INDIAN INSTITUTE OF TECHNOLOGY MADRAS

Software Engineering Project: **Milestone 1**

SUBMITTED IN THE PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE COURSE:

BSCSS3001: Software Engineering

By

Samagya Rathi (21f3002675)
Arshya Moonat (21f1004769)
Yash Jain (22f1000823)
Aryan Tiwari (21f1001076)
Puneet (21f3002005)
Atharva Dhamankar (21f1005520)
Sanjeevani Mangla (21f1003044)

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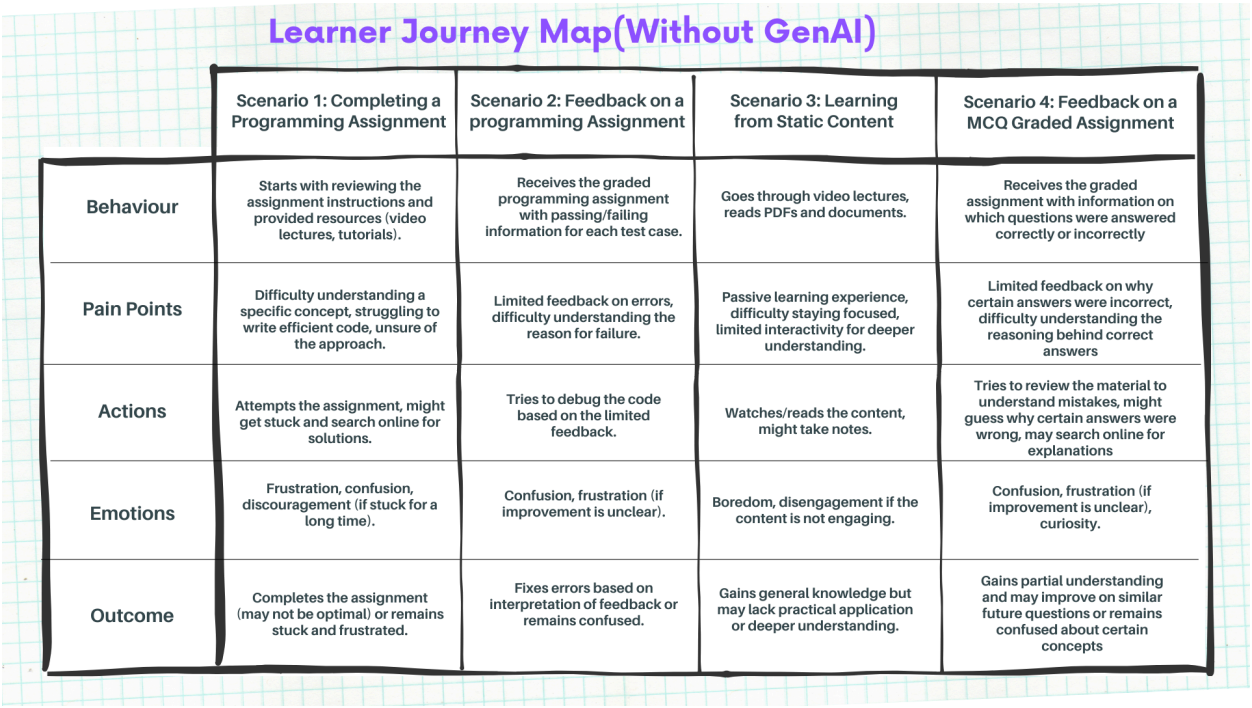
The learner journey maps illustrate the experiences of students engaging with the study portal without the assistance of GenAI. These maps highlight common challenges faced by students, such as difficulty understanding complex concepts, limited feedback on MCQ assignments, and the passive nature of learning from static content. Without GenAI, students often experience frustration and confusion when they encounter obstacles, leading to a less efficient and engaging learning experience. Course instructors and support staff also face limitations in providing timely and personalized assistance to students.



