Mobile Content Generator

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Initial Design Report

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1 INTRODUCTION

This documentation has aim to indicate initial design strategies and structural properties of e-learning project. This document contains system architecture and implementation phases in terms of software components, interfaces, and data. All information about those steps is explained clearly for better code development; thus, programmer can understand and write code through following steps.

1.1 PROBLEM DEFINITION

Technology develops in rapid speed in all over the world. Every invented technology and developed technology comes with also new information. At this point, people have to learn this new information to keep pace with developing technology closely. As a result, people have tried variety education forms. They use school, seminar and special course. However, these are not enough in terms of rapid change of technology. If today conditions are considered, then these results are emerged. Firstly, time is important for people but transportation is also loss of time. Secondly, there is one person who knows this course perfectly but even bigger class has 200 people. This number seems bigger; however, it is known that there are more than one billion people all over the world. This professional person is not enough to teach everybody who wants to learn something about this field. Thirdly, money becomes problem. People spend lots of money on education. They are major problems as the best known. At this point, e-learning become as a major solution for companies, employees, teacher, students and other such systems which has educational relationship. On the other hand, e-learning is important for companies in terms of improving training cost, decreasing material cost and increasing productivity. Also it is important for learner in terms of accessing real-time, having freedom to fail, improving retention, providing personalized learning.

It is known that while e-learning become major education tool, there are still some problems. Actually, there are lots of problems but these three are considered as majors.

- **Privacy** is the one of major problem of e-learning education. Since, information is really valuable and it should be protected when it is necessary. For example, any company does not want to share structural information with anybody except people who work for this company. Even there are strict boundaries inside some company and there is no share between its departments.
- **Compatibility** is the second of major problem of e-learning education. Since, there are lots of different mobile devices, operating systems, platforms and even programming languages. As a result, there emerge compatibility problem. In other words, one program works on Windows but not Linux. Some websites are shown Firefox wonderfully but another browser Safari makes it nasty.
- **Simplicity** is the third major problem of e-learning education. Since, instructor has to create and design website or program. This is not easy for person who is master of any course but uses computer only to surfing and reading e-mail.

In order to overcome these problems, there is a need of mobile content generator tool. By designing such a tool, people can create content of e-learning program easily. This program works on any web browser and certain people can receive this education as instructor desired. On the other hand, people who receive this education also can use this program easily, on any web browser and in secure. Education can be a video, a text or mixed of them. What's more, some features of tool gives opportunity to instructor create some feedback area such as comment, rating etc.

1.2 PURPOSE

This document is the software design description report of the project Mobile Content Generator. The purpose of this document is to explain briefly data design and system architecture of MCG. Moreover, this document explains all functionality clearly. Target group of this document is developers and testers.

1.3 SCOPE

Mobile Content Generator is a web-based application especially used for E-learning. Its general characteristics are adding e-learning material through instructors to system and handing them appropriately to learners without having any technical information about the system.

An instructor will be able to add videos, text and decide how learners can see the content among different templates. An instructor cannot create new template, he can only use predefined templates of the system. Learning material can only be uploaded via desktop computers. Authorizing learners to courses is instructor's duty. All the operations done by instructor do not require any technical skills.

Learners can reach learning materials which they are authorized to at any time with different platforms (i.e. Desktop computers, tablets, cell phones) continuously. When a learner exits from the system, he can continue the learning process from different platforms where he left. There will be also social features for learners such as giving points to materials, commenting which will be visible to other users and giving feedback about content to its instructor. Like instructors, learners do not need to have technical knowledge.

1.4 OVERVIEW

This document contains six additional chapters. In the next chapter we will give a general overview of the system. Then the Design Considerations follows in which assumptions, dependencies, constraints and guidelines of our system will be explained. The chapter after that is the Data Design which will include information and data domain of the system and its organization. In the fifth chapter, we will architecture of our system in detail with description of components. Then we will present images for our user interface. After, libraries and tools will be specified. Gantt charts of term1 and term2 will be presented and finish with conclusion.

1.5 DEFINITIONS AND ABBREVIATIONS

E-Learning: The delivery of a learning, training or education program by electronic means. E-learning involves the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, educational or learning material [2].

Learner: The user authorized to reach the learning content but not authorized to change it.

Instructor: The user who can generate learning material and authorize e-learners to it.

MCG: Mobile Content Generator

SDD: Software Design Description

1.6 REFERENCES

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[10] http://en.wikipedia.org/wiki/HTML5

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[13] Software Requirements Specification for Mobile Content Generator

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2 SYSTEM OVERVIEW

Mobile Content Generator is basically an e-learning system with instructors who are adding courses and learners who are accessing these courses' contents. Instructors can add courses only by using desktop computers however; learners can access these courses via desktop computers or mobile devices like tablets and mobile phones.

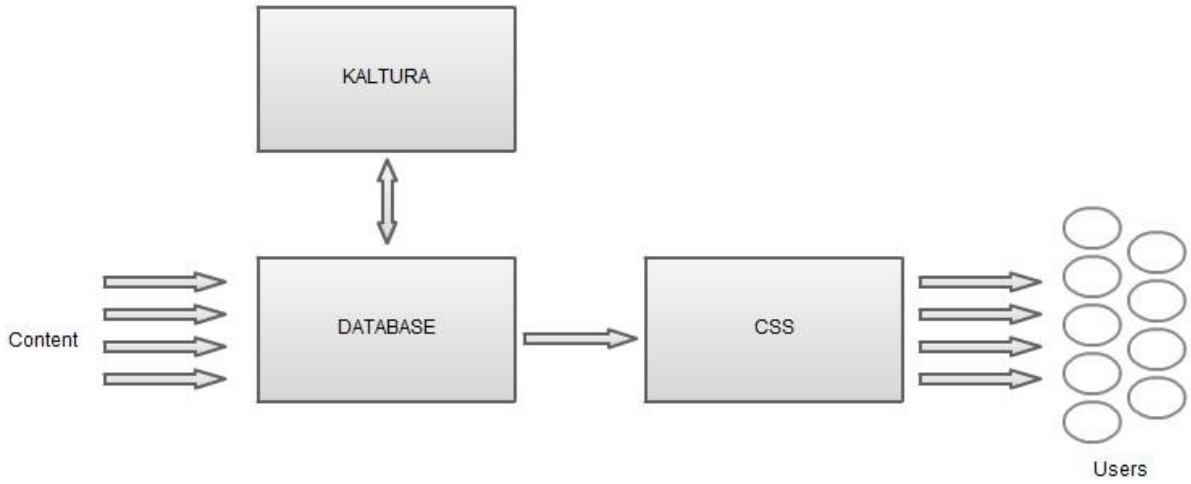


Fig1. Overall System Block Diagram

Above is the overall diagram of the system. The contents which are added to the system by instructors are sent to the database and then to Kaltura's servers for further processing. Contents coming back to database from Kaltura's servers are designed with CSS and served to users.

Our system has 3 different types of users as administrator, instructor and learner. With the administrator rights the user is able to add, delete, block and activate instructors, delete course, comment and page. The user who has instructor rights can add/delete course, chapter, page, comment, assign learners to courses and change the orders of chapters/pages. The last type of user is learners and they have the rights of attending to a course, adding/deleting comments and rating contents. Basically, administrators are able to change database in terms of contents and users of the system, instructors are able to change database in terms of contents and finally learners are able to reach to contents. Below there are the main functions of these users shown by use case diagrams.

