Altona Gators Basketball Club Admin System
Database Design Document (DDD)

Team AL-bluering

Version: 2.0
 Last Modified: August 22 2023

REVISION HISTORY

Version	Date	Description of Changes
1.0	Aug 10 2023	Baseline Version
1.1	Aug 11 2023	Update database design
2.0	Aug 22 2023	Add sub modules

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1. INTRODUCTION

In this document, we will outline the structural blueprint for a comprehensive database system that aims to support the development and management of training materials for coaches at both junior and senior levels. This initiative is led by the Director of Coaching, Randy Shanklin, with the goal of enhancing the quality and effectiveness of coaching within the club.

For the implementation of this dynamic and feature-rich database system, MongoDB will be utilized as the underlying database management system. MongoDB's flexible document-oriented architecture aligns well with the diverse content types (diagrams, text, videos) and hierarchical access structures required for the coaching program. This choice of technology underscores our commitment to crafting an efficient, scalable, and user-centric coaching resource platform.

2. OVERVIEW

The Altona Gators Basketball Club Coaching Program Database is a dynamic and integral component within the broader coaching ecosystem of the Altona Gators Basketball Club. Designed to enhance coaching effectiveness and streamline learning, this database operates at the intersection of coaching materials, assessments, and user interactions. Its purpose is to provide coaches with a tailored platform for accessing, contributing to, and engaging with coaching resources.

Dependencies and Interactions:

1. Coaching Material Sources: The database draws coaching materials from various sources, including diagrams, text, and videos. These materials may originate from internal club resources, coaching experts, or external providers.

2. User Authentication System: To ensure secure access, the database interfaces with the club's user authentication system. This system validates the identity of administrators and coaches, allowing them to access the appropriate areas of the database.

3. User Interface: The database will have a user interface accessible by administrators and coaches. The user interface will provide functionality for administrators to manage materials, assign resources to coaches, and oversee the overall system.

4. Certification Assessment System: The database interfaces with the certification assessment system, where coaches' progress and achievements are tracked. This system ensures that coaches pass the assessments and meet certification requirements.

3. ASSUMPTIONS/CONSTRAINTS/RISKS

4.1. Assumptions

1. Hardware and Infrastructure: It is assumed that the necessary hardware and infrastructure resources will be available to host the database, including sufficient storage space, processing power, and memory to accommodate the growing volume of coaching materials and user interactions.

2. Software Compatibility: The database design assumes compatibility with modern database management systems (e.g., MongoDB) and related software tools for development, deployment, and maintenance.

3. Network Connectivity: It is assumed that users (coaches and administrators) will have reliable and stable internet connectivity to access the database, interact with materials, and submit assessments.

4. User Proficiency: Users are assumed to possess basic computer literacy skills and familiarity with using web-based applications for accessing coaching resources and materials.

5. Security Measures: The database design assumes the implementation of robust security measures, such as encryption, role-based access control, and regular security updates, to protect sensitive coaching materials and user data.

4.2. Constraints

1. Scalability: The database design must account for potential growth in coaching materials and user interactions over time. Scalability constraints may impact the choice of database technology, schema design, and indexing strategies to ensure optimal performance as the system usage increases.

2. Performance: The system's performance can be constrained by hardware resources, network speed, and the complexity of database queries. The design must optimize data retrieval and processing to ensure fast response times, especially during peak usage periods.

3. Data Volume: The sheer volume of coaching materials, videos, and user interactions can impact data storage and retrieval efficiency. Techniques such as data partitioning, archiving, and data compression may be needed to manage large data volumes effectively.

4. Network Connectivity: Reliance on network connectivity means that users must have consistent and reliable internet access to use the system. Poor or unstable connections can lead to disruptions in accessing coaching resources and materials.

5. Security and Privacy: Data security and privacy constraints are crucial. The design must implement robust encryption, access controls, and authentication mechanisms to

protect sensitive coaching materials and user information, aligning with data protection regulations.

4.3. Risks

1. Data Security Breaches:
   a. Risk: Unauthorized access or data breaches could compromise sensitive coaching materials and personal information.
   b. Mitigation: Implement robust encryption, strict access controls, and regular security audits. Conduct penetration testing to identify vulnerabilities. Provide coach training on secure practices.

