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 authors 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. Authors will be able to view analytics which will correlate student performance to the type and duration of supplementary materials students consumed. A hidden grade will be displayed to assignment authors, based upon how well the student made use of supplementary materials.

3 CONCEPT SKETCH
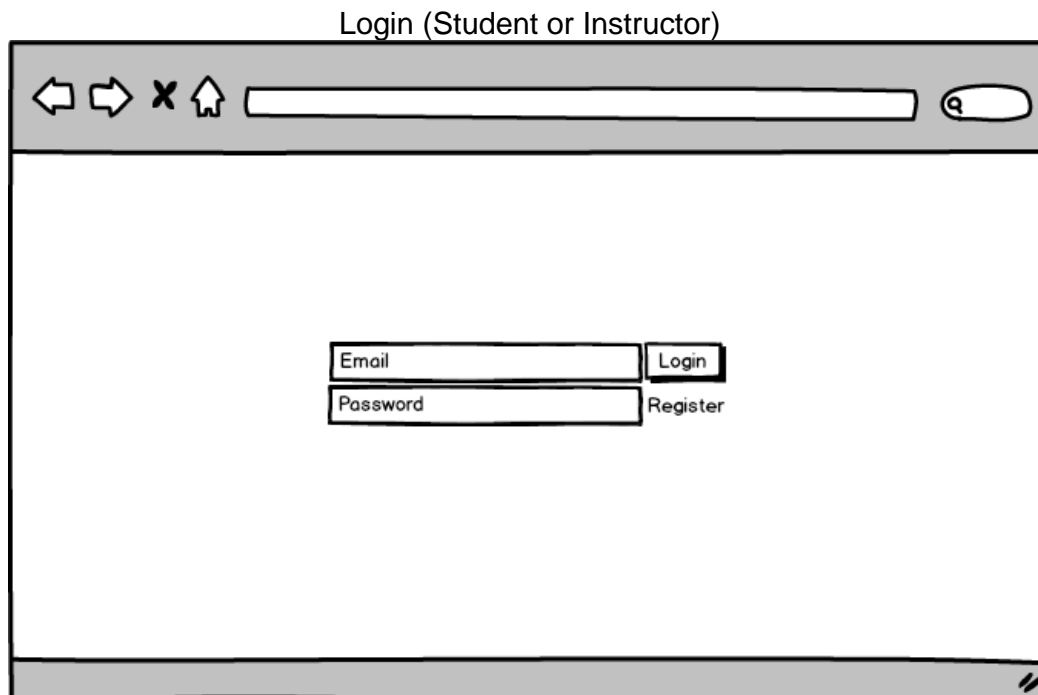
Login (Student or Instructor)

Registration (Student)

