Web Portal

PROJECT PLAN

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IOWA STATE | SENIOR DESIGN

1 CONTENTS

2 PROBLEM / NEED STATEMENT

Develop a web portal (WP) to diagnose learning styles. Handle user authentication for students and faculty to evaluate how students learn. Allow faculty to create questions that contain supplementary learning materials. Keep track of how much time students spend on these questions, and reviewing each of the supplementary learning materials. Supplementary learning materials may include (but are not limited to): youtube videos, diagrams, and readings.

3 CONCEPT SKETCH

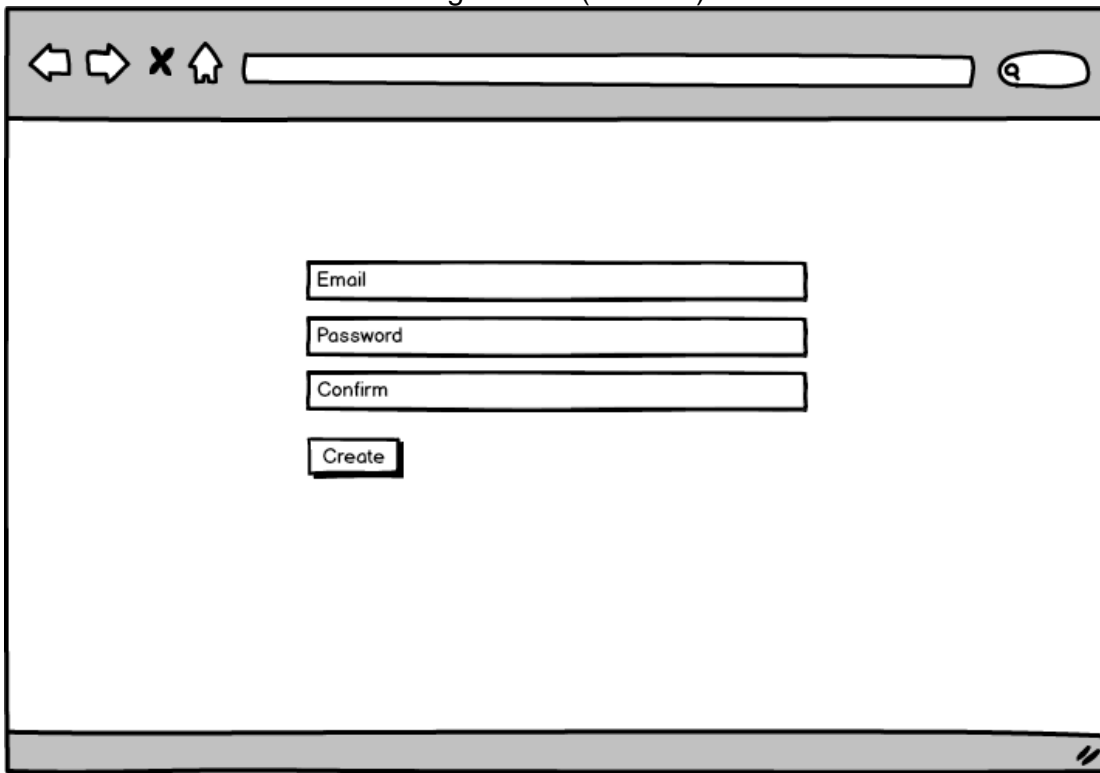Login (Student or Instructor)