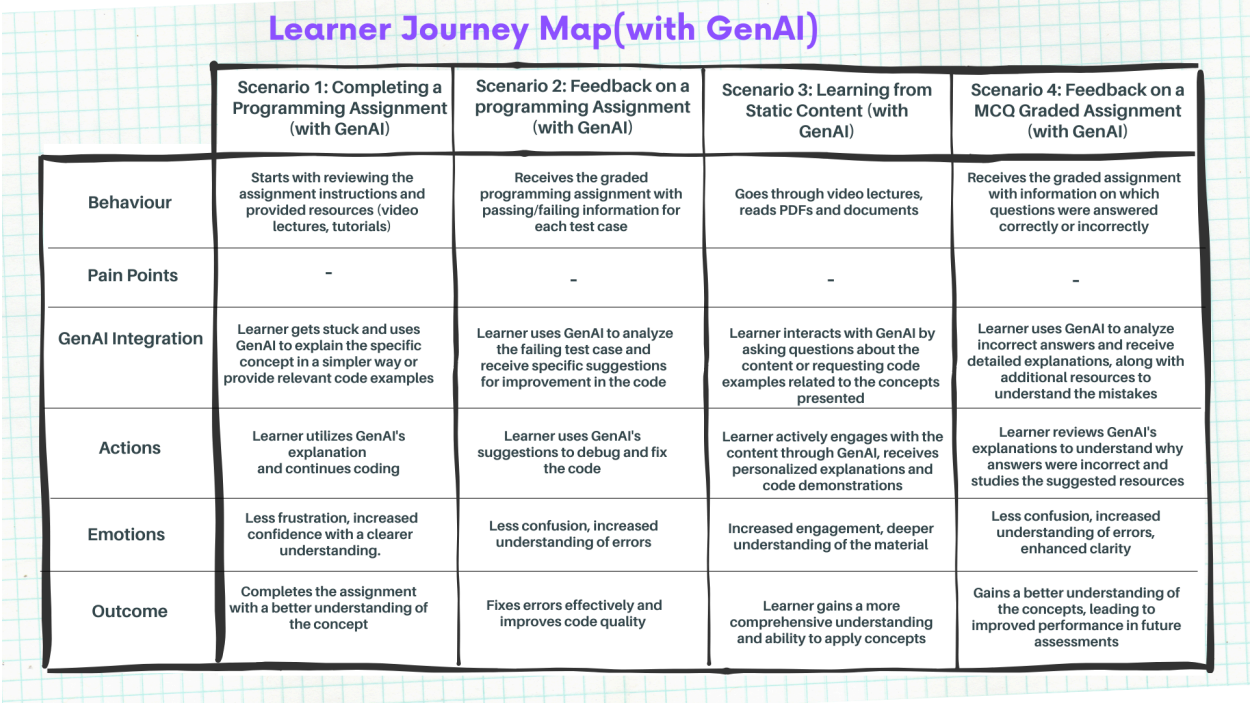
Learner Journey Map(Without GenAI)

	Scenario 1: Completing a Programming Assignment	Scenario 2: Feedback on a programming Assignment	Scenario 3: Learning from Static Content	Scenario 4: Feedback on a MCQ Graded Assignment
Behaviour	Starts with reviewing the assignment instructions and provided resources (video lectures, tutorials).	Receives the graded programming assignment with passing/failing information for each test case.	Goes through video lectures, reads PDFs and documents.	Receives the graded assignment with information on which questions were answered correctly or incorrectly
Pain Points	Difficulty understanding a specific concept, struggling to write efficient code, unsure of the approach.	Limited feedback on errors, difficulty understanding the reason for failure.	Passive learning experience, difficulty staying focused, limited interactivity for deeper understanding.	Limited feedback on why certain answers were incorrect, difficulty understanding the reasoning behind correct answers
Actions	Attempts the assignment, might get stuck and search online for solutions.	Tries to debug the code based on the limited feedback.	Watches/reads the content, might take notes.	Tries to review the material to understand mistakes, might guess why certain answers were wrong, may search online for explanations
Emotions	Frustration, confusion, discouragement (if stuck for a long time).	Confusion, frustration (if improvement is unclear).	Boredom, disengagement if the content is not engaging.	Confusion, frustration (if improvement is unclear), curiosity.
Outcome	Completes the assignment (may not be optimal) or remains stuck and frustrated.	Fixes errors based on interpretation of feedback or remains confused.	Gains general knowledge but may lack practical application or deeper understanding.	Gains partial understanding and may improve on similar future questions or remains confused about certain concepts

