CEBU INSTITUTE OF TECHNOLOGY UNIVERSITY

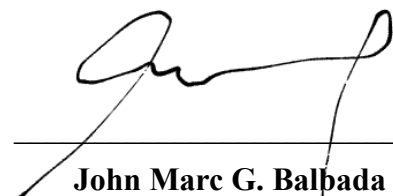## COLLEGE OF COMPUTER STUDIES

Software Test Document

for

TechnoDynamic V2: AI-Enhanced Dynamic Content
for Technopreneurship

Signature

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Change History

Version No.	Revisions or Additions Made	Date	Revised by
0.1	● Finalized File Outline	16/09/2024	Obiso, Jason Carlo O.
0.6	● Revised Test Plan ● Added Test Cases 3.1 - 3.8 with Purpose, Inputs, Expected Outputs & Pass/Fail Criteria, & Test Procedure	20/09/2024	Obiso, Jason Carlo O.
1.0	●	XX/09/2024	Obiso, Jason Carlo O.

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1. Introduction

1.1. System Overview

TechnoDynamic V2 is an AI-enhanced learning management system aimed at improving Technopreneurship courses by providing teachers with content recommendations based on insights gathered from student FAQs. The system enhances teaching efficiency and optimizes content by addressing common student inquiries and areas of confusion.

1.2. Test Approach

The system will undergo functional and non-functional testing. Each module will be tested individually using black-box testing techniques to verify functionality against the defined requirements. Integration testing will ensure that the interactions between modules work as expected, followed by system testing to validate the entire system's performance. The goal is to ensure that the AI-based content suggestions work correctly and that users can interact with the system without issues.

1.3. Definitions and Acronyms

- **AI**: Artificial Intelligence

- **Dynamic Content**: Adaptable educational material generated by the system based on student feedback.

- **FAQ**: Frequently Asked Questions

- **NLP**: Natural Language Processing

2. Test Plan

2.1 Features to be Tested

- **Module 1: Teacher Profile**
    - 1.1 Set Notification Thresholds
    - 1.2 Configure Context Similarity Threshold
    - 1.3 Enable/Disable V2 Features

- **Module 2: Student Lesson Page**
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2.2 Features not to be Tested

- **TechnoDynamic V1 Modules**: Previously implemented features will not be tested again, as they are already confirmed functional.

2.3 Testing Tools and Environment

- **Testing Tools**: Postman (for API testing)

- **Environment:** Windows 10/11, Python virtual environment for backend testing, PostgreSQL database, and modern browsers (Chrome, Firefox, Edge, or Opera) for frontend testing using Node.js.

- **Database**: Database Client (viewing of PostgreSQL database)

3. Test Cases

3.1 Module 1: Teacher Profile

3.1.1 Set Notification Thresholds

3.1.1.1 Purpose
The purpose of this feature is to allow teachers to control and manage the flow of notifications, ensuring they are not overwhelmed by too many alerts at once.

3.1.1.2 Inputs
- Numerical value representing the maximum number of notifications allowed at one time (e.g., 5, 10, 20).

3.1.1.3 Expected Outputs & Pass/Fail Criteria
- **Output**: Notifications will be capped according to the teacher's selected threshold.
- **Pass Criteria**: Notifications do not exceed the set limit.
- **Fail Criteria**: Notifications exceed the set limit, or no notifications are received.

3.1.1.4 Test Procedure
1. Log in as a teacher.
2. Navigate to the notification settings in the profile.
3. Set a custom notification threshold (e.g., 5).
4. Trigger multiple notifications to test the cap.
5. Verify that the number of notifications received matches the set threshold.
6. Repeat with different thresholds to ensure functionality.

3.1.2 Configure Context Similarity Threshold

3.1.2.1 Purpose
The purpose of this feature is to allow teachers to set a threshold for the similarity of content suggestions based on student queries or FAQ contexts, ensuring relevant and accurate AI-generated insights.

3.1.2.2 Inputs
- Numerical value between 1-10 representing the similarity threshold, where 1 is low similarity and 10 is high similarity.