Registration (Student)
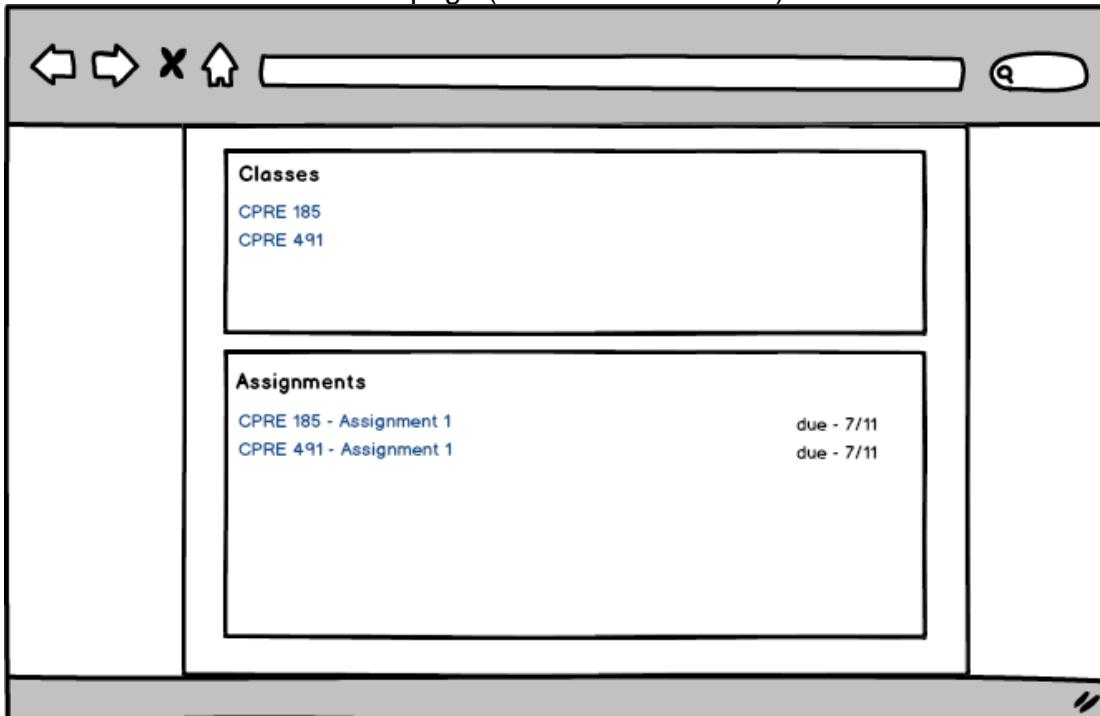
Email

Password

Confirm

Create

Homepage (Student or Instructor)

Classes

CPRE 185
CPRE 491

Assignments

CPRE 185 - Assignment 1   due - 7/11
CPRE 491 - Assignment 1   due - 7/11

Take a quiz (Student)

Question 1

Paragraph explaining question 1.

Reading 1   Reading 3

Reading 2   Reading 4

○ Answer 1   ○ Answer 2   ○ Answer 3   ○ Answer 4

Question 2

Paragraph explaining question 2.

○ Answer 1   ○ Answer 2

○ Answer 3   ○ Answer 4

Quiz builder (Instructor)

Layouts

Option 1
Option 2
Option 3
Option 4

Components

Option 1
Option 2
Option 3
Option 4

Title of question

Content area 1	Content area 2
Content area 3	Content area 4

Gradebook page

ENGL 101	CPRE 101
CPRE 101	
COMS 101	**Overall Grade:** 92% (A-)
CPRE 562	

Quiz 1:	92% (A-)
Quiz 2:	91% (A-)
Quiz 3:	93% (A)
Quiz 4:	Due in 2 days
Quiz 5:	Due in 9 days