Learner Journey Map: With Generative AI

The learner journey maps with GenAI integration demonstrate how the inclusion of advanced AI technologies enhances the overall learning experience. GenAI provides students with personalized explanations, relevant examples, and detailed feedback on assignments. It transforms passive learning into an interactive and engaging process, allowing students to actively engage with course material and receive tailored support. This integration helps students

overcome challenges more effectively, boosts their confidence, and improves their understanding and performance. Additionally, instructors benefit from AI-driven insights and feedback, enabling them to offer more focused and efficient guidance to students.



Learner Journey Map(with GenAI)

	Scenario 1: Completing a Programming Assignment (with GenAI)	Scenario 2: Feedback on a programming Assignment (with GenAI)	Scenario 3: Learning from Static Content (with GenAI)	Scenario 4: Feedback on a MCQ Graded Assignment (with GenAI)
Behaviour	Starts with reviewing the assignment instructions and provided resources (video lectures, tutorials)	Receives the graded programming assignment with passing/failing information for each test case	Goes through video lectures, reads PDFs and documents	Receives the graded assignment with information on which questions were answered correctly or incorrectly
Pain Points	-	-	-	-
GenAI Integration	Learner gets stuck and uses GenAI to explain the specific concept in a simpler way or provide relevant code examples	Learner uses GenAI to analyze the failing test case and receive specific suggestions for improvement in the code	Learner interacts with GenAI by asking questions about the content or requesting code examples related to the concepts presented	Learner uses GenAI to analyze incorrect answers and receive detailed explanations, along with additional resources to understand the mistakes
Actions	Learner utilizes GenAI's explanation and continues coding	Learner uses GenAI's suggestions to debug and fix the code	Learner actively engages with the content through GenAI, receives personalized explanations and code demonstrations	Learner reviews GenAI's explanations to understand why answers were incorrect and studies the suggested resources
Emotions	Less frustration, increased confidence with a clearer understanding.	Less confusion, increased understanding of errors	Increased engagement, deeper understanding of the material	Less confusion, increased understanding of errors, enhanced clarity
Outcome	Completes the assignment with a better understanding of the concept	Fixes errors effectively and improves code quality	Learner gains a more comprehensive understanding and ability to apply concepts	Gains a better understanding of the concepts, leading to improved performance in future assessments

Types of Users

1. Primary Users: Learners/Students

Learners/Students are the main users of the study portal. They access the week-wise video content, complete MCQ assignments, and prepare for the quizzes along with the end-term in-person exam. Their primary goal is to learn the course material effectively, perform well on assignments and exams, and receive feedback and guidance to improve their understanding and skills.

Students will interact with the portal by watching video lectures, completing assignments, taking quizzes, and using GenAI to receive personalized feedback and guidance on their performance.

2. Secondary Users: Course Instructors/Professors

Instructors/Professors create and manage the course content, including video lectures and assignments. They review student performance, provide feedback, and offer additional support as needed. Their goal is to ensure students understand the material, help them improve, and facilitate a smooth learning experience.

Instructors will use the portal to upload and organize course materials, review and grade assignments, and leverage GenAI to provide personalized feedback on a large scale and additional learning resources to students.

3. Tertiary Users: Administrators/Support Staff/Program Head

Administrators/Support Staff oversee the overall functioning of the study portal. They manage user accounts, ensure the platform runs smoothly, and provide technical and administrative support. Their goal is to maintain the system's efficiency, resolve any issues students or instructors may encounter, and support the educational process.

Administrators will interact with the portal by managing user accounts, monitoring the platform's performance, addressing technical issues, and ensuring that GenAI functionalities are integrated and functioning properly for both students and instructors.