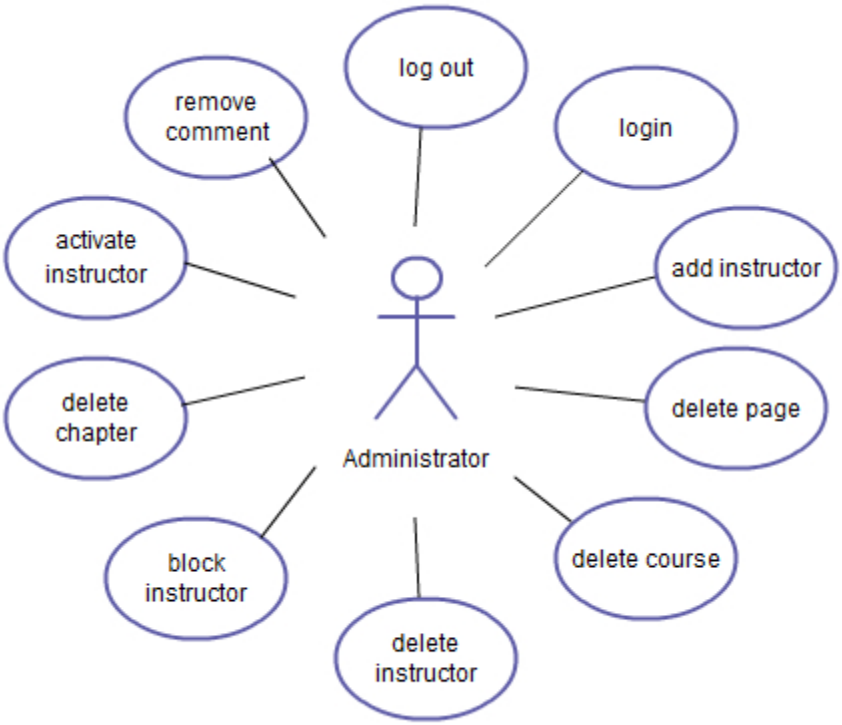


Fig2. Administrator Use Case

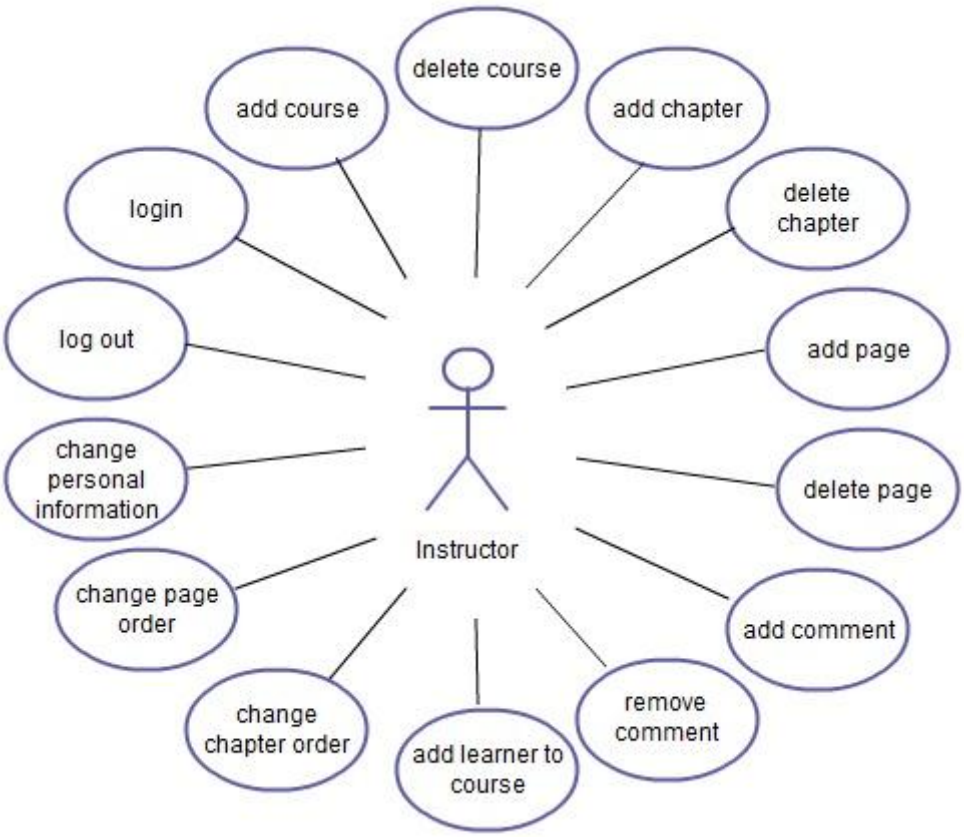


Fig3. Instructor Use Case

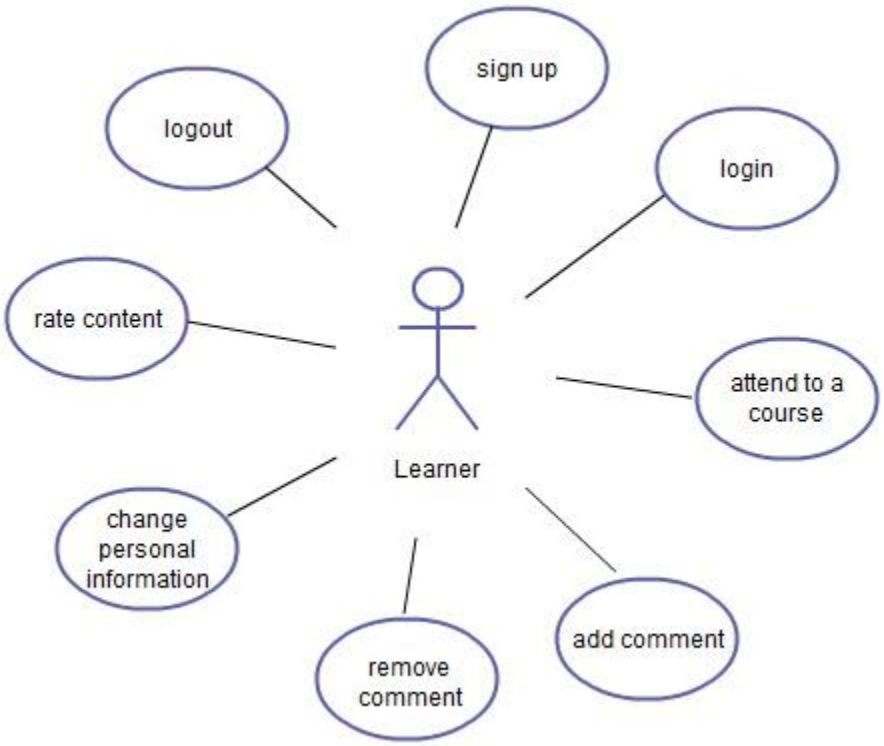


Fig4. Learner Use case

3 DESIGN CONSIDERATIONS

3.1 DESIGN ASSUMPTIONS, DEPENDENCIES AND CONSTRAINTS

In the beginning, this application is web application. Therefore, there are some restrictions as a result of server computer, network connection and developers. Server computer should be fast and provide to open more sessions simultaneously. Network connection should be better to acquire information from server faster. Files size and number also affect the performance. Then they should be minimal. There is also another performance problem which is database. There are lots of query for database. Better optimization means better database works. Externally, "kaltura.com" has also performance effect on working process. This performance effect cannot be optimized or changed. There are two types of performance effects such as static performance and dynamic performance.

- **Static Performance**

Some of features depend on server performance. For example; number of computer which are connected to website, number of people can connect at the same time, called capacity of system features. Assuming that server has average performance, number of computer which connected to website will be 4000-5000. Making simultaneously connection number will be 90-100. Called capacity of system will be related RAM space and size of code. This size of code is directly related

dynamic growing and developer's optimization. Therefore, assuming optimized code, approximately 4500 people each for a computer can call features unlimited.

- **Dynamic Performance**

Response time depends on code efficient, server performance and number of people who make operation on server. This response time will be less than one second when number of people who connect server is less than %60 of limit number. However, there will be another performance effect such as "kaltura.com". Website will acquire also video if this page contains any video. This makes response time between 2-3 second depending on "kaltura.com" response time. Since, this website prepares desired video as desired size and quality. There is also database query performance. Optimized database and fast server will make progress less than 0.01 second for a query for %70 of operations. If there are lots of operations on multiple tables, then this time will increase maximal under 0.1 second.

- **Design Constraints**

This web application contains programming languages such as ASP.NET, CSS, HTML5, MSSQL, JAVA and JAVASCRIPT. Also there is framework which name is VISUAL STUDIO. There will no hardware constraints. This web application is cross platform. Any hardware, which can run HTML5, runs also this application. Therefore, mobile phones, desktop computers and tablet computers can show this application.

System will be realizable. Since, this system will just work on server and show on HTML5. System is portable. Since, this is web application and it will work on any servers. Also, it can be transported to other server easily. Security is also better. There is login screen. There is no other entrance way. Sign up form includes image verification to protect from spam. Instruction is created directly admin and inappropriate videos directly delete from admin. Server part is also secure by itself. There are user level permissions that they just follow the course content.

3.2 DESIGN GOALS AND GUIDELINES

MCG works on web services; therefore, it depends much more on database. Security is important for database. In order to make secure system, database must have better design. Nobody can reach database without permission. Each profile must have own area in database. Queries must be designed considering the privacy. Queries' limited are determined clearly. As a result, only authorized people reach their area and this makes a shield for foreign attacks.

MCG must be designed to work every web browser without any problem. In this manner, learner can receive education anywhere. MCG provides portability in terms of working on every web browser.

Speed must be emphasized on because device's scope of MCG also includes mobile devices. This type of devices has slower processor according to standard computer.

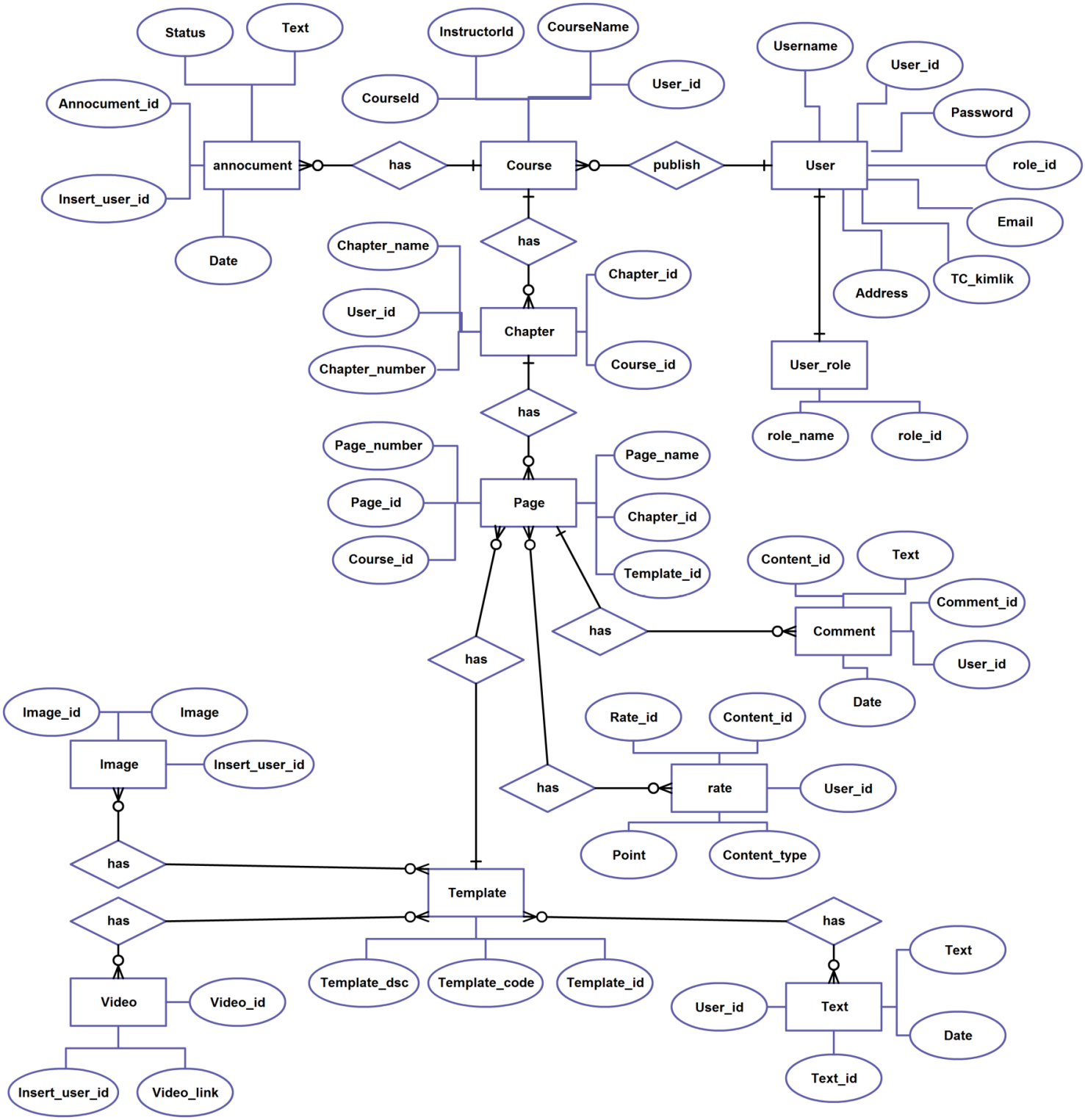
KISS principle must be used for its interfaces. As indicated, this tool must provide simplicity. Since, instructor and learner have different technological and educational background. So that, there must exist simple interface for creating content or receiving education. On the other hand,

MCG must be designed different interfaces for different devices. Since, mobile devices screen are relatively small and they need simple interfaces. Other computer has large screen and there can be more button or text area.

4 DATA DESIGN

4.1 ER DESIGN

Mobile Content Generator will run on application server. It will store all information and data in relational database. All data will be stored in database tables and used by using appropriate queries. All data manipulations will be done by database management system. MS-SQL will be used to handle database operations.



4.2 DATA DICTIONARY

To store data, we designed following tables. We will store user information and all contents except videos in the database. Videos will be stored in www.kaltura.com web page. We will only store the code that includes video's ID.

