Design Thinking Project Workbook

Don't find customers for your product but find products for your customers

4. Doc2Quiz

Team Name: Doc2Quiz

Team Members:

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2. Problem/Opportunity Domain

Domain of Interest: Education Technology (EdTech)

Description of the Domain: The project applies AI-based automation in the educational sector, specifically focusing on quiz generation. Traditional methods of creating quizzes are inefficient, inconsistent, and time-consuming. Our innovation leverages NLP and machine learning techniques to transform educational documents into structured multiple-choice questions (MCQs).

Why did you choose this domain?: The increasing demand for scalable and intelligent educational tools drove our choice. Manual quiz creation is slow and prone to inconsistencies, making automated solutions crucial for educators and trainers.

3. Problem/Opportunity Statement

Problem Statement:
Creating quizzes manually from educational documents is inefficient and inconsistent, leading to a time-consuming process for educators.

Problem Description:
Educators spend hours designing assessments, which results in inconsistencies and limits scalability. Current automated quiz generators lack contextual accuracy and adaptability to various difficulty levels.

Context (When does the problem occur):

Educators (teachers, professors, trainers).
Students who need effective self-assessment.
Educational institutions and organizations conducting training sessions.

Alternatives (What does the customer do to fix the problem):
Educators feel frustrated due to the time-consuming nature of quiz creation.
Students experience difficulty in accessing relevant quizzes tailored to their learning pace.

Customers (Who has the problem most often):
Educators (teachers, professors, trainers).
Students who need effective self-assessment.
Educational institutions and organizations conducting training sessions.

Emotional Impact (How does the customer feel):
Educators feel frustrated due to the time-consuming nature of quiz creation.
Students experience difficulty in accessing relevant quizzes tailored to their learning pace.

Quantifiable Impact (What is the measurable impact):

Reduces quiz creation time by over 70%.

Increases accuracy and contextual relevance of quizzes.

Alternative Shortcomings (What are the disadvantages of the alternatives):
Manual quiz creation is slow and inconsistent.
Pre-existing question banks lack adaptability to specific learning materials.
Current automated quiz generators do not ensure contextual relevance.

Any Video or Images to showcase the problem: N/A

4. Addressing SDGs

Relevant Sustainable Development Goals (SDGs):

Enhancing education by automating quiz creation, saving time for educators, and improving learning assessment quality.

How does your problem/opportunity address these SDGs?:

By leveraging AI to automate quiz generation, the solution promotes efficiency in education, supports personalized learning, and ensures high-quality assessments tailored to learners' needs.

4. Stakeholders

Answer these below questions to understand the stakeholder related to your project

1. **Who are the key stakeholders involved in or affected by this project?**

   Educators (teachers, professors, trainers).

   Students and self-learners.

   Educational institutions and training centers.

   EdTech companies.

2. **What roles do the stakeholders play in the success of the innovation?**

   Educators use and validate the quiz generation tool.

   Students benefit from high-quality assessments.

   Institutions integrate the tool into their learning management systems (LMS).

   EdTech companies collaborate to scale the solution.

3. **What are the main interests and concerns of each stakeholder?**

   Educators: Require time-efficient, high-quality quiz generation.

   Students: Need engaging and relevant assessments.

   Institutions: Seek scalable and effective evaluation tools.

   EdTech companies: Aim for market scalability and technological innovation.

4. **How much influence does each stakeholder have on the outcome of the project?**

   High influence: Educators, institutions, and EdTech companies.

   Medium influence: Students.

5. **What is the level of engagement or support expected from each stakeholder?**

   High engagement from educators and institutions.

   Collaboration from EdTech companies for technological implementation.

6. **Are there any conflicts of interest between stakeholders? If so, how can they be addressed?**

   Resistance to AI adoption can be mitigated by demonstrating ease of use and effectiveness.

7. **How will you communicate and collaborate with stakeholders throughout the project?**

   Conducting pilot tests with educators and institutions.

   Gathering continuous feedback for improvements.