Email

Password

Confirm

Create

Homepage (Student or Instructor)
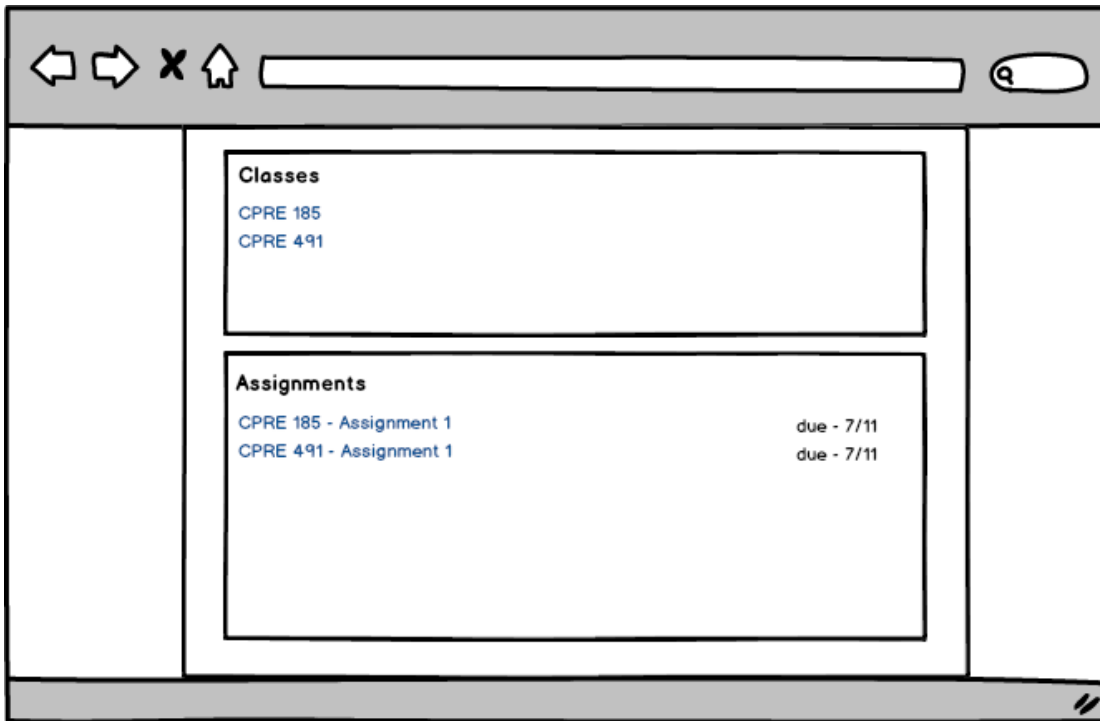
Take a quiz (Student)
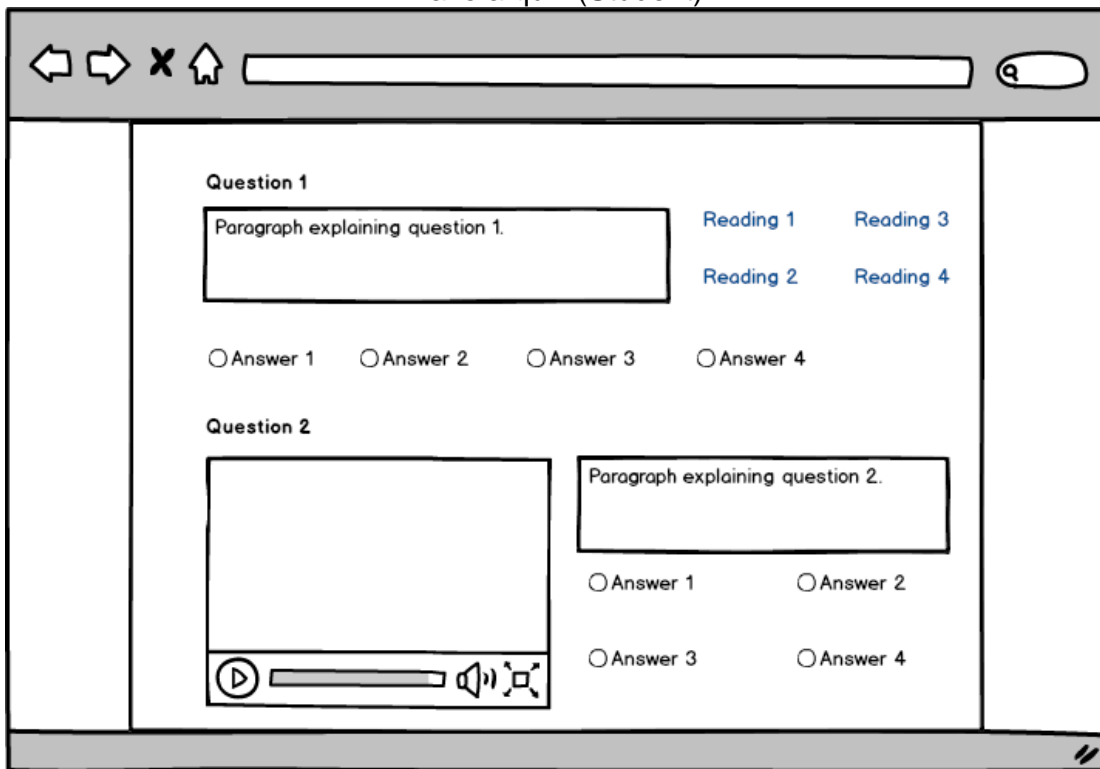
Quiz builder (Instructor)