3.1.2.3 Expected Outputs & Pass/Fail Criteria
- **Output:** AI-generated content suggestions will be filtered based on the set similarity threshold.
- **Pass Criteria:** Content suggestions match the similarity level set by the teacher, providing relevant insights.

- **Fail Criteria:** Suggestions either do not meet the similarity threshold or include irrelevant content.

3.1.1.4 Test Procedure

1. Log in as a teacher.
2. Navigate to the context similarity settings.
3. Set a similarity threshold between 1-10 (e.g., 7).
4. Generate content suggestions based on student FAQs or queries.
5. Verify that the suggestions align with the chosen similarity threshold.
6. Test with various threshold values to confirm accurate behavior.

3.1.3 Enable/Disable V2 Features

3.1.3.1 Purpose

The purpose of this feature is to allow teachers to enable or disable new V2 features, giving them control over the use of advanced functionalities in their workflow.

3.1.3.2 Inputs

- A click on an on/off switch to toggle V2 features.

3.1.3.3 Expected Outputs & Pass/Fail Criteria

- **Output**: V2 features are either activated or deactivated based on the toggle state.
- **Pass Criteria**: The features are correctly enabled or disabled after the switch is toggled.
- **Fail Criteria**: The toggle does not reflect the correct status, or features remain unchanged after toggling.

3.1.3.4 Test Procedure

1. Log in as a teacher.
2. Navigate to the settings for V2 features.
3. Click the on/off switch to enable or disable V2 features.
4. Verify the status of V2 features changes according to the toggle.
5. Confirm that the features work correctly when enabled and are unavailable when disabled.
6. Repeat the process to ensure consistent behavior.

3.2 Module 2: Student Lesson Page

3.2.1 Open/Close Chatbot Assistant

3.2.1.1 Purpose

The purpose of this feature is to allow users to open and close the chatbot assistant interface using the designated buttons, ensuring proper user interaction and functionality.

3.2.1.2 Inputs
- A click on the "Open Chatbot" button to open the assistant.
- A click on the "X" button to close the assistant.

3.2.1.3 Expected Outputs & Pass/Fail Criteria
- **Output**: The chatbot window opens when the "Open Chatbot" button is clicked and closes when the "X" button is clicked.
- **Pass Criteria**: The chatbot opens and closes correctly with the respective button clicks.
- **Fail Criteria**: The chatbot does not open or close as expected when the buttons are clicked.

3.2.1.4 Test Procedure
1. Navigate to the interface with the chatbot assistant.
2. Click the "Open Chatbot" button.
3. Verify that the chatbot assistant opens.
4. Click the "X" button to close the chatbot assistant.
5. Confirm that the chatbot assistant closes properly.
6. Repeat the process to ensure consistent behavior.

3.2.2 Converse with Chatbot Assistant

3.2.2.1 Purpose
The purpose of this feature is to test whether the chatbot assistant accurately responds to student queries and provides helpful feedback.

3.2.2.2 Inputs
- A question or query entered by the student into the chatbot.

3.2.2.3 Expected Outputs & Pass/Fail Criteria
- **Output**: The chatbot responds to the student's question with a relevant and accurate answer.
- **Pass Criteria**: The chatbot correctly processes the question and provides an appropriate response.
- **Fail Criteria**: The chatbot does not respond, provides irrelevant answers, or encounters an error.

3.2.2.4 Test Procedure
1. Open the chatbot assistant.
2. Type a relevant question (e.g., "What is the topic all about?").
3. Verify that the chatbot provides an accurate response to the query.
4. Test with various questions to confirm the chatbot handles different topics correctly.
5. Check for response speed and accuracy.
6. Close the chatbot after confirming the responses.

3.3 Module 3: Frequently Asked Questions (FAQ)

3.3.1 View FAQ

3.3.1.1 Purpose
The purpose of this feature is to allow teachers to view frequently asked questions (FAQs) from students, grouped by similar context, providing insight into common areas of confusion or interest.

3.3.1.2 Inputs
- A click on the notification that informs the teacher that a lesson has been suggested for change based on student FAQs.