Learning Analytics - Instructor

ENGL 101	CPRE 101
CPRE 101	How are your students doing?
COMS 101	
CPRE 562	

4   SYSTEM BLOCK DIAGRAM

Login /
Registration

Homepage

[Instructor content]*

News feed content

[Student content]*

Online quizzes

Personal Gradebook

Course builder tool

Gradebook tools

Learning analytics

Database
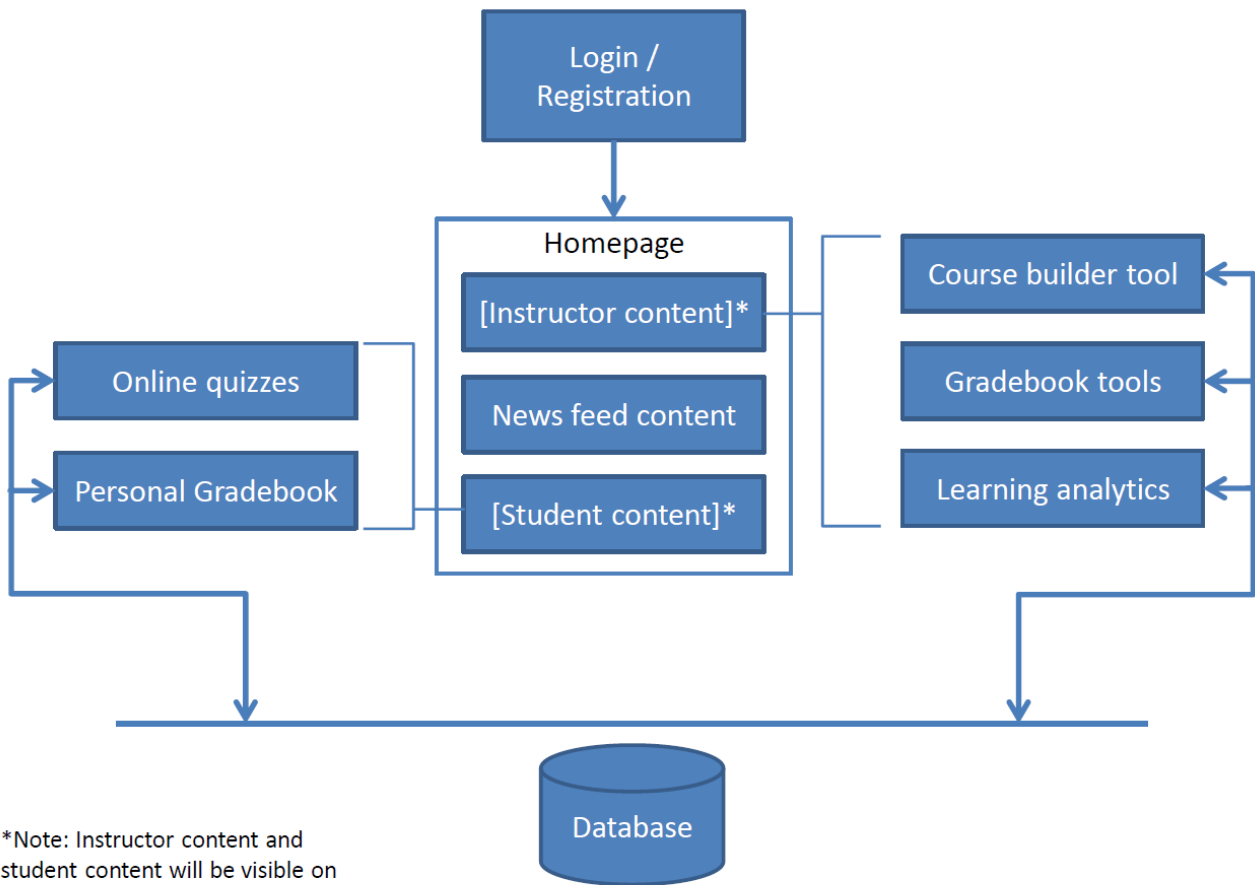
*Note: Instructor content and
student content will be visible on
the home page depending on the
type of user which is logged in.

5   SYSTEM DESCRIPTION

The system to be used for the web portal will consist of an Iowa State server to host the site
itself with a SQLite database to house all of the login information and content to be used on
the portal. Backend code will consist of python and the front end development will be in
Javascript and Html. Ajax calls in the javascript will allow communication between the user
interface and the backend.

6 OPERATING ENVIRONMENT

The environments capable of operating the web portal will be diverse. Anyone should be able to access this if the device in use takes advantage of a standard web browser either on a desktop, laptop, or mobile device. Web browsers that will be included in testing for functionality initially will include Google Chrome, FireFox, Internet Explorer, Safari, and Opera. The User Interface for all of these will have the same functionality, but may appear slightly different based on the operating system that is in use.

7 USER INTERFACE DESCRIPTION

7.1 LOGIN PAGE:

This page will have username and password fields to allow users to login. There will also be a button for creating an account.

7.2 MAIN PAGE(AUTHOR):

The author will be given a blank page and will allowed to select a grid layout from a list of possible layouts. Inside of the grid there will be areas where an author can place elements of their page. A few examples would be youtube videos, titles, or text fields for questions.

7.3 MAIN PAGE(STUDENT):

The student will see one question per page based on what the author of the page has created for the student. The student will then have a method of answering the question(multiple choice, essay, buttons) based on what the author provides them. There will also be a submit button at the bottom of every page. At the top of every page there will be an account bar for login and account management.

7.4 REGISTRATION PAGE:

This page will contain lists and text fields for selecting courses.

8 FUNCTIONAL REQUIREMENTS

8.1 AUTHENTICATION
   a. Simple login/logout system with basic auth
   b. User registration for students
   c. Have two tiers: Student/Professor/Admin
      i. The student can view questions, submit responses, and view their own results.
      ii. The professor has all of the power of a student, but they can also create and modify questions, add students to their classes, and view responses from their classes.
      iii. The admin has all of the power of a professor, but they can also add professors to classes, and add professors to the system.

   d. Stretch goal - support authentication with blackboard credentials.