4.2.1 ANNOUNCEMENT TABLE

Field	Type	Nullable	Foreign Key	References
announcement_id(P.K.)	integer(10)	No	No	-
insert_user_id	integer(10)	No	Yes	user_id(User)
text	varchar(500)	No	No	-
date	date	No	No	-
status	integer(1)	No	No	-

In Announcement table, we store announcements that will be created by system admin or instructor. There is a primary key announcement_id and a foreign key that references User table's user_id.

4.2.2 CHAPTER TABLE

Field	Type	Nullable	Foreign Key	References
chapter_id(P.K.)	integer(10)	No	No	-
chapter_name	varchar(250)	No	No	-
course_id	integer(10)	No	Yes	course_id(Course)
chapter_number	integer(3)	Yes	No	-
user_id	integer(10)	No	Yes	user_id(User)

In Mobile Content Generator, a course will consist of chapters. To handle this need, we store chapters in Chapter table. Chapter table keeps basic attributes of a chapter and its primary key is chapter_id. There are two foreign keys, first one is course_id that refers to Course table and second one is user_id that refers to User table.

4.2.3 COMMENT TABLE

Field	Type	Nullable	Foreign Key	References
comment_id(P.K.)	integer(10)	No	No	-
text	varchar(1000)	No	No	-
content_id	integer(10)	No	No	-
content_type	integer(3)	No	No	-
date	date	Yes	No	-
user_id	integer(10)	No	Yes	user_id(User)

In Mobile Content Generator, user will be able to comment contents of a course. Content word means course, chapter or page. Actually, content_id refers to these tables. To keep contents type, there is content_type attribute. There is one foreign key, user_id that refers User table and keeps information of the user who adds that comment to the system. Primary key of the table is comment_id.

4.2.4 COURSE TABLE

Field	Type	Nullable	Foreign Key	References
course_id(P.K.)	integer(10)	No	No	-
course_name	varchar(250)	No	No	-
instructor_id	integer(10)	No	Yes	user_id(User)

Course is main heading of our tool. It includes chapters and chapters include pages which keep all needed education information. Course table has one foreign key, instructor_id to refer user_id in User table and its primary key is course_id.

4.2.5 IMAGE TABLE

Field	Type	Nullable	Foreign Key	References
image_id(P.K.)	integer(10)	No	No	-
image	image	No	No	-
insert_user_id	integer(10)	No	Yes	user_id(User)

Images are needed to show some visual elements in courses. Instructors can add schemas, charts or pictures formatted as image. Image table stores image itself and needed information for image. It has one foreign key, insert_user_id to refer user_id in User table. Primary key of the table is image_id.

4.2.6 PAGE TABLE

Field	Type	Nullable	Foreign Key	References
page_id(P.K.)	integer(10)	No	No	-
page_number	integer(4)	Yes	No	-
page_name	varchar(250)	Yes	No	-
chapter_id	integer(10)	Yes	Yes	chapter_id(Chapter)
template_id	integer(5)	No	Yes	template_id(Template)
course_id	integer(10)	Yes	Yes	course_id(Course)
user_id	integer(10)	No	Yes	user_id(User)

All needed information for learners will be hold in pages. To keep these information, he have page table. The information of how page will be shown to user will keep in template table. Template_id in Page table will refer to Template table. There are also three foreign keys, chapter_id and course_id refer Chapter and Course table to determine which course and chapter that the page belongs to; and user_id to keep the instructors information who adds the page to the system. Primary key of the table is page_id.

4.2.7 RATE TABLE

Field	Type	Nullable	Foreign Key	References
rate_id(P.K.)	integer(10)	No	No	-
point	integer(2)	No	No	-
content_id	integer(10)	No	No	-
content_type	integer(2)	No	No	-
user_id	integer(10)	No	Yes	user_id(User)

In Mobile Content generator, users will be able to rate every page, chapter or course. To store these ratings, we have Rate table. Primary key of this table is rate_id. There is one foreign key user_id to refer User table to keep inserted user's information. In content_id attribute holds information about which rating belongs to which chapter, course or page. To distinguish these contents, content_type will hold type of the content.

4.2.8 TEMPLATE TABLE

Field	Type	Nullable	Foreign Key	References
template_id(P.K.)	integer(5)	No	No	-
template_code	varchar(5000)	No	No	-
template_dsc	varchar(250)	Yes	No	-

In Template table, we store html5 codes of pages. Template codes will include ids of videos, images and texts and be stored in template_code attribute. Primary key of the table is template_id.

4.2.9 TEXT TABLE

Field	Type	Nullable	Foreign Key	References
text_id(P.K.)	integer(10)	No	No	-
text	varchar(5000)	No	No	-
date	date	No	No	-
user_id	integer(10)	Yes	Yes	user_id(User)

Text table will include texts of pages. There is one foreign key user_id to refer User table to store the person who adds text to the system, and the primary key of the table is text_id.

4.2.10 USER TABLE

Field	Type	Nullable	Foreign Key	References
user_id(P.K.)	integer(10)	No	No	-
username	varchar(25)	No	No	-
password	varchar(10)	No	No	-
role_id	integer(2)	No	Yes	role_id(User_role)
address	varchar(500)	Yes	No	-
email	varchar(50)	No	No	-
tckimlik	varchar(11)	Yes	No	-

User table will store personal information of all kind of users. There is one foreign key role_id that refers to User_role table and stores the role of this user in system. Primary key of the table is user_id attribute.

4.2.11 USER_ROLE TABLE

Field	Type	Nullable	Foreign Key	References
role_id(P.K.)	integer(10)	No	No	-
role_name	varchar(50)	No	No	-

We will define different roles to assign users and give different authorizations. User_role table will store these role information. It has two attributes, role_id as primary key and role_name to identify the role.

4.2.12 VIDEO TABLE

Field	Type	Nullable	Foreign Key	References
video_id(P.K.)	integer(10)	No	No	-
video_link	varchar(50)	No	No	-
insert_user_id	integer(10)	No	Yes	user_id(User)

Our system will not be stored videos in database. Instead, we will upload all videos to www.kaltura.com web-site and take the link of the video. In video_link attribute, we store this data. There is one foreign key insert_user_id that refers to User table and keep information about user who adds this video to system. Primary key of the table is video_id.

5 SYSTEM ARCHITECTURE

A general description of the Mobile Content Generator system architecture is presented in the following sections.

5.1 ARCHITECTURAL DESIGN

Mobile Content Generator is a web-based software which is composed of seven components; GUI, Authentication, User, DataRetrieval, BackEndApplication, DataStorage, Kaltura.com. The component diagram illustrates structure of the system. Each component will be explained separately in the next section.

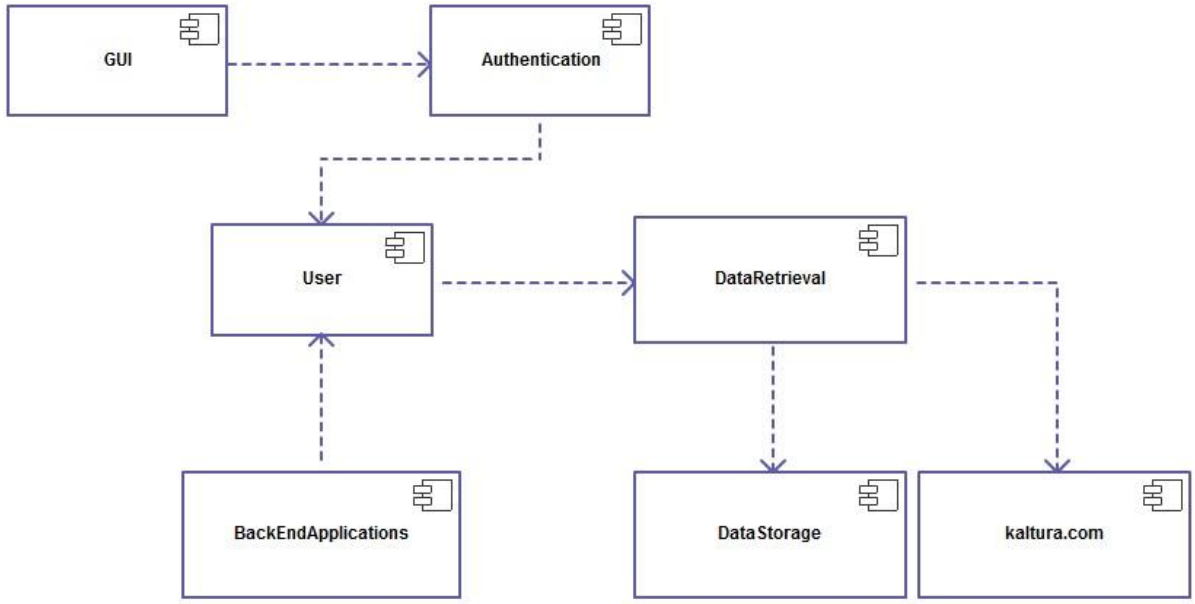


Fig5. Component Diagram of the System

5.2 DESCRIPTION OF COMPONENTS

In this section, components mentioned in 5.1 are described individually a section. Each description contain short definition, processing narrative for component, interface description, component processing detail and dynamic behavior.

5.2.1 GUI

Graphical user interface provides user to use system easily. This is obtained by using button, text box etc.

5.2.1.1 PROCESSING NARRATIVE FOR GUI

This component comprises all the objects and shows them as appropriate kind. This shows all hard part clearly as everybody can understand what s/he should do. This component works in

client side through HTML5. Server side sends desired information and client side interpret as desired. This component manages this overflow by creating dynamic HTML5 webpage through ASP.NET.

5.2.1.2 GUI INTERFACE DESCRIPTION

There are inputs from client side. Then, this input stack sends to server side with necessity information. Server side processes this information and also makes some information transformation with other components and return desired information as output. On the other hand, this output stack reaches the client side successfully. Client side creates dynamically desired webpage through using output information.

5.2.1.3 GUI PROCESSING DETAIL

The complete procedural activities related to this component are as follow;

1. User/client requests a page from the system through the internet
2. Server captures the request successfully
3. Server evaluates this request inside
4. Server gets necessary information from data storage component
5. Server returns information as output
6. Client side takes information successfully
7. Client evaluates the server's output
8. Client creates webpage dynamically and show to user

5.2.1.4 GUI DYNAMIC BEHAVIOR

This component has relation with authentication and user components. This component interacts with authentication component as authentication component calls this component. User component also calls this component to show itself on webpage. This component depends on receiving information from these two components.