3.3.1.3 Expected Outputs & Pass/Fail Criteria
- **Output:** The teacher is shown a list of FAQs grouped by similar context for the lesson in question.
- **Pass Criteria:** FAQs are displayed correctly, grouped appropriately by context.
- **Fail Criteria:** FAQs do not appear, are not grouped properly, or an incorrect set of FAQs is shown.

3.3.1.4 Test Procedure
1. Trigger a notification suggesting changes to a lesson based on FAQs.
2. Click on the notification to view the FAQs.
3. Verify that the FAQs are displayed and grouped by similar context.
4. Check that the FAQs match the lesson and address relevant student concerns.
5. Ensure all relevant FAQs are included and displayed properly.

3.3.2 View Conversation

3.3.2.1 Purpose
The purpose of this feature is to allow teachers to view the full conversation between a student and the system for a particular FAQ, providing deeper context and understanding of student queries.

3.3.2.2 Inputs
- A click on a specific FAQ question.

3.3.2.3 Expected Outputs & Pass/Fail Criteria
- **Output:** The full conversation between the student and the system related to the selected FAQ is displayed to the teacher.
- **Pass Criteria:** The conversation is displayed correctly, providing complete context for the FAQ.
- **Fail Criteria:** The conversation is missing, incomplete, or incorrectly linked to the

FAQ.

3.3.2.4 Test Procedure
1. View the list of FAQs as per the steps in 3.3.1.
2. Click on a specific FAQ question.
3. Verify that the complete conversation between the student and the system is displayed.
4. Ensure the conversation is relevant to the selected FAQ and provides the necessary context.
5. Test multiple FAQs to confirm that all associated conversations are displayed correctly.

3.4 Module 4: Notification

3.4.1 Receive Notification

3.4.1.1 Purpose
The purpose of this feature is to notify the teacher when a lesson is suggested for change due to frequently asked questions (FAQs) from students, ensuring they are aware of potential areas for content adjustment.

3.4.1.2 Inputs
- Accumulation of a sufficient number of similarly related student questions triggers a notification.
- The teacher is notified through the notification bell.

3.4.1.3 Expected Outputs & Pass/Fail Criteria
- **Output**: A notification pops up in the notification bell indicating that a lesson has been suggested for change based on student FAQs.
- **Pass Criteria**: The notification appears correctly when the condition is met (sufficient related questions).
- **Fail Criteria**: The notification does not appear, appears incorrectly, or appears without the required student input.

3.4.1.4 Test Procedure
1. Ensure multiple students submit similarly related questions for a lesson.
2. Wait for the system to accumulate the related questions.
3. Verify that the notification appears in the teacher's notification bell.
4. Confirm that the notification reflects the correct lesson and FAQ context.
5. Test with varying numbers of related questions to ensure proper notification triggering.

3.4.2 Close Notification

3.4.2.1 Purpose
The purpose of this feature is to allow the teacher to close a notification when the suggested

lesson content change is either accepted or ignored, ensuring the notification system functions efficiently.

3.4.2.2 Inputs
- The teacher accepts the suggested lesson content change or ignores it.

3.4.2.3 Expected Outputs & Pass/Fail Criteria
- **Output**: The notification is removed once the teacher accepts the lesson content change or ignores the suggestion.
- **Pass Criteria**: The notification closes properly upon teacher action (accepting or ignoring).
- **Fail Criteria**: The notification remains open despite the teacher's action or closes without the proper trigger.

3.4.2.4 Test Procedure
1. Trigger a notification by accumulating sufficient student FAQs.
2. Open the notification and review the suggested lesson content change.
3. Accept the change and verify that the notification closes.
4. Trigger another notification and this time ignore the suggestion.
5. Confirm that the notification closes after the suggestion is ignored.
6. Repeat the process to ensure consistent functionality.

3.5 Module 5: Ask for Insights / Ask for Content Page

3.5.1 Generate Insights

3.5.1.1 Purpose
The purpose of this feature is to display AI-generated insights based on the FAQs without leaving the current page, allowing teachers to view the insights on top of the lesson content seamlessly.

