

# Customized Learning Assessment Generation

April 2024

## 1 Problem Statement

With the implementation of National Education Policy 2020, and shift of focus towards holistic education, our traditional textbooks, teaching methods and assessment strategies are becoming obsolete.

The teaching methods need to incorporate external factors like background, students' interests, practical application, moral responsibility in addition to the course content to ensure a holistic understanding of any topic. Even the assessments should not only test textbook knowledge but also test how well the student can apply it to real-life scenarios, enabling them to relate to the subject in an interactive space.

Though the above scheme has promising advantages, designing such questions is very time-consuming and demanding for the instructor.

This gives rise to the need of an automated customized assessment generation software that can create relevant, enjoyable and brain-teasing assessments for the students with minimum effort.

## 2 Approach Towards Problem

With the increasing need for individualistic attention to student learning, we make the use of advancements in technology to assist teachers in these tasks.

We leverage Large Language Models (LLMs) alongside the MERN Stack to aid teachers in creating customized assessments tailored to judge comprehension levels of individual students.

## 3 Designing The Application

The web application has mainly 3 pages:

- **New Assessment Page**  
This is the landing page of the website. It consists of a form where the user can enter topic, number of questions, question type, context keywords and upload relevant PDFs to be referred to for assessment generation. After filling the form, the user can click on Submit button to view the assessment generated.
- **Edit Assessment Page**  
When the assessment is generated, the user is redirected to this page. Here the user can modify any of the questions or sample answers to improve the quality of the assessment. On clicking the save button, he is asked whether he would like to overwrite the changes or save as a new copy. According to the option selected, the assessment is saved to the database. There is also an option to export it as docx or pdf.
- **History Page**  
On this page, all the assessments generated on the web application are displayed with their respective date and time of generation. The user can click on the name of any of these and view the assessment (in its latest version), make changes to it, save it and export it as PDF/docx.

## 4 Demonstrating The Flow Of Application

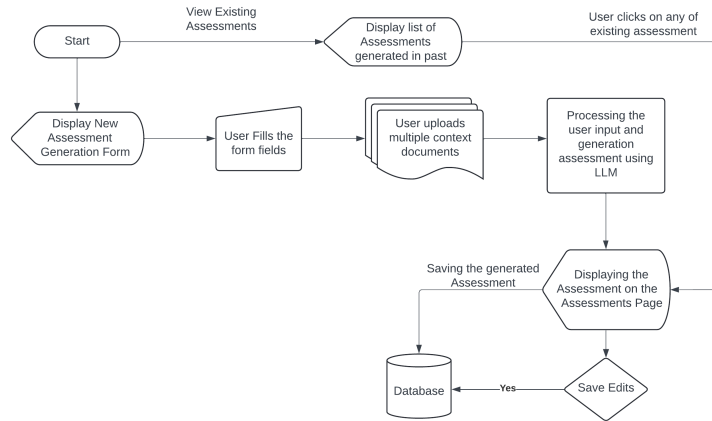


Figure 1: Workflow of Application

## 5 Glimpse Into The UI

Generate New Assessment
View Existing Assessments

### New Assessment

Error the main topic or subject of the Assessment to be Generated. (NOTE: The character limit is 125)

\* Topic:

Choose the type of questions registered in the Assessment from the options provided.

\* Type of Assessment:

Error the number of questions in the Assessment (NOTE: The maximum limit is 20)

\* Number of Questions:

In this field you can enter the contextual keywords (i.e., specific concepts which aim to be integrated with the main topic for Assessment Generation)

Contextual Keywords:

You can upload file(s) for providing the content for Assessment Generation

Upload PDF:  Upload

Close

Figure 2: New Assessment Generation Page

Generate New Assessment
View Existing Assessments

The below assessment has 10 short answer question(s) on the topic 'Thermodynamics'.  
No context keywords were supplied.  
No context PDF files were uploaded.