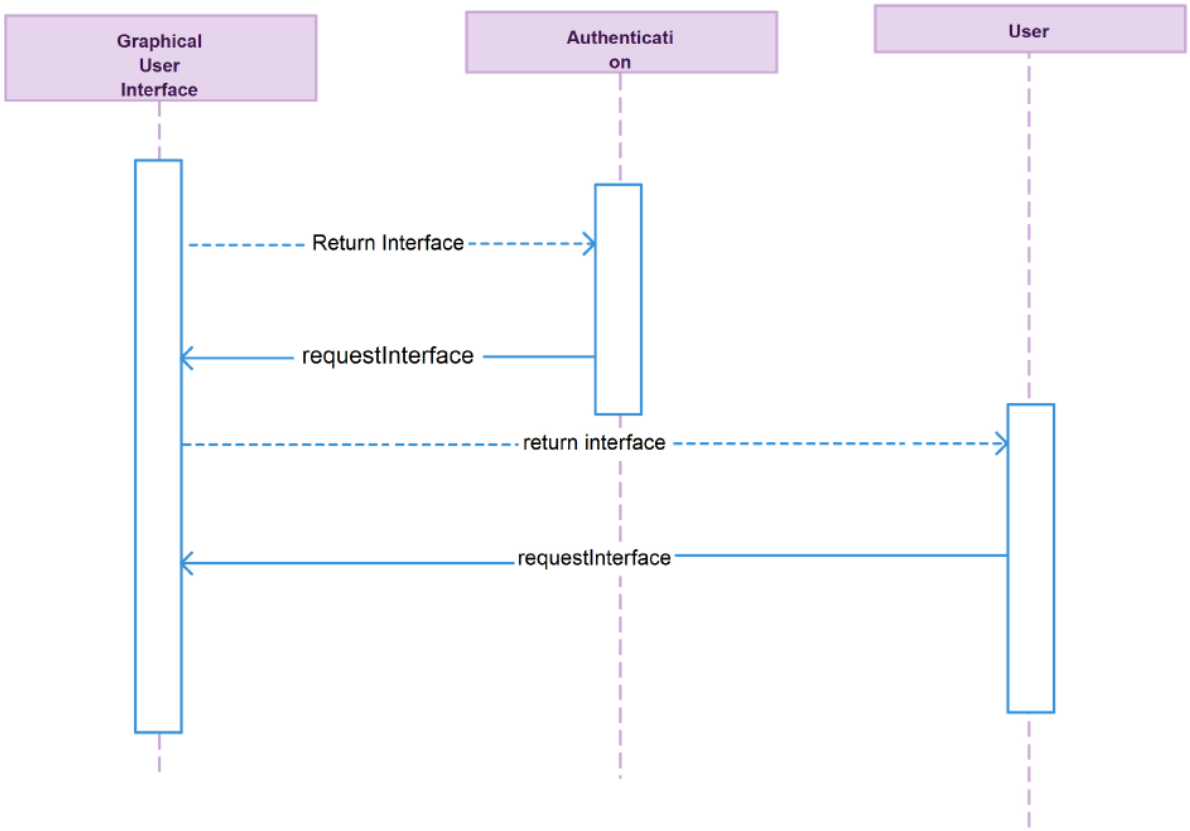


Fig6. Sequence diagram of GUI

5.2.2 AUTHENTICATION

This component provides to separate people who have permission to enter system and also separate people who are administrator, instructor and learner.

5.2.2.1 PROCESSING NARRATIVE FOR AUTHENTICATION

This component is responsible for checking personal requests with the permission of the clients. This prevents people who are not related with the system. This is implemented as username and password. At this point, everybody who is related with system have unique username and password. On the other hand, this component separates profile of people who is related with system. Learner cannot reach or display instructor profile.

5.2.2.2 AUTHENTICATION INTERFACE DESCRIPTION

This has two areas. First one is username, second one is password. Also there is log in button under these two text boxes. Log in button sends all information in the text box to server side to check. Output depends on whether information is correct or not. User can go next step or try again.

5.2.2.3 AUTHENTICATION PROCESSING DETAIL

The complete procedural activities related to this component are as follow;

1. User/client fills the username and password area
2. User/client clicks the log in button under this area
3. Client side sends these information to server side to check
4. Server side takes these information successfully
5. Server side check information from database
6. Server side return different information stack whether correct or not
7. Client side gets information successfully
8. Client side interprets received information
9. Client side create dynamically webpage according to received information
10. User see the desired webpage

5.2.2.4 AUTHENTICATION DYNAMIC BEHAVIOR

This component has relation with GUI component and user component. This calls GUI component to show itself as webpage. On the other hand, this component directs client to user component according to receiving information from server side.

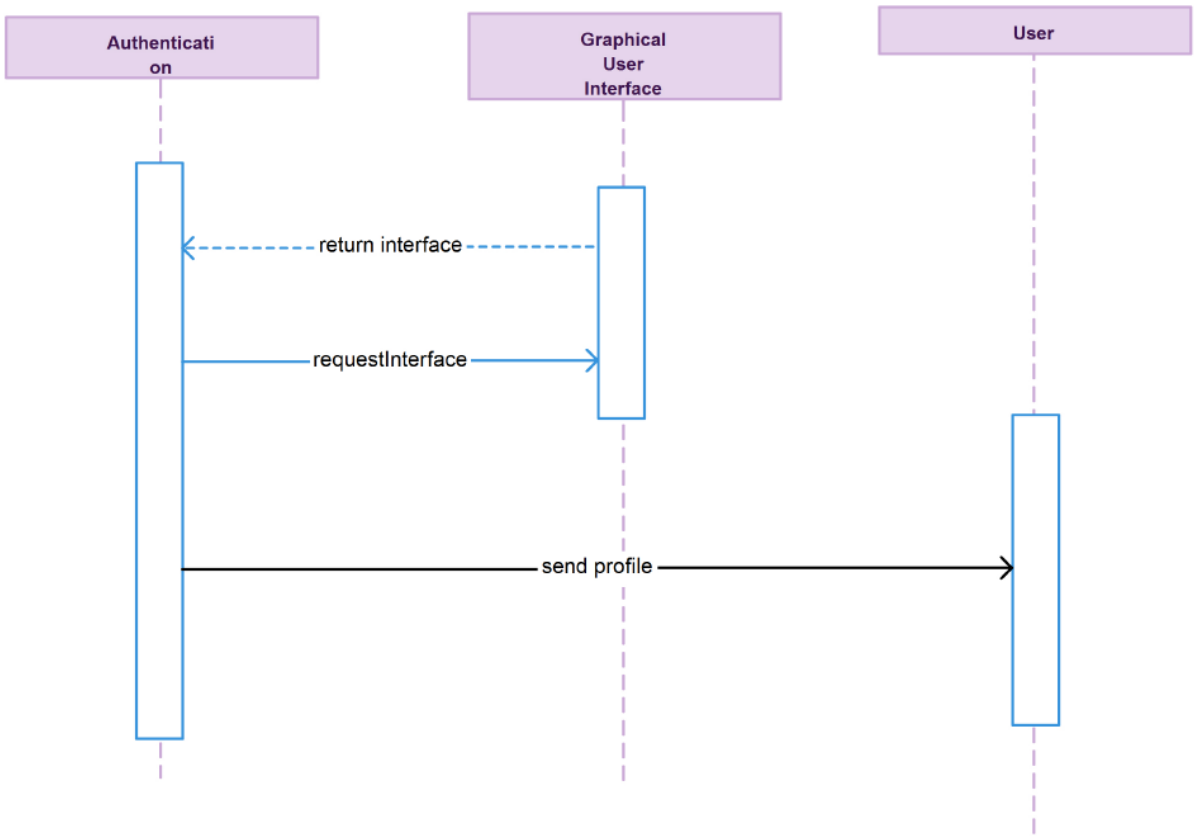


Fig6. Sequence diagram of Authentication

5.2.3 USER

5.2.3.1 PROCESSING NARRATIVE FOR USER

This component is responsible for sending requests to DataRetrieval. Only the authenticated components become user components. It has 3 kinds of sub-components as administrator, instructor and learner. User component has corresponding back end applications. It acts as a bridge between back end applications and data retrieval. User can request a data from DataRetrieval or can request to store data to DataStorage.

5.2.3.2 USER INTERFACE DESCRIPTION

It generates data requests for DataRetrieval. By using back end applications requests are processed with corresponding program. Processes like uploading video, text, audio or accessing to these contents are requested and results of these requests are returned from DataRetrieval.

5.2.3.3 USER PROCESSING DETAIL

It works as follows;

1. It generates requests for loading from or storing to database by using backend applications.
2. Results of requests are returned to user component from DataRetrieval.

5.2.3.4 USER DYNAMIC BEHAVIOR

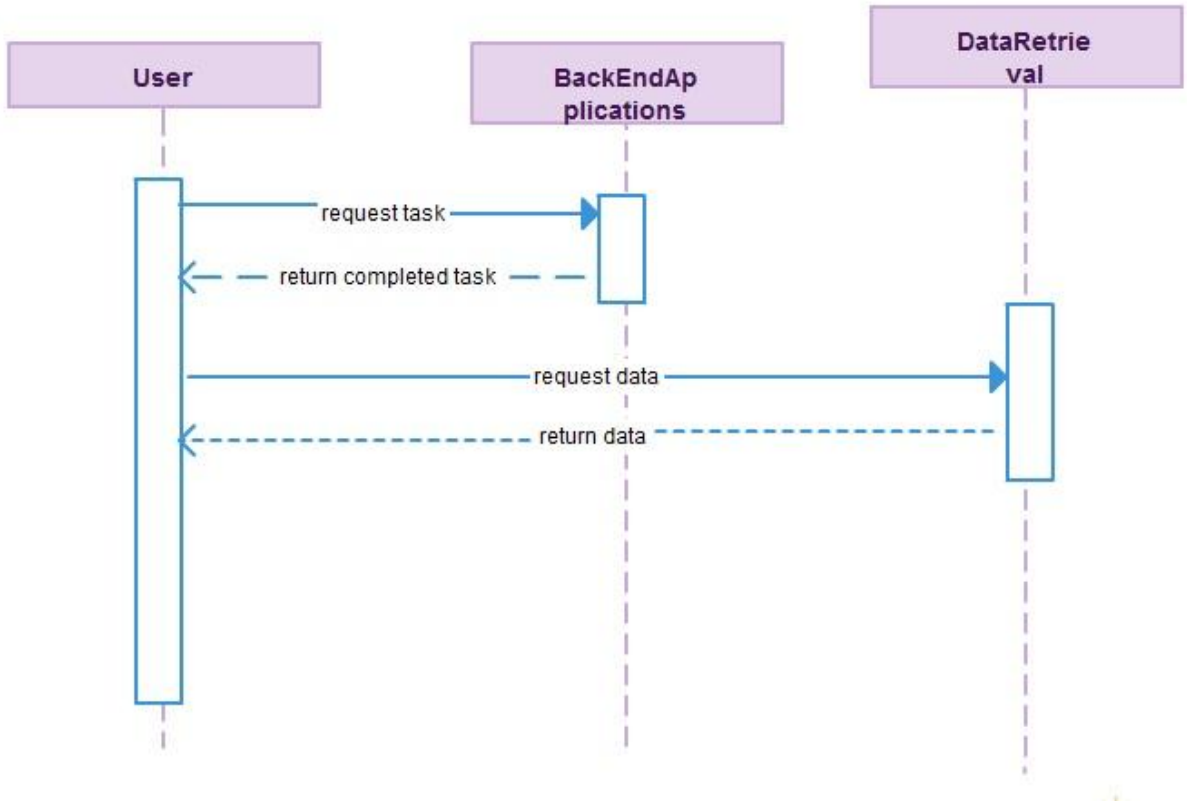


Fig7. Sequence diagram of User

5.2.4 BACKEND APPLICATIONS

5.2.4.1 PROCESSING NARRATIVE FOR BACKEND APPLICATIONS

This component is for handling different tasks using technologies available. These technologies include ASP.net, JavaScript, HTML5 and CSS.