3.5.1.2 Inputs
- A button click on the "View Insights" button.

3.5.1.3 Expected Outputs & Pass/Fail Criteria
- **Output:** The insights are displayed on top of the lesson content on the current page without a redirect.
- **Pass Criteria:** Insights are displayed correctly on the current page when the "View Insights" button is clicked.
- **Fail Criteria:** Insights do not appear, are incorrectly displayed, or the page redirects instead of displaying the insights inline.

3.5.1.4 Test Procedure
1. Navigate to the lesson with FAQs.
2. Click on the "View Insights" button.
3. Verify that the insights appear on top of the current lesson content.
4. Ensure no page redirection occurs and that insights are relevant to the lesson.
5. Repeat the process to ensure consistent functionality.

3.5.2 Generate Content Page

3.5.2.1 Purpose
The purpose of this feature is to redirect the teacher to the Suggest Content Page, where they can review, accept, or ignore suggested content based on the gathered insights.

3.5.2.2 Inputs
- A button click on the "Suggest Content" button.

3.5.2.3 Expected Outputs & Pass/Fail Criteria
- **Output:** The user is redirected to the Suggest Content Page (Module 7) where suggested content can be accepted or ignored.
- **Pass Criteria:** The system correctly redirects to the Suggest Content Page when the "Suggest Content" button is clicked.
- **Fail Criteria:** The page does not redirect, or redirects to an incorrect page.

3.5.2.4 Test Procedure
1. Navigate to the lesson with FAQs.
2. Click on the "Suggest Content" button.
3. Verify that the system redirects to the Suggest Content Page.
4. Ensure the correct content suggestion options are available on the new page.
5. Repeat the process to ensure consistent functionality.

3.6 Module 6: Insights Page

3.6.1 View Insights

3.6.1.1 Purpose
The purpose of this feature is to display AI-generated insights based on student FAQs, providing teachers with useful information to improve lesson content.

3.6.1.2 Inputs
- No direct inputs. Insights generated from 3.5.1 should automatically be displayed.

3.6.1.3 Expected Outputs & Pass/Fail Criteria
- **Output**: The generated insights from the FAQs are displayed on the Insights Page.

- **Pass Criteria**: Insights are properly displayed and relevant to the lesson based on the generated FAQ data.
- **Fail Criteria**: Insights are missing, incorrectly displayed, or not relevant to the FAQ data.

3.6.1.4 Test Procedure
1. Ensure insights have been generated from 3.5.1.
2. Navigate to the Insights Page.
3. Verify that the insights are correctly displayed, match the FAQ context, and are relevant to the lesson.
4. Confirm the layout and format are clear and usable for the teacher.
5. Repeat to ensure consistent functionality.

3.6.2 Redirect to Content Page

3.6.2.1 Purpose
The purpose of this feature is to allow the teacher to use the "Suggest Content" button on the Insights Page to modify lesson content based on the provided insights, redirecting to the Content Page for further action.

3.6.2.2 Inputs
- A click on the "Suggest Content" button.

3.6.2.3 Expected Outputs & Pass/Fail Criteria
- **Output**: The system redirects to the Suggest Content Page where the teacher can review, accept, or ignore content suggestions.
- **Pass Criteria**: The system successfully redirects to the Content Page when the "Suggest Content" button is clicked.
- **Fail Criteria**: The system does not redirect or the system redirects to the wrong page.

3.6.2.4 Test Procedure
1. Ensure you are on the Insights Page.
2. Click on the "Suggest Content" button.
3. Verify that the system redirects to the Suggest Content Page.
4. Confirm that the suggested content options are correctly displayed on the new page.
5. Repeat the process to confirm consistent behavior.

3.7 Module 7: Accept/Ignore Content Page

3.7.1 Regenerate Content

3.7.1.1 Purpose
The purpose of this feature is to allow the teacher to regenerate the suggested content if the

initial suggestion is unsatisfactory, providing an updated content recommendation.

3.7.1.2 Inputs
- A click on the "Regenerate Content" icon.

3.7.1.3 Expected Outputs & Pass/Fail Criteria
- **Output:** The system generates a new content suggestion based on the same insights.
- **Pass Criteria:** New content is generated and displayed to the teacher.
- **Fail Criteria:** The content remains unchanged or the new suggestion is not displayed correctly.