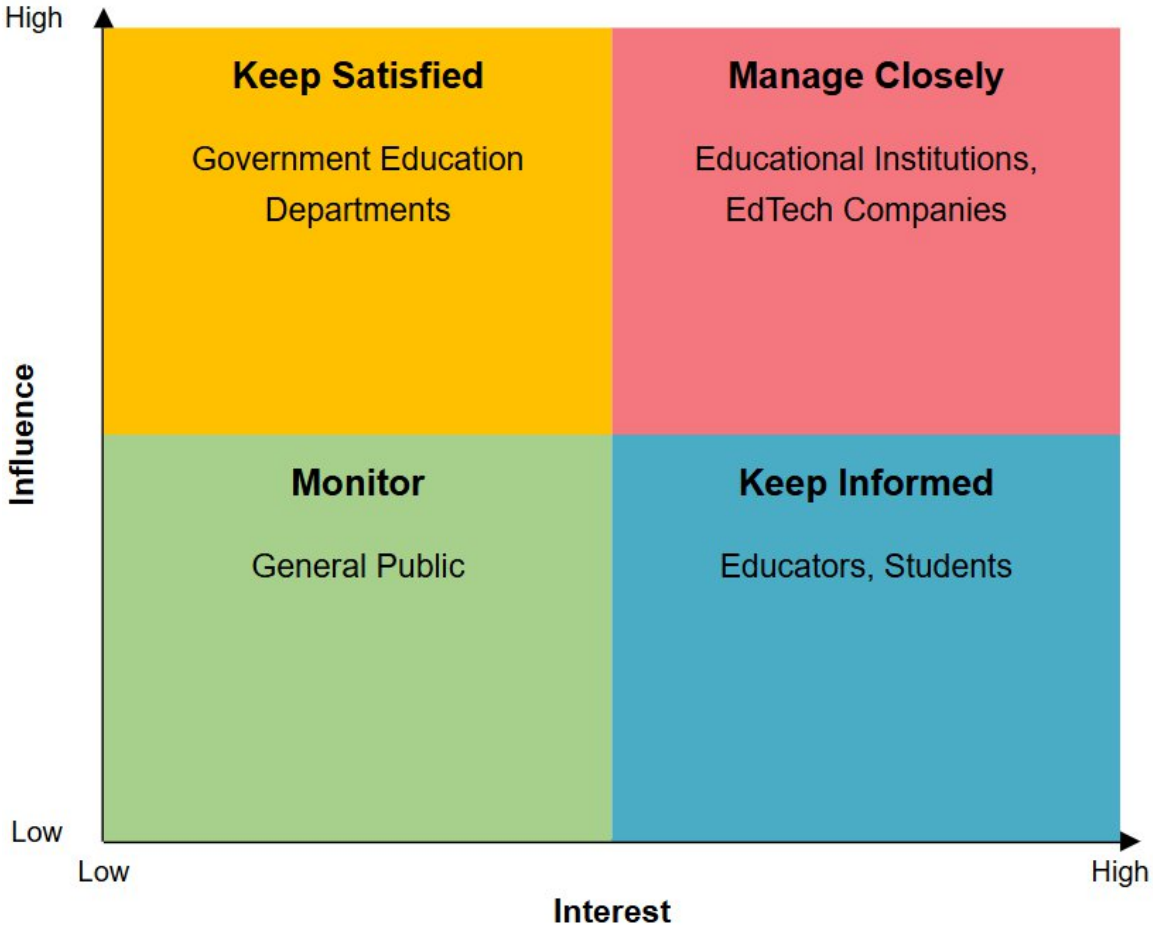
8. **What potential risks do stakeholders bring to the project, and how can these be mitigated?**

   Resistance from traditional educators: Addressed through training and user-friendly implementation.

   Integration issues with LMS: Solved by providing API support and seamless compatibility.

5. Power Interest Matrix of Stakeholders

Power Interest Matrix: Provide a diagrammatic representation of Power Interest Matrix



- **High Power, High Interest: Educational institutions, EdTech companies.**
- **High Power, Low Interest: Government education departments.**
- **Low Power, High Interest: Educators, Students.**
- **Low Power, Low Interest: General public.**

1. Empathetic Interviews

Conduct Skilled interview with at least 30 citizens/Users by asking open ended questions (What, why/How etc) and list the insights as per the format below

I need to know (thoughts, feelings, actions)	Questions I will ask (open questions)	Insights I hope to gain
Thoughts		
How does he approach self-learning and skill development?	What challenges do you face when learning new technologies?	Understand the difficulties he encounters in acquiring and retaining technical knowledge.
Feelings		
What challenges does he face in retaining technical knowledge?	How do you usually test your understanding after studying technical documents?	Identify his current methods for self-assessment and knowledge validation.
actions		
How does he currently test his knowledge and track progress?	Why do you think AI-generated quizzes might be useful for your learning process?	Gauge his perception of automation in learning and any concerns he might have.