User Stories

User Story 1:

- As a **student** learning from static content (video lectures, PDFs) and struggling with programming concepts
- I want to use GenAI to ask questions about the content and receive personalized explanations or relevant code examples
- So that I can actively engage with the material, gain a deeper understanding, and improve my ability to apply the concepts and complete assignments more efficiently.

User Story 2:

- As a **student** receiving no or not useful feedback on a graded programming assignment,

- I want to use GenAI to analyze cases where the code fails to achieve the right result and receive specific suggestions for improvement,
- So that I can effectively debug my code and improve its quality.

User Story 3:

- As a **student** preparing for a quizzes and the end-term exam,
- I want to use GenAI to generate practice problems with varying difficulty levels,
- So that I can test my understanding of the concepts in a simulated quiz environment and identify areas for improvement.

User Story 4:

- As a **Student** with limited study time,
- I want instant feedback on my MCQ assignments,
- So that I can immediately know my performance and understand my mistakes.

User Story 5:

- As a **Student**,
- I want a detailed performance analysis after my in-person exam,
- so that I know which topics to focus on for future improvement.

User Story 6:

- As a **Student**,
- I want personalized study recommendations based on my exam performance,
- so that I can access relevant resources to improve my knowledge.

User Story 7:

- As a **student** with a learning disability that affects reading comprehension,
- I want to use GenAI to convert text-based learning materials (PDFs, articles) into an audio format with adjustable narration speed,
- So that I can access information in a way that is more accessible and promotes better understanding.

User Story 8:

- As a **student** with a busy schedule,
- I want GenAI to analyze my learning pace and progress through the course material,
- So that it can suggest personalized learning pathways, recommending additional resources or skipping redundant revisions based on my mastery level thus focusing my effort.

User Story 9:

- As a **student** struggling to identify where I face problems with a specific topic,
- I want GenAI to identify my knowledge gaps based on my performance in graded and practice assignments
- So that it can recommend targeted practice exercises or short video tutorials to address those specific gaps and improve my understanding.

User Story 10:

- As a **student** who's unable to write optimized code,
- I want GenAI to analyze my code and provide suggestions for optimization, potential bugs, or alternative approaches (once the deadline passes),
- So that I can submit a well-structured and efficient code that demonstrates a strong understanding of the concepts.

User Story 11:

- As a **course instructor** wanting to personalize feedback for students,
- I want to leverage GenAI to analyze common errors in student assignments,
- So that I can create targeted feedback templates or automated messages addressing those specific errors, saving time and providing more focused guidance.

User Story 12:

- As a **course instructor** looking for new and engaging ways to present complex concepts,

- I want to use GenAI to generate interactive quizzes or code challenges based on the course material,
- So that I can assess student understanding in a fun and interactive way, promoting active learning and engagement.

User Story 13:

- As a **professor** supervising student projects,
- I want to utilize GenAI to analyze project proposals and identify potential roadblocks or areas of technical difficulty,
- So that I can provide early feedback and guidance to students, ensuring the project stays on track and avoids major pitfalls.

User Story 14:

- As a **program head** responsible for curriculum development,
- I want to use GenAI to analyze student performance data across different courses in the program,
- So that I can identify areas where the curriculum may need adjustments or additional support resources, ensuring students are well-prepared for future courses and careers.

User Story 15:

- As a **course instructor** striving to create a more inclusive learning environment,
- I want to use GenAI to generate captions for video lectures and alternative text descriptions for images in course materials,
- So that students with disabilities can access information more easily and participate fully in the learning experience.

User Story 16:

- As a **course instructor** aiming to foster a more interactive learning environment,
- I want to leverage GenAI to improve and encourage discussion prompts based on real-time student conversations,

- So that I can address student confusion or gauge their understanding in real-time, allowing for more dynamic and engaging lectures.

User Story 17:

- As a **professor** looking to promote peer-to-peer learning and collaboration,
- I want to use GenAI to match students with similar learning styles or skill sets for group projects,
- So that students can benefit from diverse perspectives and learn from each other's strengths, fostering a more collaborative learning environment.

User Story 18:

- As an **Instructor**,
- I want GenAI to generate video summaries and keywords,
- so that I can ensure important topics are highlighted for the students.