5.2.4.2 BACKEND APPLICATIONS INTERFACE DESCRIPTION

It generates result for User using the User's request as input and produces output.

5.2.4.3 BACKEND APPLICATIONS PROCESSING DETAIL

It works as follows;

1. User requests a task and triggers an appropriate task for back end application.
2. The application returns processed task's result to user.

5.2.4.4 BACKEND APPLICATIONS DYNAMIC BEHAVIOR

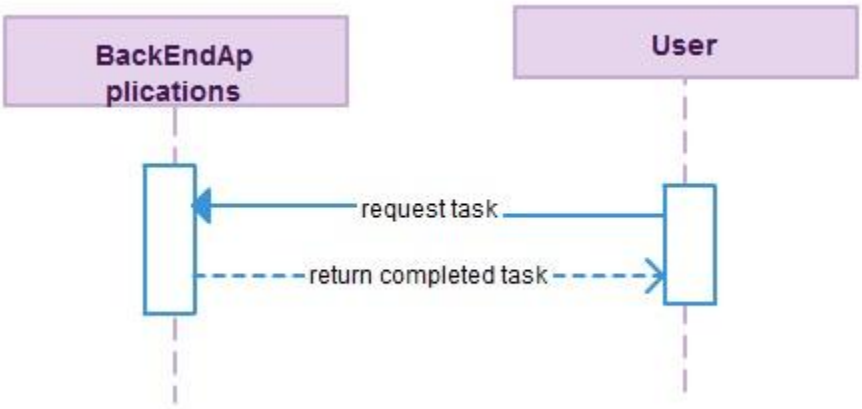


Fig8. Sequence diagram of Backed Application

5.2.6 DATA RETRIEVAL

5.2.5.1 PROCESSING NARRATIVE FOR DATA RETRIEVAL

DataRetrieval is responsible for accessing data from and storing data to DataStorage and Kaltura.com. It provides a connection between users and database. Users requests are sent to DataStorage or Kaltura.com via DataRetrieval.

5.2.5.2 DATA RETRIEVAL INTERFACE DESCRIPTION

It receives data requests from users of the system. Then, these requests are converted into SQL commands and sent to DataStorage or Kaltura.com for getting data objects. The result obtained from DataStorage or Kaltura.com is reported to the component which sent request for it.

5.2.5.3 DATA RETRIEVAL PROCESSING DETAIL

It works as follows;

1. Receive a request from User component.
2. Request is converted into SQL commands.
3. Send commands to DataStorage or Kaltura.com components
4. Received object from DataStorage or Kaltura.com is reported to the component which sent request for it.

5.2.5.4 DATA RETRIEVAL DYNAMIC BEHAVIOR

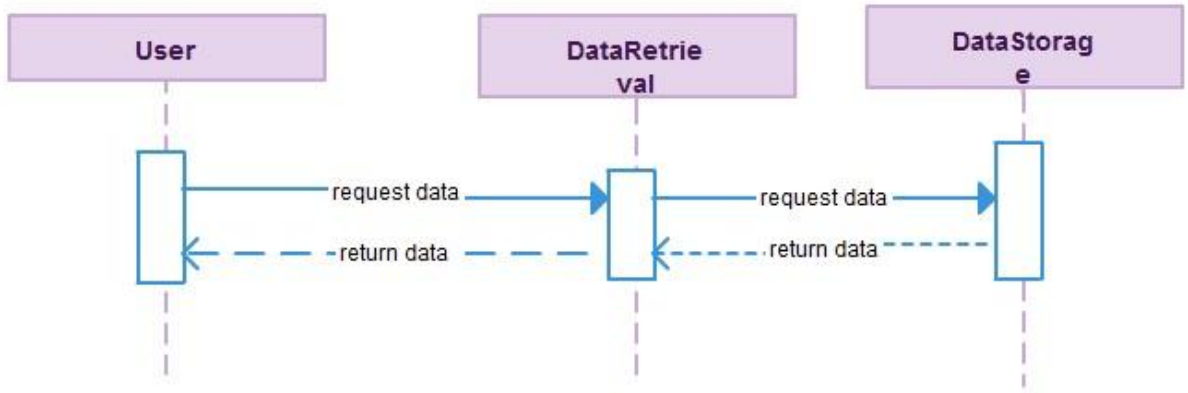


Fig9. Sequence diagram of Data Retrieval

5.2.7 DATA STORAGE

5.2.6.1 PROCESSING NARRATIVE FOR DATA STORAGE

Data Storage component is responsible for creating and storing data objects. It provides the data which is requested from DataRetrieval. ADO.NET is used as a connector between data storage and ASP.net to get data from database and create corresponding data objects.

5.2.6.2 DATA STORAGE INTERFACE DESCRIPTION

DataRetrieval sends data requests to DataStorage for further processing. Then, DataStorage processes these commands and with the help of ADO.NET, the processed SQL commands are put to objects for future use.

5.2.6.3 DATA STORAGE PROCESSING DETAIL

It works as follows;

1. Receive a data request from DataRetrieval component.
2. Converted SQL queries are processed with ADO.NET.
3. Results of queries are put to objects.

5.2.6.4 DATA STORAGE DYNAMIC BEHAVIOR

Fig10. Sequence diagram of Data Storage

5.2.7 KALTURA.COM

5.2.7.1 PROCESSING NARRATIVE FOR KALTURA.COM

This component is responsible for video upload and video streaming. When an instructor upload a video, system will connect www.kaltura.com , upload the video and give back video link. Then the video link will be saved to our database. When a user wants to watch a video, parameters will be sent to www.kaltura.com and video will be retrieved in appropriate way

5.2.7.2 KALTURA.COM INTERFACE DESCRIPTION

It recieves data inputs and as JSON objects. It will encode video in its own server and send outputs as form of JSON objects. Then JSON objects will be parsed and saved in database if the request is video upload request done by instuructor. On the other hand, if the request is a video streaming request, then output will be sent to user's browser.

5.2.7.3 KALTURA.COM PROCESSING DETAIL

It works as follows;

1. It receives a request as form of JSON object.
2. It decodes and applies needed processes.
3. When process finished, it sends appropriate JSON objects according to type of the request it received.

5.2.7.4 KALTURA.COM DYNAMIC BEHAVIOR

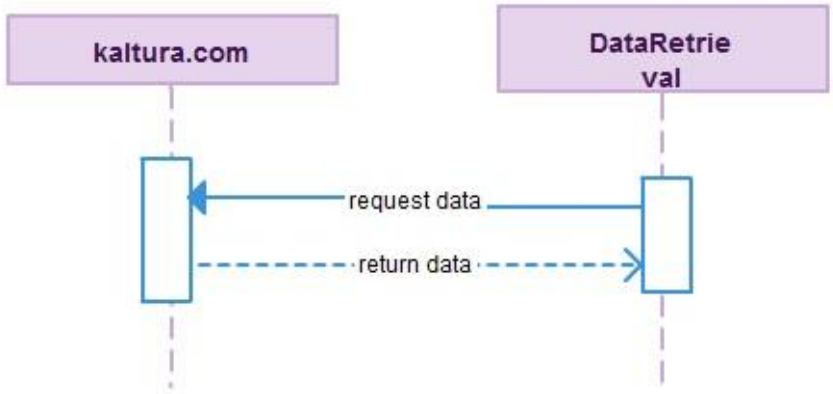


Fig11. Sequence diagram of Kaltura.com

5.3 DESIGN RATIONALE

Firstly, login page of system appears on the screen as webpage. Then, user who is learner, instructor or administrator enters his/her information into text box and click log in button. According to profile, login page directs him/her to own profile page.

If s/he is administrator, there appears control panel; his/her own information and other applications. S/he can delete comment, rate, video, text, course, instructor and learner. S/he can see everything about system as desired and interfere in this situation.

If s/he is instructor, there appears his/her courses and control panel. S/he uses control panel to add course. Adding course also directs him/her new page. Firstly, s/he enters information about courses, then selects appropriate template, lastly; if necessary add video using kaltura.com, text, audio, image; then publish this course. Later, s/he selects people or group who can see this course.

If s/he is learner, there appears his/hers courses. S/he selects any course which has been allowed for his/her and starts or continues to receive education. S/he can write comment or rate.

Any user profile can exit from system anytime by clicking logout button.

5.4 TRACEABILITY OF REQUIREMENTS

3.2.3.3	5.2.2
3.2.16.3	5.2.2

3.2.17.3	5.2.3
3.2.21.3	5.2.3

6 USER INTERFACE DESIGN

In this section, user interface of Mobile Content Generator is explained in detail.

6.1 OVERVIEW OF USER INTERFACE

System has there type of users; Learner, Instructor, Admin. These users have different authorization and capabilities. Login mechanism is same for all users. They will choose their status as whom they want to login and submit valid password and ID. . An additional function for Learner is signup. A Learner who is not registered must sign up and fill requested form. After his account is approved, he can login the system. Just after login, these users will be directed different pages. All types of user can use the system through desktop environment, however only Learner is also able to reach it via mobile devices.

6.2 SCREEN IMAGES

All screen images of MCG will be shown in the following subsections. All screens are supported by Desktop environment and all Learner Screens also supported by Mobile environments.

6.2.1 LOGIN

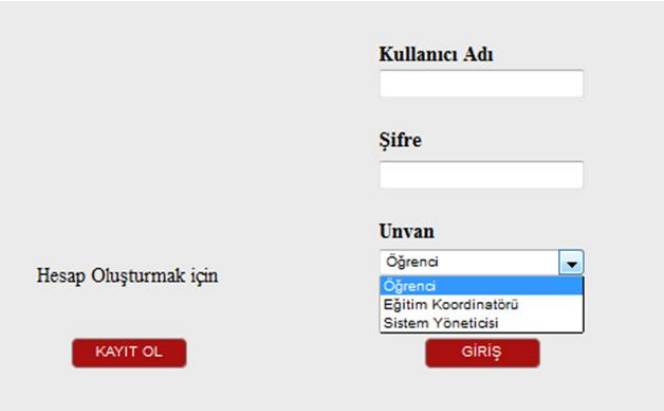


Fig12. Login Screen

When the webpage of the Mobile Content Generator is open, user faces with the login screen. This page can be seen through desktop and mobile platforms. Users which are authenticated previously, can login the system with accurate username and password that matches with the

title of the person. For unauthorized users there is another option which is sign up. Only Learners can use this action. Instructors are added to system by Admins and admins are predefined by the system.

