

Design Thinking For Software Engineers

Lab-3

E-learning platforms fail to keep learners engaged

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1. Aim of the Experiment

The aim of this experiment is to apply the Design Sprint methodology by following the Empathize, Define, Ideate, Prototype and Test stages to design a user-centred solution for improving engagement and course completion in e-learning platforms. The experiment focuses on understanding real learner and instructor challenges related to UI usability, content delivery, pacing and interactivity and validating proposed solutions through user feedback rather than assumptions.

2. Problem Context

Students, instructors and working professionals increasingly rely on e-learning platforms for academic learning, certification and upskilling. However, many users struggle with poor UI design, long non-interactive videos, text-heavy lessons, confusing navigation, rigid pacing and lack of doubt-clearing mechanisms. These issues often result in frustration, low motivation, superficial completion for certificates and high dropout rates. Instructors also face difficulties in identifying quality courses and monitoring learner engagement, reducing the overall effectiveness of online education systems.

3. Empathize

Key Observations

- What frustrates users most?
 - Users became frustrated with long, non-interactive videos, dense text blocks, lagging playback, timed quizzes for complex topics and difficulty finding quality courses. Instructors were annoyed by low engagement and poor discovery tools.
- Where do users hesitate or seek help?
 - Users hesitated when solving timed problems, navigating confusing dashboards and searching for interactive features or doubt-clearing options. Students paused frequently when instructions were unclear.
- What makes users feel confident or unsafe?
 - Clear visuals, smooth playback, short modules and visible progress indicators increased confidence. Lack of interaction, unclear explanations and pressure-based timers made learners feel stressed, leading to skipping content or quitting.

Activities Performed

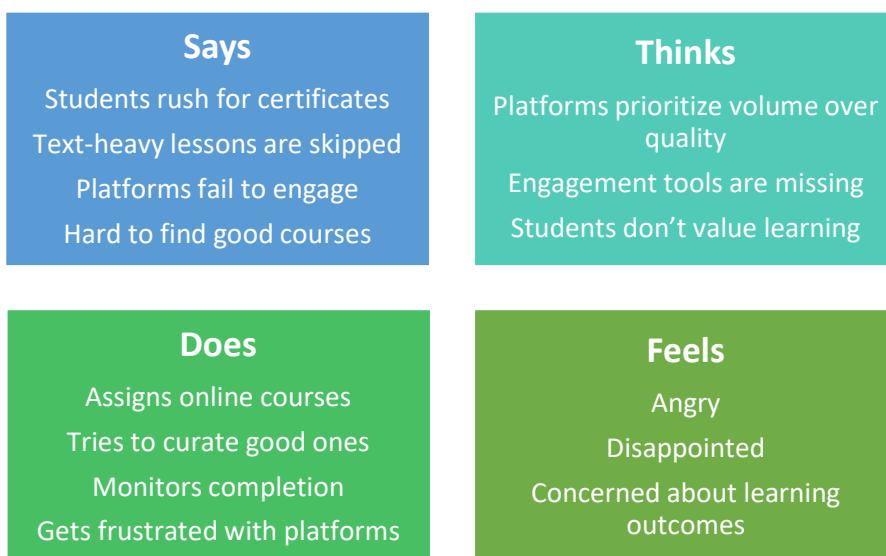
- Reviewed interview notes and empathy maps created in Lab 2 for students instructors and working professionals using e-learning platforms
- Observed users navigating existing e-learning applications while starting courses watching lessons and attempting quizzes
- Noted hesitation points confusion during navigation reactions to long content timed tasks and difficulty in clearing doubts
- Recorded emotional responses such as frustration boredom stress and loss of motivation when interacting with current platforms

Empathy Map

Name: Santhosh KV

Age: 45

Occupation: Professor



Name: Ridit Santhosh

Age: 14

Occupation: Student

Says

Explanations are unclear
Timers cause stress
No way to ask doubts
Quit after grades fell

Thinks

He isn't fast enough
Platform doesn't help
Learning is stressful

Does

Tries timed problems
Skips course later
Quits platform
Avoids tasks

Feels

Frustrated
Sad
Discouraged
Anxious

Name: Shijith M

Age: 28

Occupation: Working IT professional

Says

Good courses are expensive
Poor UI reduces interest
Long text is skipped
Visuals help engagement

Thinks

Free courses are low quality
UI matters a lot
Repetition is okay if useful

Does

Skips text-heavy parts
Drops boring courses
Prefers visuals
Upskills selectively

Feels

Frustrated
Impatient
Selective

User Insights

- Learners abandon courses when platforms prioritize content volume over engagement and clarity.
- Users lose motivation quickly when navigation is confusing or videos lag.