### Assessment Questions

Question 1

What is the first law of thermodynamics? [🔗](#)

Sample Answer

The first law of thermodynamics, also known as the Law of Conservation of Energy, states that energy cannot be created or destroyed in an isolated system. [🔗](#)

Question 2

What is the second law of thermodynamics? [🔗](#)

Sample Answer

The second law of thermodynamics states that the entropy, or disorder, of an isolated system will always increase over time. [🔗](#)

Figure 3: Assessment Page for Short Answers

Generate New Assessment
View Existing Assessments

The below assessment has 7 mcqs question(s) on the topic 'thermodynamics'.  
Context keywords: entropy and 1st law.  
No context PDF files were uploaded.

### Assessment Questions

Question 1

What is entropy according to the second law of thermodynamics? [🔗](#)

Options

☒ A. A measure of system's disorder [🔗](#)

☐ B. A measure of system's energy [🔗](#)

☐ C. A measure of system's temperature [🔗](#)

☐ D. A measure of system's pressure [🔗](#)

Question 2

What is the mathematical expression for entropy change in a reversible process? [🔗](#)

Figure 4: Assessment Page for MCQs

Generate New AssessmentView Existing Assessments

The below assessment has 2 long answer question(s) on the topic 'particle physics'.  
No context keywords were supplied.  
No context PDF files were uploaded.

Assessment Questions

Question 1

Explain the concept of quarks and leptons, their role in the Standard Model, and how they contribute to the fundamental forces in the universe. [🔗](#)

Sample Answer

Quarks and leptons are elementary particles that form the basis of matter in the universe, according to the Standard Model. Quarks combine to form protons and neutrons, while leptons include electrons and neutrinos. They interact via four fundamental forces: electromagnetic, strong, weak, and gravitational forces. Quarks experience the strong force via color charge, while leptons do not. Both quarks and leptons participate in the electromagnetic and weak forces, leading to phenomena such as radioactive decay and the emission and absorption of photons. [test 🔗](#)

Question 2

Discuss the Higgs boson, its discovery, and the implications of its existence for our understanding of particle physics and the universe. [🔗](#)

Sample Answer

The Higgs boson is a unique particle, first proposed by Peter Higgs and others in the 1960s, that is associated with the Higgs field, a field that permeates the universe and gives other particles mass. Its discovery in 2012 by the ATLAS and CMS experiments at the Large Hadron Collider confirmed the existence of the Higgs field and the Standard Model's predictions about the particle's properties. The Higgs boson's existence has profound implications for our understanding of the universe, including the nature of mass, the early universe, and the possibility of new physics beyond the Standard Model. [🔗](#)

Figure 5: Assessment Page for Long Answers

Generate New AssessmentView Existing Assessments

List of Already Generated Assessments

Sort: From Recent to Oldest

Search by topic

Assessment on Industrial revolution

Last modified: 2024-04-18 10:13:28

Question Type: long answer

Assessment on thermodynamics

Last modified: 2024-04-17 20:18:07

Question Type: mcqs

Assessment on thermodynamics

Last modified: 2024-04-17 19:59:34

Question Type: mcqs

Assessment on thermodynamics

Last modified: 2024-04-17 17:39:37

Question Type: mcqs

Assessment on Software design

Last modified: 2024-04-17 18:14:37

Question Type: mcqs

Assessment on Design and analysis of software systems

Last modified: 2024-04-18 22:57:43

Question Type: Long Answer

Assessment on quantum computing

Last modified: 2024-04-18 17:41:17

Question Type: Short Answer

Assessment on Shakespeare's Plays

Last modified: 2024-04-13 20:00:20

Question Type: mcqs

Assessment on Thermodynamics

Last modified: 2024-04-13 19:56:29

Question Type: Short Answer

Assessment on Thermodynamics

Last modified: 2024-04-13 18:50:49

Question Type: Short Answer

Assessment on Thermodynamics

Last modified: 2024-04-13 19:50:29

Question Type: Short Answer

Assessment on Machine Learning

Last modified: 2024-04-13 19:48:22

Question Type: mcqs

Assessment on Thermodynamics

Last modified: 2024-04-13 19:47:40

Question Type: Short Answer

Assessment on Thermodynamics

Last modified: 2024-04-13 19:46:40

Question Type: Short Answer

Assessment on Thermodynamics

Last modified: 2024-04-13 18:45:14

Question Type: Short Answer

12345>

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Figure 6: Existing Assessment Page