6.2.2 SIGN UP

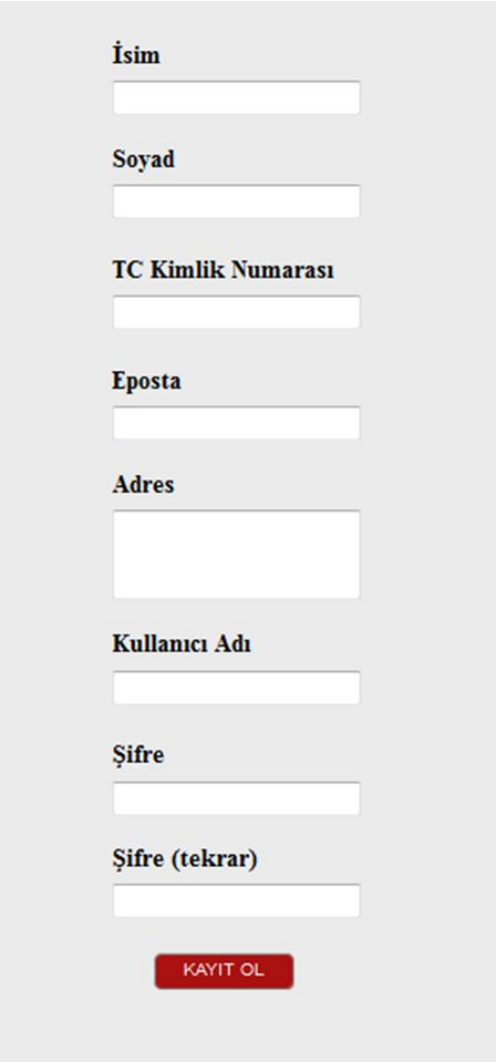


Fig13. Sign Up Screen

When a user clicks the “Kayıt Ol” button at Login page, he is directed to Sign Up page. This page requests necessary information to enroll the system. When a user is signed up the system with filling this form, he can login to system as Learner type of user. Sign Up page works for both Desktop and Mobile environments.

6.2.3 LEARNER HOMEPAGE

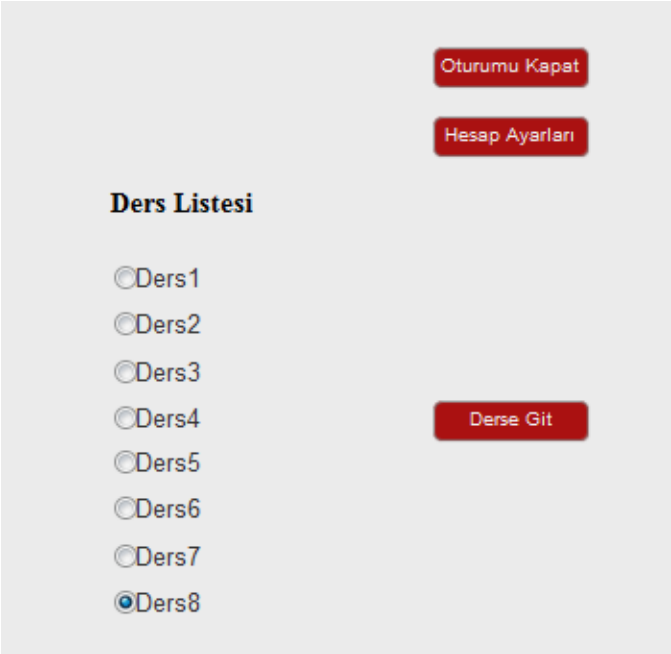


Fig14. Learner Homepage Screen

When a user is logged in the system as Learner, he is directed to Learner homepage. Learner sees list of all courses that he is assigned to. He can choose one and go to course page with clicking "Derse Git" button. He also sees to buttons "Oturumu Kapat" and "Hesap Ayarları". If Learner clicks "Oturumu Kapat", he logs out from system and web page is directed to Login page. If Learner clicks "Hesap Ayarları" button, he is directed to the form page same as Sign Up page filled with user's information. He can do changes at that page.

6.2.4 COURSE SCREEN FOR LEARNER

When Learner selects a course to go from Learner homepage, he is directed to course page for Learner. There is a list of Chapters belonging to current Course. He can select one from this list to go. Learner can give rate to overall course. At the bottom of the page, comments done by other Learners for current course exists. If learner wants to send his thoughts, he can use the form and his comment will be able to seen by all the users authorized to course. "Oturumu Kapat" and "Hesap Ayarları" buttons stand at the right upper corner like previous page.

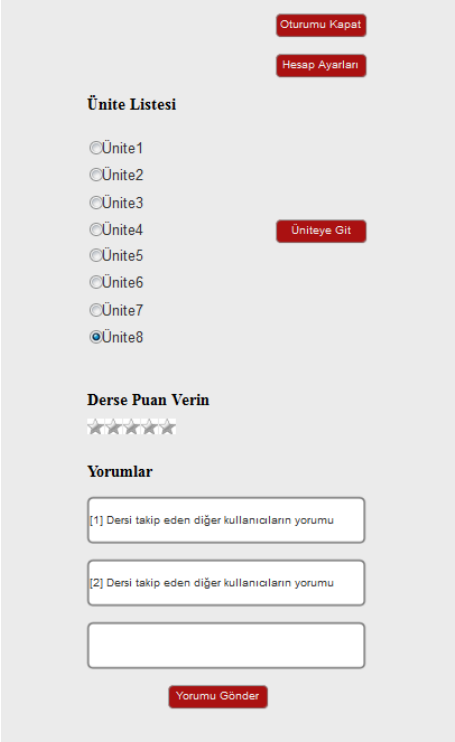


Fig15. Course Screen for Learner

6.2.5 CHAPTER SCREEN FOR LEARNER

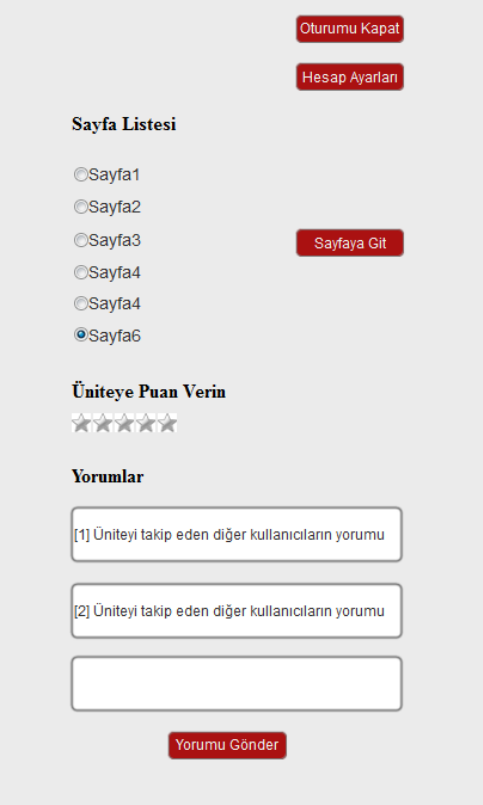


Fig16.Chapter Screen for Learner

This page represents content of the current Chapter for Learner. There is a list of pages. One can be selected and directed to the Page with “Sayfaya Git” button. User can give rate to current Chapter and view other Learners comment. With Learners will, he can also submit comment for the Chapter. Functionality of “Oturumnu Kapat” and “Hesap Ayarları” is the same with previous screens.

6.2.6 PAGE SCREEN FOR LEARNER

After Learner has chosen a Page and directed there, he faces with learning material. This page can be in different forms. Instructor decides the template of Page which fits best for his purpose. These options are limited by number of four (Video-Text, Audio-Text, Image-Text and Image-Audio). Each possible template that can be faced by Learner will be shown in the following subsection.

6.2.6.1 VIDEO-TEXT

Fig17. Video-Text Screen for Learner

Video-Text is a template of Page screen which contains learning material provided by Instructor. Learner can watch the video and when he wants, he can stop. System records the information of which point Learner stopped and left from Page. By means of this feature of the system, when the Learner reenters the Page and press the play button, video continues from the point where Learner left. Leaner does not have to deal with to find where he had come at the video. Text written by Instructor stands below video. Under these, Leaner can rate learning material of the Page. Underneath, Learners comments exits and user can also submit his comment; after writing comment by clicking "Yorumu Gönder" button. After finishing work with current Page, Learner can go next Page by "Sonraki Sayfa" button or go back to previous Page by "Önceki Sayfa" button.

6.2.6.2 AUDIO-TEXT

Fig18. Audio-Text Screen for Learner

Audio-Text is another template of Learner Page. The page contains an audio player and text below it. Like Video-Text Page, this Page also contains rating, showing comments, submitting comments, going next or previous pages, account settings and log out buttons.

6.2.6.3 IMAGE-TEXT

Fig19. Image-Text Screen for Learner

As indicated in its name, this template's main components are an image and a text. Learner can rate the Page, submit comment and see others comment about the material. Clicking "Önceki Sayfa" or "Sonraki Sayfa" changes current Page. Learner can log out or change account settings with the buttons on the right upper corner.

6.2.6.4 IMAGE-AUDIO

Fig20. Image-Audio Screen for Learner

The learning material in this Page consists of an Image and an audio. There exists an audio player under the image. Like other pages it contains rating and comment functionalities and "Önceki Sayfa", "Sonraki Sayfa", "Oturumu Kapat" and "Hesap Ayarları" buttons.

6.2.7 INSTRUCTOR HOMEPAGE

Fig21. Instructor Homepage

This is the first Screen related to Instructor. After Instructor is logged in the system, he is directed to Instructor Homepage. At the right upper corners there are “Oturumu Kapat” and “Hesabı Düzenle” buttons. Main content of the screen is List of Courses that Instructor created and leaded. Instructor has the authorization to delete course by clicking “Dersi Sil” or creating a new cours by clicking “Ders Ekle”. If he wants to see or change the content of a course, he can select a course, go Course by “Derse Git” Button.