2. Data Integrity Issues:
   a. Risk: Data inconsistencies or errors could arise during data entry, updates, or synchronization.
   b. Mitigation: Implement data validation rules, constraints, and referential integrity. Use transactions to ensure data integrity during complex operations. Regularly perform data audits and validation checks.

3. Budget and Resource Constraints:
   a. Risk: Insufficient budget or resources could hinder the implementation of necessary security measures, scalability improvements, or user experience enhancements.
   b. Mitigation: Prioritize critical features and allocate resources accordingly. Explore open-source solutions and leverage available tools and frameworks. Seek partnerships or sponsorships if possible.

4. Lack of User Adoption:
   a. Risk: Coaches and administrators may not fully adopt the system, impacting its effectiveness.
   b. Mitigation: Involve end-users in the design process. Provide comprehensive training and support resources. Continuously gather feedback and make improvements based on user input.

4. DESIGN DECISIONS

The design decisions for the Altona Gators Basketball Club Coaching Program Database were meticulously formulated to ensure a robust, efficient, and user-friendly system that meets the unique requirements of coaching resource management. These decisions encompass the choice of platform, database management system (DBMS), data conversion plan, and other crucial elements that collectively contribute to the success of the proposed database design.

Platform and DBMS Selection: For the foundation of the database system, the decision was made to employ MongoDB as the database management system. This choice was driven by MongoDB's flexible document-oriented architecture, which aligns seamlessly with the diverse nature of coaching materials, user interactions, and personalized content. The decision to utilize MongoDB ensures that the system can accommodate a variety of data formats, such as diagrams, text, and videos, while facilitating efficient storage and retrieval.

Data Conversion Plan: To facilitate a smooth transition to the new database system, a comprehensive data conversion plan has been established. This plan outlines the procedures for migrating existing coaching materials, user accounts, and certification records from the club's current systems to the proposed MongoDB-based database. The conversion process will prioritize data integrity, accuracy, and minimal disruption to coaches and administrators.

User Experience and Interface Design: Informed by user-centered design principles, the database's user interface has been crafted to be intuitive, accessible, and responsive. Navigation paths, material assignment, and progress tracking have been designed to optimize user engagement. A user-friendly interface contributes to increased user adoption and supports the coaching community's continuous professional development.