- Students feel discouraged and quit when they cannot ask doubts or are pressured by timers.
- Instructors lose trust in platforms when it is difficult to identify quality, engaging courses.
- Learners skip long or repetitive content when it feels disconnected from their goals.
- Visual polish raises expectations, but poor explanations drive dropout.

4. Define Stage

- Objective
 - To clearly define the core problem faced by users of e-learning platforms based on insights gathered from interviews and observations.
- Problem Statement
 - Learners need a way to stay engaged and complete online courses with confidence because confusing interfaces, long non-interactive content, unresolved doubts, and rigid pacing cause frustration and high dropout rates.
- How Might We (HMW) Question
 - How might we design an e-learning platform that keeps learners motivated through clear navigation, interactive learning, and flexible pacing so they confidently finish their courses?

5. Ideate

Brainstormed Ideas

- Adaptive learning paths with level detection personalized pacing adjustable timers and confidence-based progression
- Micro lessons and interactive checkpoints including five-minute modules quizzes after concepts practice mode and engagement gates before certificates
- Rich visual learning using animations simulations visual summaries and story-based explanations
- Doubt resolution and support through AI tutors live chat peer discussion boards and instructor office hours
- Instructor tools and discovery systems such as course preview dashboards quality ratings learner analytics and dropout heatmaps

Idea Selection

A learning system that blends personalization bite sized lessons, visual explanations, doubt clearing and instructor analytics into one continuous experience.

6. Prototype Stage

Objective

The objective of the prototype is to create a low-fidelity representation of an adaptive e-learning experience that demonstrates how learners can progress through short interactive lessons with

flexible pacing, access doubt-clearing support, and receive clear feedback on their progress. The prototype aims to test whether these features reduce frustration, increase confidence, and encourage course completion while also helping instructors evaluate and assign high-quality courses.

First Screen- Home Screen

The wireframe illustrates the layout of the Home Screen:

- Top Bar:** Includes a **LOGO** icon, a **Home** button with a house icon, an **Instructor** button with a person icon, and a user icon.
- Header:** A large box labeled **[HOME DASHBOARD]**.
- Recommended Next Lesson:** A section titled **RECOMMENDED NEXT LESSON** featuring a **Data Visualization Basics** micro-lesson. It includes labels for **MICRO-LESSON**, **3 MIN**, and **EASY**, and a **▷ START** button.
- My Enrolled Courses:** A section titled **MY ENROLLED COURSES** listing three courses with progress bars:
 - Introduction to Data Science:** Progress 65%, with a **CONTINUE** button.
 - Web Development Basics:** Progress 30%, with a **CONTINUE** button.
 - Machine Learning Fundamentals:** Progress 85%, with a **CONTINUE** button.
- Summary Statistics:** Three boxes at the bottom showing:
 - HOURS LEARNED:** 24 hours, represented by a clock icon.
 - BADGES EARNED:** 7 badges, represented by a trophy icon.
 - AVG COMPLETION:** 60% completion, represented by a percentage icon.