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
COMS 101
CPRE 562

CPRE 101

Overall Grade:	92% (A-)
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
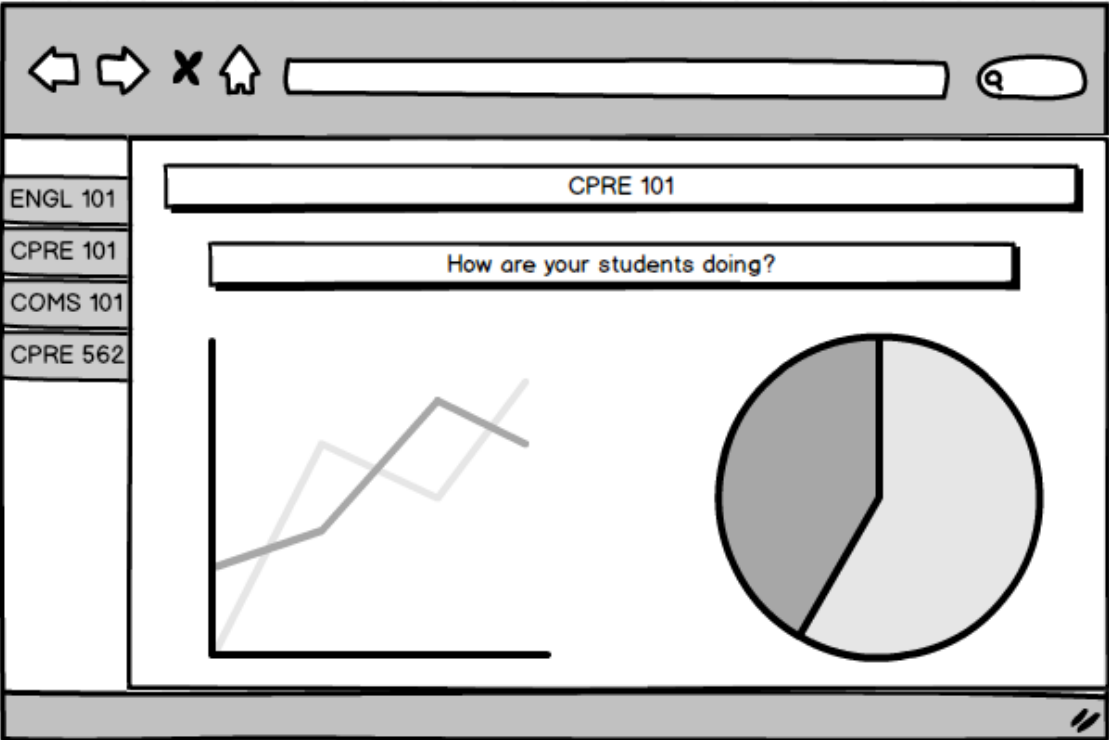
4 SYSTEM BLOCK DIAGRAM
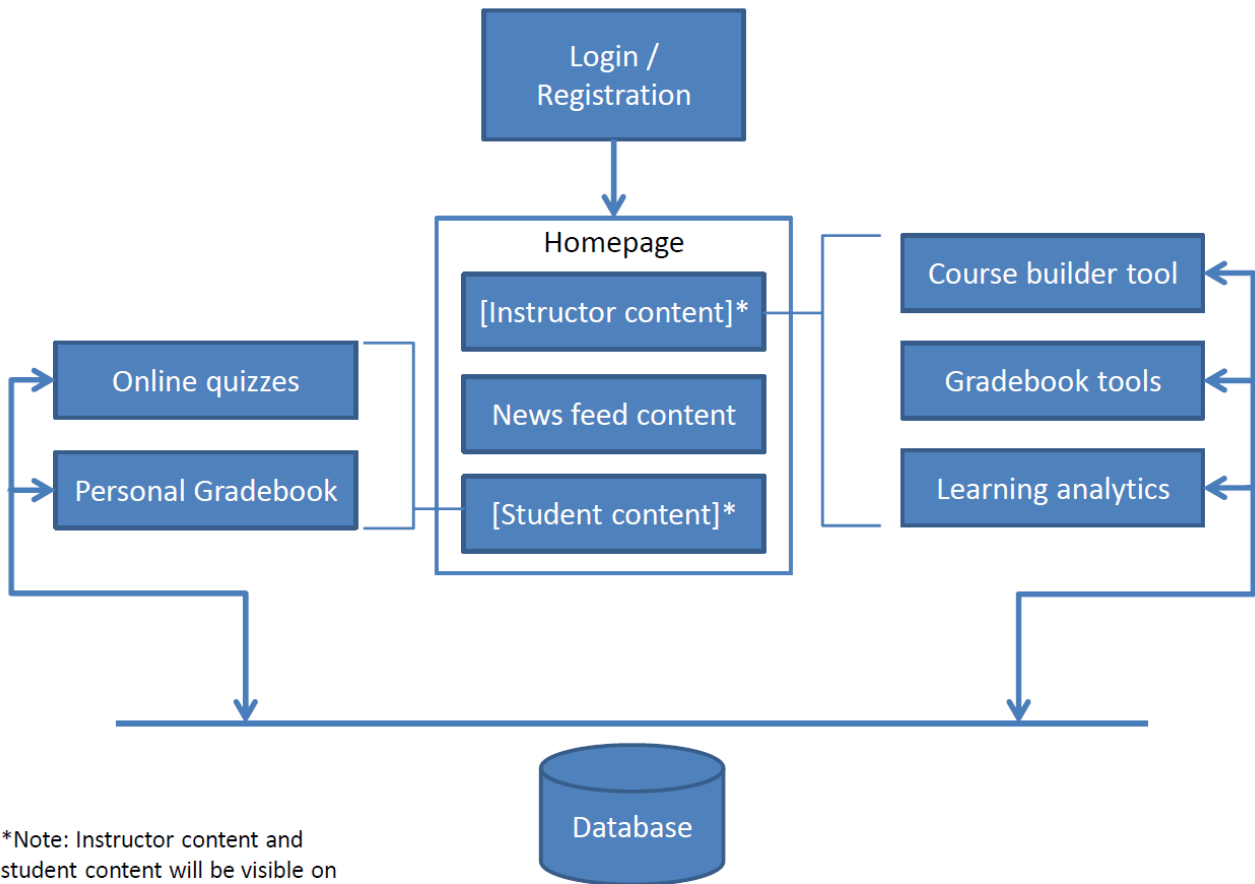
*Note: Instructor content and student content will be visible on the home page depending on the type of user which is logged in.