3.7.1.4 Test Procedure
1. Navigate to the Accept/Ignore Content Page.
2. Click the "Regenerate Content" icon.
3. Verify that new content is generated and displayed.
4. Confirm the newly suggested content is different from the original.
5. Repeat the process to ensure consistent behavior.

3.7.2 Accept Content

3.7.2.1 Purpose
The purpose of this feature is to allow the teacher to accept the suggested content, approving it for use and redirecting to the Revert Content Page for further actions.

3.7.2.2 Inputs
- A click on the "Accept" button.

3.7.2.3 Expected Outputs & Pass/Fail Criteria
- **Output:** The teacher accepts the suggested content, and the system redirects to the Revert Content Page.
- **Pass Criteria:** The system redirects correctly and confirms the content acceptance.
- **Fail Criteria:** The content is not accepted, or the system fails to redirect to the correct page.

3.7.2.4 Test Procedure
1. On the Accept/Ignore Content Page, click the "Accept" button.
2. Verify that the content is accepted and the system redirects to the Revert Content Page.
3. Confirm that the accepted content is now available for further actions.
4. Repeat the process to ensure consistent functionality.

3.7.3 Ignore Content

3.7.3.1 Purpose
The purpose of this feature is to allow the teacher to ignore the suggested content and be

redirected to the home page without accepting the suggestion.

3.7.3.2 Inputs
- A click on the "Ignore" button.

3.7.3.3 Expected Outputs & Pass/Fail Criteria
- **Output:** The suggested content is ignored, and the teacher is redirected to the home page.
- **Pass Criteria:** The system redirects to the home page and no content changes are applied.
- **Fail Criteria:** The content is not ignored, or the system fails to redirect to the home page.

3.7.3.4 Test Procedure
1. On the Accept/Ignore Content Page, click the "Ignore" button.
2. Verify that the system redirects to the home page.
3. Confirm that no changes were applied to the lesson content.
4. Repeat the process to ensure consistent functionality.

3.8 Module 8: Revert Content Page

3.8.1 Save Accepted Content

3.8.1.1 Purpose
The purpose of this feature is to save the accepted suggested content as the new official lesson content, finalizing the changes made by the teacher.

3.8.1.2 Inputs
- A click on the "Looks good to me!" button.

3.8.1.3 Expected Outputs & Pass/Fail Criteria
- **Output**: The accepted suggested content is saved as the official lesson content.
- **Pass Criteria**: The lesson content is successfully updated with the accepted suggestion, and the changes are applied.
- **Fail Criteria**: The content is not saved, or the changes are not reflected in the lesson.

3.8.1.4 Test Procedure
1. Navigate to the Revert Content Page after accepting suggested content.
2. Click the "Looks good to me!" button.
3. Verify that the lesson content is updated with the accepted suggestion.
4. Ensure the changes are saved and reflected in the lesson.
5. Repeat to confirm consistent functionality.

3.8.2 Revert to Initial Content

3.8.2.1 Purpose
The purpose of this feature is to revert the lesson back to its original content, disregarding the suggested content and treating it as ignored.

3.8.2.2 Inputs
- A click on the "Revert Changes" button.

3.8.2.3 Expected Outputs & Pass/Fail Criteria
- **Output**: The lesson content reverts to its initial state, and the suggestion is considered ignored.
- **Pass Criteria**: The initial lesson content is restored, and any suggestions or notifications related to the content change are removed.
- **Fail Criteria**: The lesson content does not revert, or the suggestion is not ignored as expected.

3.8.2.4 Test Procedure
1. Navigate to the Revert Content Page.
2. Click the "Revert Changes" button.
3. Verify that the lesson content reverts to its original state.
4. Confirm that the notification and suggestion are dismissed or removed.
5. Repeat to ensure consistent behavior.

Appendix (Test Logs)

A.1 Log for Test n

Record of actions taken during each test.

A.2 Test Results

Document the pass/fail status of each test.

A.3 Incident Report

Any issues or incidents encountered during testing should be logged here.