5. DETAILED DATABASE DESIGN

5.1. ER diagram
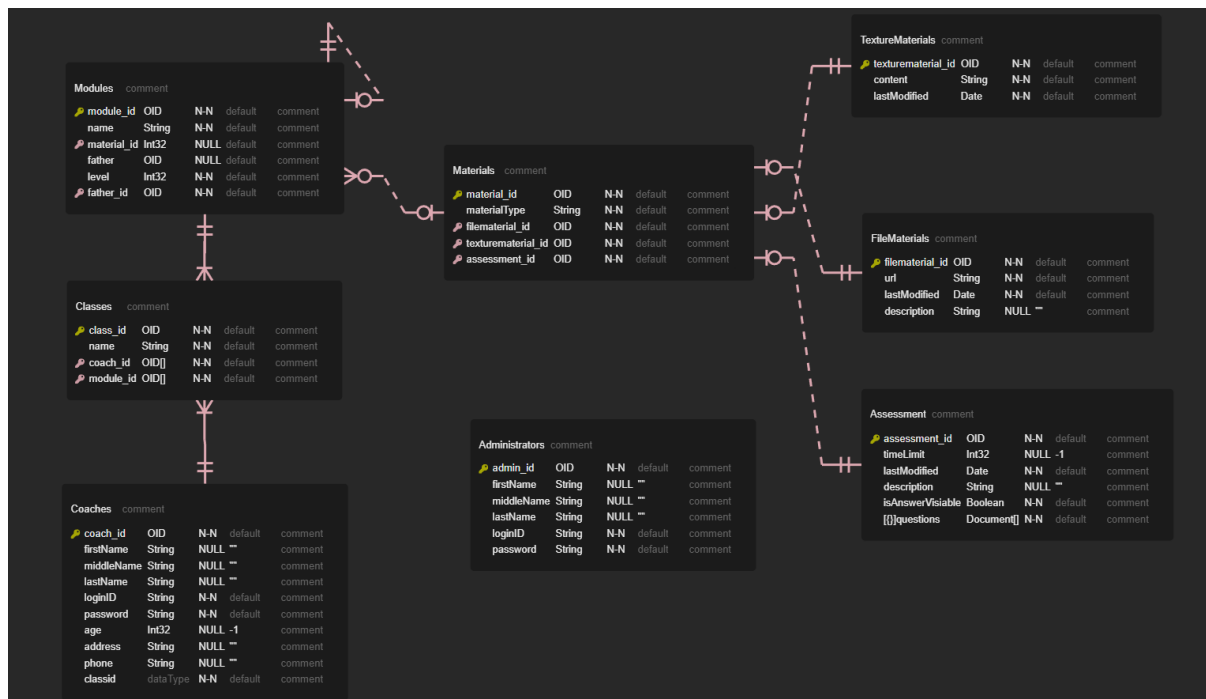
5.2. Table & Attributes

Administors

id	Name	Key	Data type	Null	References	Description
1	admin_id	✓	OID			Intgernal uniquie admin identifier. Collection primary key.
2	firstName		String	✓		first name of the admin

id	Name	Key	Data type	Null	References	Description
3	middleName		String	✓		middle name of the admin
4	lastName		String	✓		last name of the admin
5	loginID		String			login ID of the admin
6	password		String			encryped admin login password

Coaches

id	Name	Key	Data type	Null	References	Description
1	coach_id	✓	OID			Intgernal uniquie coach identifier. Collection primary key.
2	firstName		String	✓		first name of the coach
3	middleName		String	✓		middle name of the coach
4	lastName		String	✓		last name of the coach
5	age		int32	✓		age of the coach
6	address		String	✓		Aaddress of the coach
7	phone		String	✓		phone number of the coach: "+61 041234567"
8	loginID		String			login ID of the coach
9	password		String			encryped admin login coach

Modules

id	Name	Key	Data type	Null	References	Description
1	module_id	✓	OID			Intgernal uniquie module identifier. Collection primary key.
2	name		String			module name
3	[{}]contents		Document[]	✓	materials	list of dictionary containing materials [{id,type,reference_id}]
4	father_id		OID		modules	the father module of current module
5	level		Int32			level of the module: 1, 2, 3

Classes

id	Name	Key	Data type	Null	References	Description
1	class_id	✓	OID			Intgernal uniquie class identifier. Collection primary key.
2	name		String			class name
3	coach_id		OID[]			list of reference to coach
4	module_id		OID[]			list of reference to module

Materials

id	Name	Key	Data type	Null	References	Description
1	material_id	✓	OID			Intgernal uniquie material identifier. Collection primary key.
2	type		String			type of the material:"FileMaterials", "Assessment" or "TextureMaterials"
3	fileMaterial_id		OID	✓	FileMaterials	material reference id

id	Name	Key	Data type	Null	References	Description
4	textureMaterial_id		OID	✓	TextureMaterials	material reference id
5	assessment_id		OID	✓	Assessments	material reference id

TextureMatericals

id	Name	Key	Data type	Null	References	Description
1	texturematerial_id	✓	OID			Intgernal uniquie image identifier. Collection primary key.
2	content		String			content of the text
3	lastModified		Date			datetime of the last modification

fileMaterials

id	Name	Key	Data type	Null	References	Description
1	filematerial_id	✓	OID			Intgernal uniquie file identifier. Collection primary key.
2	url		String			url address of the file
3	lastModified		Date			datetime of the last modification
4	description		String	✓		description of the file

Assessments

id	Name	Key	Data type	Null	References	Description
1	assessment_id	✓	OID			Intgernal uniquie assessment identifier. Collection primary key.
2	timeLimit		Int32	✓		time limitation of the assessment
3	lastModified		Date			datetime of the last modification
4	description		String	✓		description of the assessment
5	isAnswerVisiable		Boolean			the visiability of the answer
6	[{}]questions		Document[]		MultiChoice	list of dictionary containing MultiChoice questions [{id,statement,choice[],answer}]