5 SYSTEM DESCRIPTION

The system to be used for the web portal will consist of an Iowa State Apache server that will host the site itself with a SQLite database to house all of the login information and content to be used in the portal. Backend code will consist of python and the front end development is developed in Javascript and Html. Ajax calls in the javascript will allow communication between the user interface and the backend. There is a user hierarchy that is used to determine who has access to different aspects of a page. These are levels consist of student, author, admin, and super admin.

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 use information the Habermas and Grundy cognitive learning study. 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 authors can create questions and evaluate responses
2. An online application, where students can answer questions and receive results
3. An online application that will create a hidden score based upon how many supplementary materials the student views, and for how long

12 WORK PLAN:

12.1 WORK BREAKDOWN STRUCTURE

Gantt Chart:

ACTIVITY	PLAN START	PLAN DURATION	ACTUAL START	ACTUAL DURATION	PERCENT COMPLETE
Team Formation	1	1	1	1	100%
Language Choice	2	1	2	1	100%
Github Tutorial	3	1	3	1	100%
Python Tutorial	4	1	4	1	100%
Login/Logout	5	2	5	2	80%
Project Plan Version 1	5	1	5	1	100%
Project Design/Design Documents	6	1	6	1	100%
Registration	6	1	6	1	80%
Database	7	3	7		70%
General Website Layout	6	1	6	1	100%
Course Creation View	10	3	10	3	80%
Author Course Invite	9	2	9	2	50%
Student Add Class (Passcode)	12	2			0%
Homepage	7	3	7		50%
Task Creator Navigation	7	3	7		80%
Task Creator Layout	7	3	7		80%
Task Creator Supplementary	8	3	8		80%
Student Complete Task	12	2			0%
Question Viewer Student View	12	3			0%
Question Response	12	3			0%
Results View Author	19	3			0%
Results View Student	19	3			0%
Response Analytics	19	3			0%
Project Plan Version 2	11	1	11	1	100%

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: Author perspective : Course and task creator
December: Student perspective : Sign up for classes, and complete tasks

Semester 2:
January: Author perspective : student response analytics
February: Improvements to existing functionality/ user experience
March: Improvements to existing functionality/ user experience
April: Final testing and bug fixes
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.