Second Screen- When Clicked on Start/Continue

The wireframe illustrates the layout of a second screen interface, likely for a mobile device or a large-scale presentation. The top navigation bar includes 'LOGO' on the left, 'Home' and 'Instructor' buttons in the center, and a user icon on the right. Below the navigation is a URL placeholder 'Screen: /lesson/1'. A main title box contains '[MICRO LESSON]'. Underneath, a header box displays 'Data Visualization Basics' and 'MODULE 2 • LESSON 2 OF 8'. To the right of the header are 'MICRO-LESSON' and 'A. PIZZI' buttons. The central video area is a large rectangle containing a play button icon and the text '[3 MINUTE VIDEO PLACEHOLDER]' above a progress bar showing '40:05 / 60:00'. Below this is a 'LESSON PROGRESS' bar with a black segment and a '40%' label. The next section, 'KEY CONCEPT VISUALIZATION', features a large empty area labeled '[ANIMATED VISUAL AREA]' with three small square placeholders. At the bottom are three buttons: 'PRACTICE MODE' with a question mark icon, 'ASK DOUBT' with a circular icon, and a large 'NEXT' button with a right-pointing arrow icon. A footer bar at the bottom contains the text 'FLEXIBLE LEARNING: Review this lesson anytime • Skip if confident • Adjust playback speed'.

Second Screen- Section A-When Clicked on Ask Doubt

LOGO

Home Instructor

Screen: /ask-doubt

[ASK DOUBT / CHAT]

Current Topic: Data Visualization Basics
MODULE 2 • LESSON 3

BACK TO LESSON

AI TUTOR ONLINE

Hi! I'm your AI tutor. How can I help you understand this concept better?

Type your question... 

SUGGESTED QUESTIONS

What is the difference between bar charts and histograms?

When should I use a scatter plot vs a line chart?

Can you explain the concept with a real-world example?

 REQUEST LIVE INSTRUCTOR
1-on-1 video call

 PEER DISCUSSION
Join study group

Second Screen- Section B-When Clicked on Practice Mode

Screen: /practice/1

[PRACTICE MODE]

QUESTION 1 OF 5
Data Visualization Basics

TIMER OFF

✓ STRESS-FREE PRACTICE MODE • No time pressure • Learn at your pace

Which type of chart is best suited for showing the relationship between two continuous variables?

Bar Chart

Scatter Plot

Pie Chart

Line Chart

SHOW HINT

BACK TO LESSON

CHECK ANSWER →

1

Third Screen-When Clicked on Instructor

LOGO [Home](#) [Instructor](#) [U](#)

[INSTRUCTOR DASHBOARD]

TOTAL STUDENTS
598

ENGAGEMENT
63%

COMPLETION RATE
71%

AT-RISK STUDENTS
23

MY COURSES

Introduction to Data Science
215 students, 145 engaged
MANAGEMENT SCORE: 78%
DROPOUT RISK: LOW

[@ VIEW ANALYTICS](#) [ASSIGN](#)

Web Development Basics
189 students, 125 engaged
MANAGEMENT SCORE: 65%
DROPOUT RISK: MEDIUM

[@ VIEW ANALYTICS](#) [ASSIGN](#)

Machine Learning Fundamentals
114 students, 85 engaged
MANAGEMENT SCORE: 45%
DROPOUT RISK: HIGH

[@ VIEW ANALYTICS](#) [ASSIGN](#)

DROPOUT HEATMAP
Showing lesson completion across all courses

LEGEND: 0-25% 26-50% 51-75% 76-100%

COURSE ACTIONS

[CREATE NEW COURSE](#) [ASSIGN TO STUDENTS](#) [EXPORT REPORTS](#)

Fourth Screen- When Clicked on View Analytics

LOGO

Home Instructor

[INSTRUCTOR ANALYTICS]

Introduction to Data Science
Course Quality Analytics

← BACK

QUALITY SCORE
4.8

COMPLETION
78%

TIME SPENT
8.5h

VERIFIED
QUALITY BADGE

ENGAGEMENT OVER TIME

LESSON-BY-LESSON PERFORMANCE

Introduction to Data Completion: 95% Avg Score: 90% Quality: 12

Data Types & Structures Completion: 80% Avg Score: 85% Quality: 20

Data Visualization Basics Completion: 65% Avg Score: 75% Quality: 15

Statistical Analysis Completion: 70% Avg Score: 72% Quality: 18

RECENT STUDENT FEEDBACK

[Great explanations and examples]

[Would like more practice problems]

[Very clear and well-structured]

INSTRUCTOR QUALITY BADGE EARNED

This course meets high-quality standards based on:

- ✓ Completion rate above 75%
- ✓ Student satisfaction above 4.5/5.0
- ✓ Engagement metrics in top 20%
- ✓ Regular content updates

