling the Learners to confirm the mastery, helping them continually improve and providing them with the confidence to obtain certificate. | Leaners should take quizzes required by the courses that they are enrolled, therefore Quiz should connect to Learner and Course. Learner can take Quiz with bigger QuizID if and only if they pass the Quiz with smaller QuizID. When the last quiz of course enrolled is passed, they will be granted Certificate. |
| Certificate | The Learner can obtain a certificate on successful completion of the course, while the platform also can carry on analysis on the Certificate to find out the completion of each Course and estimate the popularity of each Course, which can contribute to refine the future marketing strategy and the sales objectives. | The Certificate is related to the Learner through the Quiz entity. The Quiz entity may have one or zero corresponding Certificate while one Certificate is connect merely to one Quiz. |