6.2.8 COURSE SCREEN FOR INSTRUCTOR

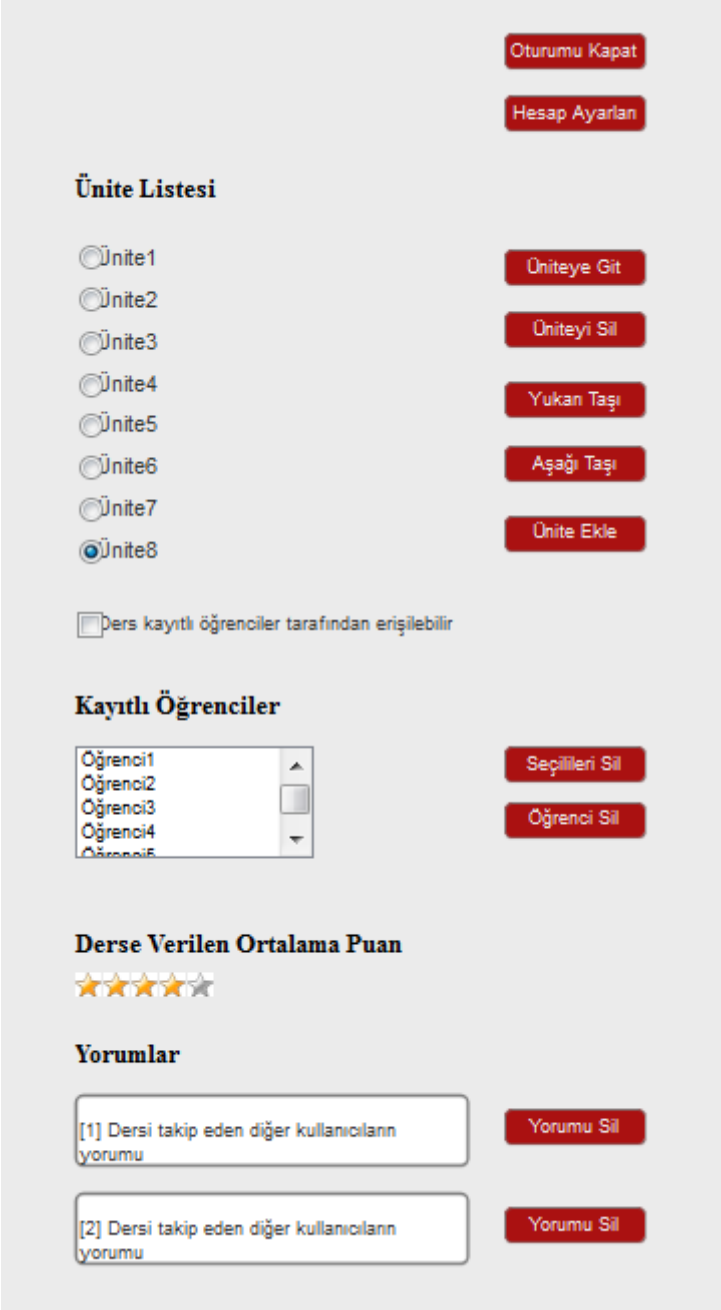


Fig22. Course Screen for Instructor

At this screen, there is a list of chapters. Instructor can change ordering of the chapter with “Yukarı Taşı” or “Aşağı Taşı” buttons. He can delete a chapter with “Üniteyi Sil”, add a new chapter with “Ünite Ekle” or go to selected Chapter with “Üniteye Git” buttons. Instructor determines the visibility of the Course to Learners with the check box. Below Course list, there is a list of student enrolled to the course. Instructor can delete a Learner or multiple with “Seçilenleri Sil”. He can also add Learner to the Course. Downward, there is an informative part which shows the Rate of the Course given by Learners. At the bottom, comments done by Learners are shown. Instructor can delete any irrelevant or inappropriate comment by clicking “Yorumu Sil” button.

6.2.9 CHAPTER SCREEN FOR INSTRUCTOR

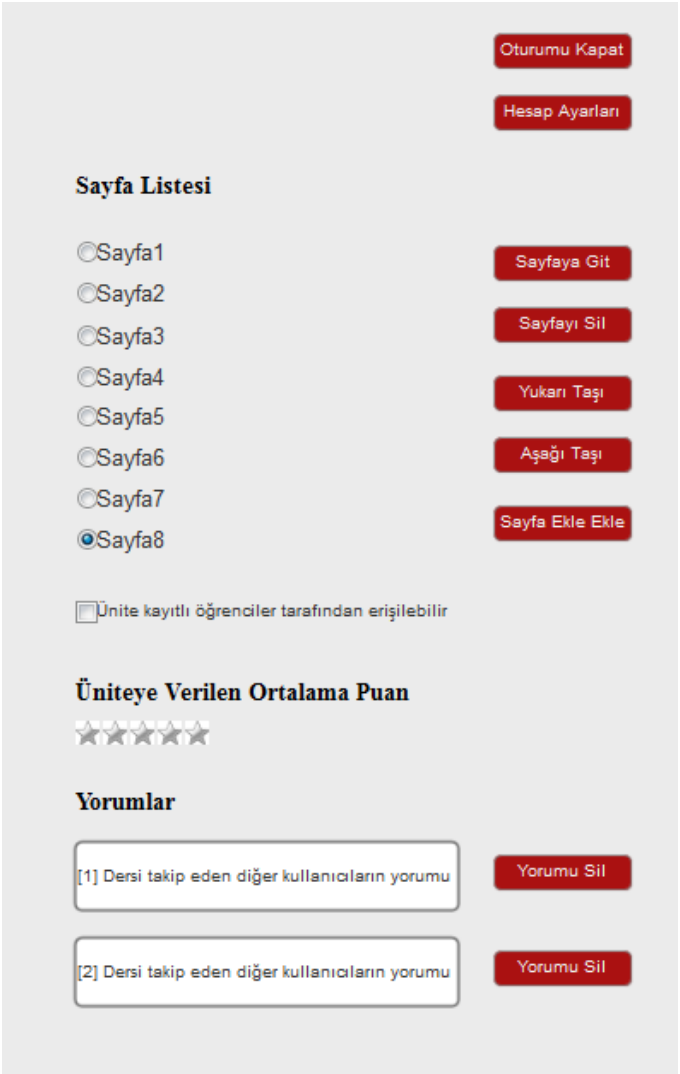


Fig23. Chapter Screen for Instructor

This screen is very similar to Course screen for Instructor. He can select a Page from Page list and change order of it, delete it or go that page. Instructor can determine visibility of the Chapter with checking or unchecking the check box. He sees the overall rating from Learners about the Chapter. Instructor is able to delete any comment done by Learners. When Instructor clicks the "Sayfa Ekle" to create new Page, he should select a template from Video-Image, Audio-Image, Image-Text and Image-Audio than he is directed to a new screen to compose Learners material.

6.2.10 PAGE SCREEN FOR INSTRUCTOR

Fig24. Page Screen for Instructor

In this screen, Instructor sees the content of the page (templates explained in the sections 6.2.6.1-6.2.6.4). Below the content he can change visibility of the page with check box. He can delete any comment done by Learners.

6.2.11 PAGE GENERATION

When Instructor wants to create a new Page, he faces possible options, four Page template (shown at 6.2.6 from Learner's perspective). In this section, generation process of the Page is shown from Instructor's perspective.

6.2.11.1 VIDEO-TEXT

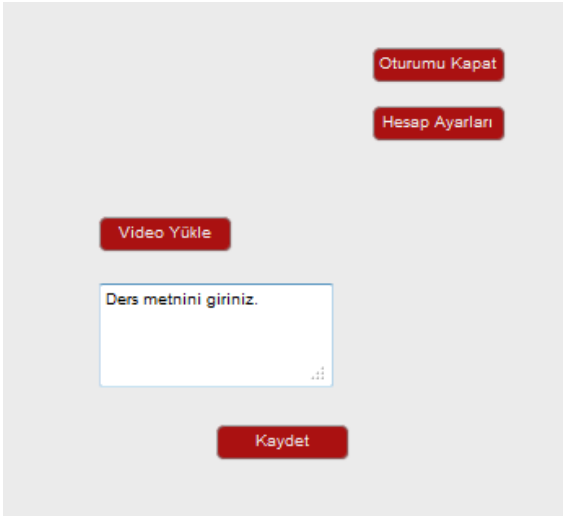


Fig25. Video-Text

This template contains two components: video and text. Instructor should upload a video by clicking the button "Video Yükle". He should enter text through the text box. In order to save the changes he should click "Kaydet" button.

6.2.11.2 AUDIO-TEXT

Fig26. Audio-Text

This template requests uploading audio file. Instructor can upload audio file by clicking “Ses Dosyası Yükle” button. He can use the text box below this button to enter learning material as taxt. To save the Page, Instructor must click “Kaydet” button.

6.2.11.3 IMAGE-TEXT

Fig27. Image-Text

When Instructor wants Learners to learn from the template described in 6.2.6.3, he uses this Page generator. He can upload image with clicking “Resmi Yükle” button. Text of the learning material should be entered to text box. After forming page, Instructor must click “Kaydet” button to save the Page.

6.2.11.4 IMAGE-AUDIO

Fig28. Image-Audio

In order to form a Page shown at the 6.2.6.4, Instructor should use this generator. He should upload ımage file through “Resmi Yükle” button and audio file through “Ses Dosyasını Yükle” button. After successfully uploaded material, Instructor must save work by clicking “Kaydet” button.

6.2.12 ADMIN HOMEPAGE

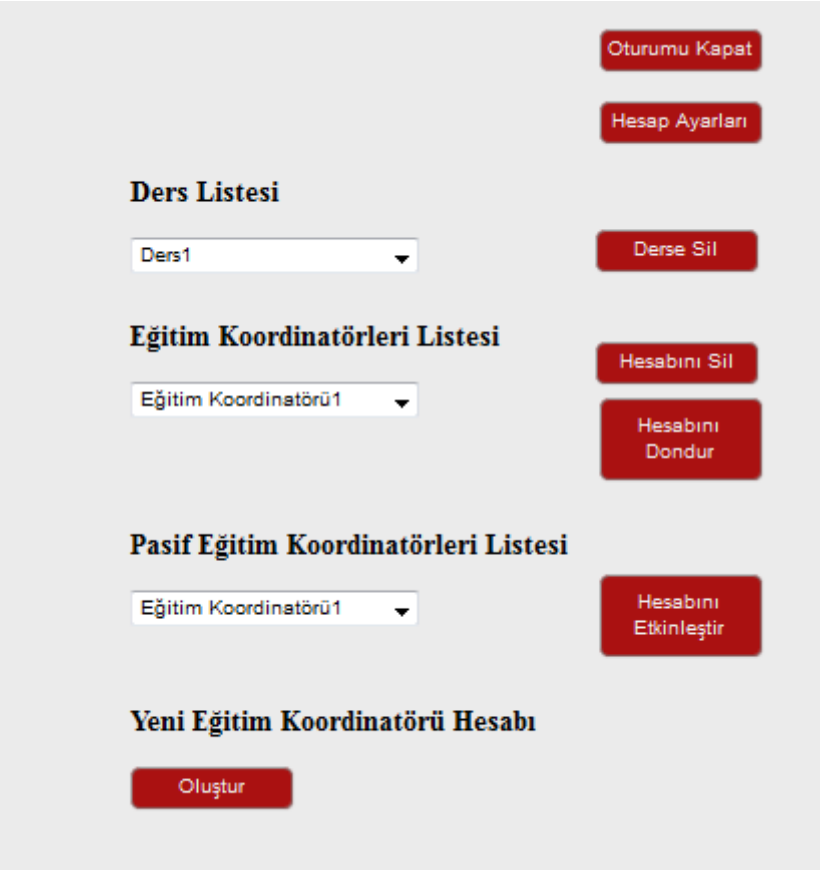


Fig29. Admin Homepage

Admin is directed after logging in the system to this screen. Admin’s permission is more than Instructor and Learner. He can delete course with selection from course list and clicking the “Dersi Sil” button. Admin can delete an Instructor account with selecting from Instructor List (shown as Eğitim Koordinatörleri Listesi) and clicking “Hesabı Sil” button. Another option is deactivation of Instructor account by clicking “Hesabı Dondur” button, thus the Instructor cannot use his account until Admin deactivate the account. There is another list of Instructors whose accounts are deactivated. Admin can chose Instructor from “Pasif Eğitim Koordinatörleri Listesi” and deactivates the account by clicking “Hesabı Etkinleştir” button. When Admins wants to add a new Instructor to the system, he can click “Oluştur” button.