SKILLED INTERVIEW REPORT

User/Interviewee	Questions Asked	Insights gained (NOT THEIR ANSWERS)
M.R Sai Vamsy, Software Engineer at ARM	What challenges do you face in learning new technologies?	Struggles with information overload and retaining key concepts
	How do you usually test your understanding after reading technical documents?	Prefers quizzes but finds manual quiz creation too time-consuming.
	Why do you think AI-generated quizzes might help you?	Believes automation can make learning more efficient, but worries about accuracy.
	How do you decide which learning resources to trust?	Relies on well-structured content but lacks an easy way to assess comprehension.
	What features would you want in an AI-based quiz generator?	Desires customizable difficulty levels and question categorization.

Key Insights Gained from Interview with M.R Sai Vamsy

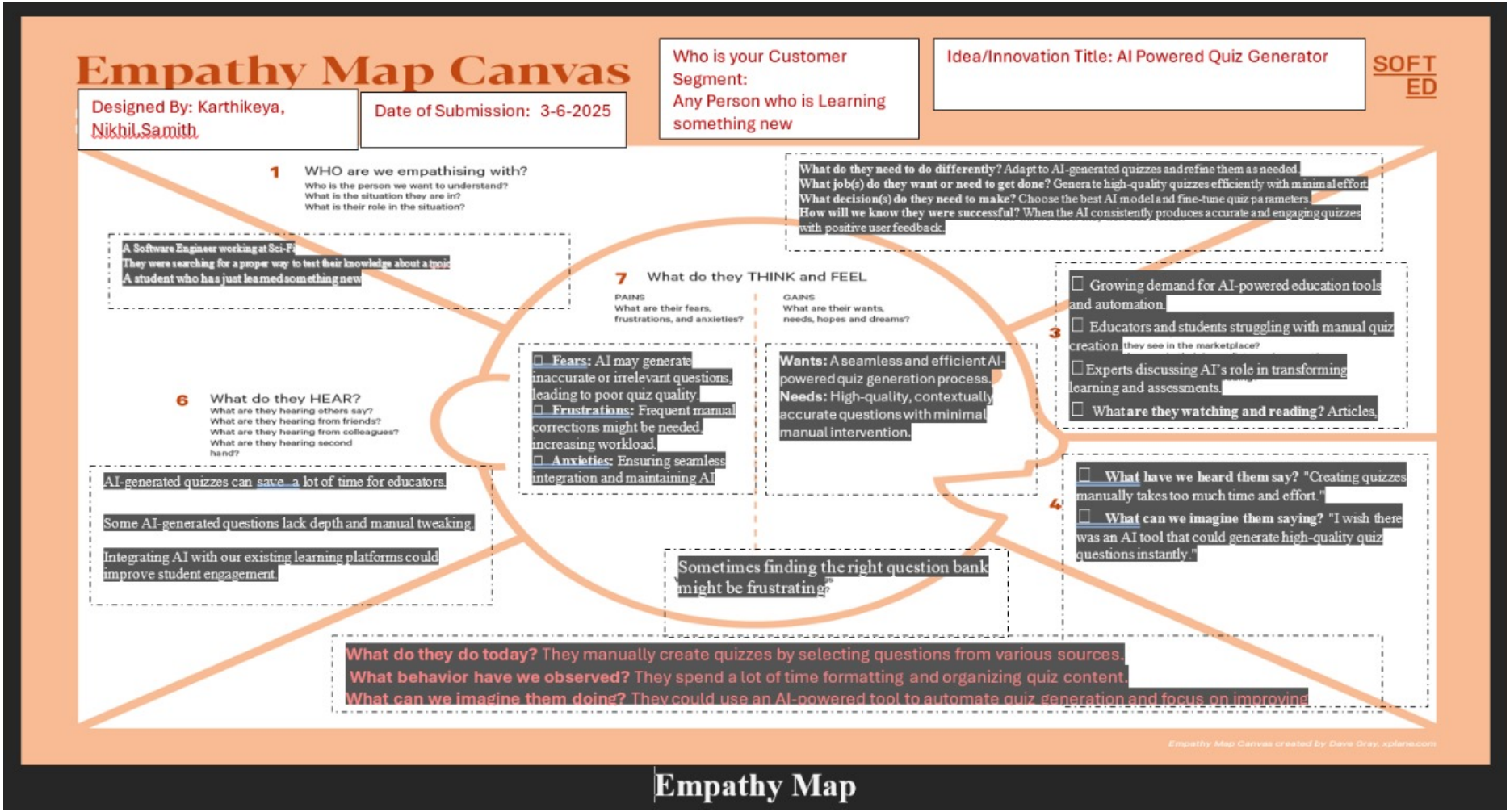
- **Insight 1:**

Manually creating quizzes for self-assessment is time-consuming, and he prefers an automated solution to streamline his learning process.