8.2 CREATE QUESTIONS
   a. Allow professors to create questions and assign these questions to specific assignments.
   b. Questions are made up of, the question, any potential responses, and supplementary material.
      i. Supplementary material can include videos, text, or images.

8.3 ANSWER QUESTIONS.
   a. Students can answer questions from their assignments
   b. Students can view supplementary material from their assignments.
   c. Students can only view one question at a time.
      i. The student can view questions, submit responses, and view their own results
      ii. The professor has all of the power of a student, but they can also create and modify questions, add students to their classes, and view responses from their classes
      iii. The admin has all of the power of a professor, but they can also add professors to classes, and add professors to the system.

   d. Stretch goal - support authentication with blackboard credentials

8.4 EVALUATE RESPONSES
   a. Professors can evaluate responses from their students.
   b. This evaluation will include access to metrics including time spent on question, which supplementary materials were viewed, and for how long.

8.5 SIGN UP FOR CLASSES

    a. Students can sign up for the system
    b. Professors can add these students to their own classes

8.6 GRADES

    a. Professors can grade assignments
    b. Professors can submit feedback
    c. Students can view grades for courses and for individual assignments

9 NON-FUNCTIONAL REQUIREMENTS

9.1 UI DESIGN

    a. Design/answering buttons at most 3 clicks away

9.2 SPEED

    a. Response calls from server come back within 1000 ms
    b. Load time of home page 1500 ms

9.3 SCALABILITY

    a. Able to extend to other teaching communities

9.4 MAINTAINABILITY

    a. Code readability
    b. Low Coupling

9.5 TESTING

    a. 65% test code coverage (python)
    b. TDD (Test Driven Development)

9.6 MISCELLANEOUS

    a. Analytics report generated after each answered question

10 MARKET AND LITERATURE

There is no question that education is a prominent path in our society, counting for at least 12 years of most people's lives. With such a wide audience, not everyone is able to be educated in the same way as others, as for there is not a foolproof education plan set. This undoubtedly allows space in the market for new more effective learning styles.

Trying to find a solution to help maximize a learning method is very difficult. There are many proven/disproven methods available to date. However the Web Portal project will be inheriting the Habermas and Grundy as a cognitive learning method. This learning style contains three main parts of cognitive development including technical aspects of learning (theoretical stage), practical stage, and the emancipator interest stage. The first stage is where the students learn while memorizing and following rules. The second stage, the students take the concepts they learned and applying them to various problems. The scopes of problems in this stage are narrowed, with reduced difficulty to that of real world problems. The third stage allows students questions from "what" to "why". This allows the student to broaden their mind sets and determine many factors that affect the problem. Most of the development and growth usually comes from this final stage.

11 DELIVERABLES

1. An online application, where professors can create questions and evaluate responses
2. An online application, where students can answer questions and receive results

12 WORK PLAN:

12.1 WORK BREAKDOWN STRUCTURE
Gantt Chart:
https://docs.google.com/a/iastate.edu/spreadsheets/d/1YRSOunVZ9ov-Ab6IMpl-IIz9okY_WwuNB1jAWtLFm_I/edit#gid=0

12.2 RESOURCE REQUIREMENTS
Physical capital:
Partition of a high availability server on the Iowa State that will host our learning portal website. There will be no significant speed requirements. We anticipate roughly 50GB of database space will be needed per semester. If classes will persist for multiple semesters, or be re-taught, the storage space on our server will need to expand to accommodate.

Software capital:

There will be no notable costs for purchasing or licensing software that will be used in this project. All of the tooling we will use is freely available. We expect that database software will be provided by Iowa State.

12.3 PROJECT SCHEDULE

See Gantt chart in section 11.1 for detailed schedule.

Semester 1:

September: Design document, Screen Sketches
October: Setup server environment, Login / Logout / Registration functionality
November: Teacher perspective : Course and question builder
December: Teacher perspective : Course and question builder

Semester 2:

January: Teacher perspective : Course and question builder
February: Student perspective : Sign up for classes, and take questions
March: Teacher perspective : student response analytics
April: Teacher perspective : student response analytics
May: Final testing and bug fixes

12.4 RISKS

Risk	Probability of Occurrence	Criticality (1-100)	Risk Factor	Mitigation Strategy
Loss of team member (or non contributing team member)	.05	60	3	Have solid group communication and document as much work as possible.
The project is not completed on time.	0.2	80	16	We are beginning the development work for this sprint early, and we have a development plan firmly in place for future sprints.
Student data is stolen	.1	100	10	We will keep as little student data as possible. We will research good authentication practices.