6.3 SCREEN OBJECTS AND ACTIONS

Mobile Content Generator is interacted with user through a browser (workers whether on Desktop or on Mobile environment). Consequently screen object will be mainly HTML5 elements.

- **Label:** It is used for input fields. Where the user enters a text, this element will be used (username, password, name, etc.). Mainly used in login screen, sign up screen and page generate templates.

- **Check Box:** Especially used visibility of the Page / Chapter / Course to change by Instructor. When is checked the visibility by Learner type of user get changed.

- **Radio Button:** This element used in lists (lists of Courses / Instructors /Learners / Pages, etc.) to choose one element from the list. Generally selecting one used for directing current page to another Page.

- **Select:** Another element is select which is used to create drop lists. It is used several screens in the previous section.

- **Submit Button:** This button is used in every screen. One action of it is sending information that is already selected (like sign up page-Kayıt button). Another action is directing current page to target page ("Önceki Sayfa", "Sonraki Sayfa", "Hesap Ayarları", etc).

- **Image:** This component is used at Page Templates to show learning material as Image.

- **Audio:** In Audio-Text and Image-Audio there is a need for audio field. Audio tag meets the need of an audio player. Audio file can be listened without downloading it, stopped and replayed.

- **Video:** In the Video-Text template there is used a video player. HTML5 tag fulfills the requirement. All the functions can be done with is that is expected from an media player.

- **Pop-up Window:** Pop-up window is used to ease the upload period. When a user wanted to upload a material, pop-up window is opened and user doesn't have to wait until upload is finished to other things.

- **Rate:** Rate is used by both Instructor and Learner. Instructor sees the average rating of the current material. Student can submit a rate to current material, and the rating is send to database.

7 LIBRARIES AND TOOLS

- **UML:** The Unified Modeling Language (UML) is a standard language for specifying, visualizing, constructing, and documenting the artifacts of software systems, as well as for business modeling and other non-software systems. The UML represents a collection of best engineering practices that have proven successful in the modeling of large and complex systems.

- **MSSQL:** Microsoft SQL is a software product whose primary function is to store and retrieve data as requested by other software application. In shortly; this software provides database to store necessity information.

- **MS VISUAL STUDIO:** This is an integrated development environment from Microsoft. It is used to develop web services. This software works on compatible with MSSQL. This software's code editor support ASP.NET. Also this includes database schema designer. Integrated debugger works both as a source-level debugger and a machine-level debugger is a plus.

- **ASP.NET:** This is web application framework which is supported from .NET family. This allows programmers to build dynamic web sites and web applications. This framework contains libraries to make connection and run queries on MSSQL database.

- **KALTURA:** This is web site. This provides to store videos and publish desired video as desired quality, size etc. This support also JAVASCRIPT language to send and receive information about video. This website allows getting any information about video.

- **HTML5:** This is a markup language for structuring and presenting content for World Wide Web. This provides some syntactical features such as "<video>", "<audio>","<object>". This is supported from all web browsers.

- **JAVASCRIPT:** This is a prototype-based scripting language that is dynamic, weakly typed and has first-class functions. It is a multi-paradigm language, supporting object-oriented, imperative, and functional programming styles. This is supported from almost all web languages. This is primarily used in the form of client-side in order to provide enhanced user interfaces and dynamic websites.

- **CSS:** Cascading Style Sheet is a style sheet language used to describe the presentation semantics (the look and formatting) of a document written in a markup language. It's most common application is to style web pages written in HTML and XHTML. CSS is designed primarily to enable the separation of document content (written in HTML or a similar markup language) from document presentation, including elements such as the layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple pages to share formatting, and reduce complexity and repetition in the structural content (such as by allowing for web design without using table). CSS can also allow the same markup page to be presented in different styles for different rendering methods.

8 TIME PLANNING

This section contains two Gantt Chart to illustrate approximate schedule of the project at this term and next term.

8.1 TERM 1 GANTT CHART

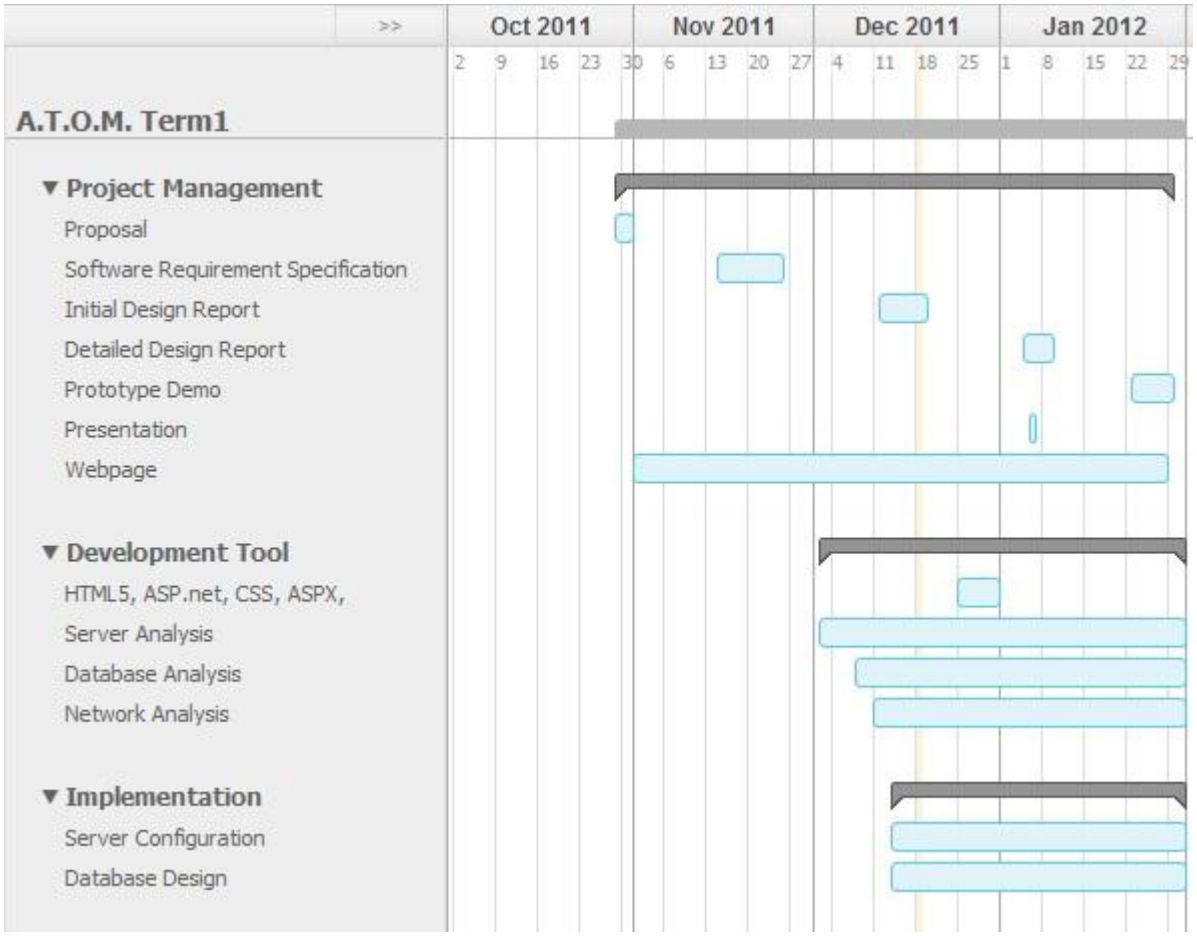


Fig30. Term1 Gantt Chart

8.2 TERM 2 GANTT CHART

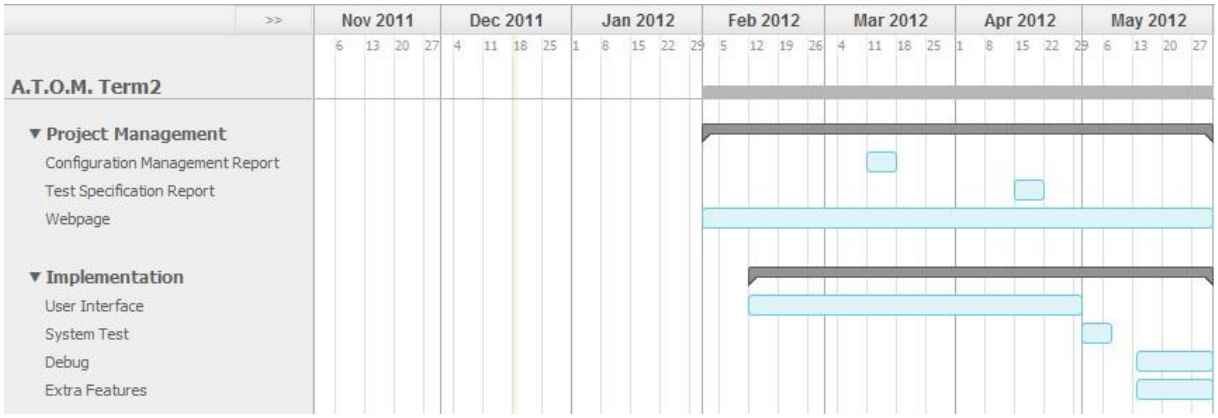


Fig30. Term2 Gantt Chart

9 CONCLUSION

This initial design report document gives initial design information about the project, Mobile Content Generator, which is web-based software that simplifies forming e-learning material for instructors and enables learners to reach the material through different platforms. At the beginning of this document, basic introduction of entire design is provided. Afterwards, general description of the software and assumptions, dependencies, constraints, goals and guidelines are clarified. In the data design part, data domain organization of the system is presented. Decomposition of the system to its components has been presented in system architecture section. Finally, user interfaces, libraries and tool and time planning of the project are provided.