Prototype Description

- A personalized home dashboard with recommended next lessons progress tracking and enrolled courses
- Micro lesson screens featuring short videos animated concept visuals and lesson progress indicators
- Practice mode with optional timers stress free mode hints and multiple question navigation
- Ask Doubt screen with AI tutor chat suggested questions live instructor requests and peer discussion options
- Instructor dashboard showing course completion engagement metrics dropout heatmaps and analytics tools
- Instructor analytics pages with lesson level performance quality scores feedback summaries and quality badges

Design Rationale

- Micro lessons reduce fatigue and prevent skipping long content
- Animated visuals improve conceptual clarity
- Practice mode with timer control lowers anxiety and supports self paced learning
- Ask Doubt features prevent unresolved confusion and dropout
- Instructor analytics help detect disengagement early and assign better courses
- Heatmaps and performance charts allow instructors to improve content quality

Prototype Type

Low fidelity wireframes created to visualize user flows interactions and system structure rather than visual polish. The focus is on testing learning flow engagement mechanisms doubt resolution and instructor decision making tools.

7. Test Stage

Objective

To test the learning platform prototype with previously interviewed users and gather feedback on engagement features doubt resolution tools pacing controls and instructor analytics.

Testing Method

- The prototype wireframes were shown to three participants
- Each user explored learner and instructor flows relevant to them
- Users were asked to comment on usefulness clarity and motivation to continue a course
- Observations and feedback were recorded

User Feedback Summary

User 1

Name: Ridit Santhosh

Age: 14

Occupation: Student

- What Worked Well
 - One on one live instructor sessions felt very helpful for clearing doubts
 - Concept visualization previews helped him understand what the lesson would include
 - Peer discussion groups were useful for learning from others
 - Practice mode with optional timers supported both speed checking and relaxed study
 - Hint option helped when he was stuck
- What Was Confusing
 - None major reported
- User Suggestions
 - More gamified rewards for practice sessions
- Observation
 - Ridit appeared motivated and engaged and showed interest in continuing the course if it was as such

User 2

Name: Shijith M

Age: 28

Occupation: Working IT professional

- What Worked Well
 - Micro lessons under three minutes were appealing
 - Average completion rate helped him judge course quality and his own dropout risk
 - AI tutor inside the video was considered very useful
 - Option to escalate to live instructor increased trust
- What Was Confusing
 - None significant
- User Suggestions
 - Faster navigation between lessons
- Observation
 - Shijith focused on efficiency and quality indicators and responded positively to embedded support tools.

User 3

Name: Santhosh KV

Age: 45

Occupation: Professor

- What Worked Well
 - Instructor dashboard statistics were valuable
 - Risky student indicators helped identify struggling learners
 - Course analytics with dropout heatmaps made assignment easier
- What Was Confusing
 - Wanted clearer indicators for real time student attention
- User Suggestions
 - Add engagement detection such as focus tracking or interaction alerts
- Observation
 - Santhosh felt the design analytical and felt could spend more time exploring dashboards and student performance.

8. Iteration and Improvements

- Improve icon labelling and add short tooltips
- Allow users to control voice speed and subtitle display
- Introduce engagement detection during lessons for instructors
- Add gamified rewards and progress incentives for students

9. Reflection

- **Did the solution actually solve the user problem**
 - It solved many key problems by improving engagement doubt clearing and flexible pacing but attention retention during lessons still needs improvement
- **What assumptions were proven wrong**
 - The main issue was not just poor content quality but lack of interactivity emotional frustration and weak instructor insight into student engagement
- **How did user feedback change the design**
 - Feedback pushed the design toward clearer labels language options adjustable voice pacing and stronger live support and peer interaction
- **What would you improve in the next version**
 - Add engagement tracking gamification adaptive pacing and better concept previews to reduce dropout and keep attention steady

10. Conclusion

The Design Sprint process enabled the identification of genuine user problems and rapid validation of design ideas. Through empathize define ideate prototype and test stages a learner centred platform was conceptualized that addresses dropout behaviour confusion and instructor workload.

The results demonstrate that continuous user feedback is critical for creating engaging accessible and effective digital learning systems.