- **Insight 2:**

He values accuracy in AI-generated quizzes but is concerned about the reliability of automatically generated questions.

Empathy Map


Empathy Map Canvas
Designed By: Karthikeya, Nikhil,Samith
Date of Submission: 3-6-2025
Who is your Customer Segment:
Any Person who is Learning something new
Idea/Innovation Title: AI Powered Quiz Generator
SOFT ED
1 WHO are we empathising with?
Who is the person we want to understand?
What is the situation they are in?
What is their role in the situation?
A Software Engineer working at Sci-Fi
They were searching for a proper way to test their knowledge about a topic
A student who has just learned something new
What do they need to do differently? Adapt to AI-generated quizzes and refine them as needed.
What job(s) do they want or need to get done? Generate high-quality quizzes efficiently with minimal effort.
What decision(s) do they need to make? Choose the best AI model and fine-tune quiz parameters.
How will we know they were successful? When the AI consistently produces accurate and engaging quizzes with positive user feedback.
7 What do they THINK and FEEL
PAINS
What are their fears, frustrations, and anxieties?
GAINS
What are their wants, needs, hopes and dreams?
Fears: AI may generate inaccurate or irrelevant questions, leading to poor quiz quality.
Frustrations: Frequent manual corrections might be needed, increasing workload.
Anxieties: Ensuring seamless integration and maintaining AI
Wants: A seamless and efficient AI-powered quiz generation process.
Needs: High-quality, contextually accurate questions with minimal manual intervention.
3
Growing demand for AI-powered education tools and automation.
Educators and students struggling with manual quiz creation.
they see in the marketplace?
Experts discussing AI's role in transforming learning and assessments.
What are they watching and reading? Articles,
6 What do they HEAR?
What are they hearing others say?
What are they hearing from friends?
What are they hearing from colleagues?
What are they hearing second hand?
AI-generated quizzes can save a lot of time for educators.
Some AI-generated questions lack depth and manual tweaking.
Integrating AI with our existing learning platforms could improve student engagement.
Sometimes finding the right question bank might be frustrating?
4
What have we heard them say? "Creating quizzes manually takes too much time and effort."
What can we imagine them saying? "I wish there was an AI tool that could generate high-quality quiz questions instantly."
What do they do today? They manually create quizzes by selecting questions from various sources.
What behavior have we observed? They spend a lot of time formatting and organizing quiz content.
What can we imagine them doing? They could use an AI-powered tool to automate quiz generation and focus on improving
Empathy Map Canvas created by Dave Gray, xplane.com
Empathy Map

2. Empathy Map

a. **Who is your Customer?**

Description: This is where you specify the customer or user you are empathizing with. It could be a specific user persona or a general user segment.

- **Customer Profile:**
- **Educators (Teachers, Professors, Trainers)**
- **Students (Learners preparing for exams)**
- **Training Institutions**
- **Goals & Needs:**
- **Quickly generate quizzes from study material.**
- **Ensure quizzes align with learning objectives.**
- **Automate question generation to save time.**
- **Context of Interaction:**
- **Users interact with DOC2Quiz through an AI-based interface to upload documents and generate quizzes.**

b. **Who are we empathizing with?**

Description: This area helps you define who the user is, what their situation looks like, and what role they play. It emphasizes understanding the user's perspective in depth.

- **User Characteristics:**
- **Educators: Knowledgeable, tech-savvy, seeking efficiency.**
- **Students: Eager to test their knowledge, looking for structured quiz formats.**
- **Goals & Challenges:**
- **Goals: Create and access quizzes easily.**
- **Challenges: Manually creating quizzes is time-consuming and inconsistent.**

- **Broader Situation:**

- **In academic institutions, e-learning platforms, and professional training centers.**

c. **What do they need to DO?**

Description: This section identifies what actions or tasks the user needs to perform. It helps highlight the expectations and demands the user faces.

- **Upload documents in various formats.**
- **Generate MCQs with varying difficulty.**
- **Review, edit, and approve questions.**
- **Ensure quizzes align with subject matter.**

d. **What do they SEE?**

Description: This focuses on the visual stimuli or environment that the user interacts with. It's important to consider what users see in their immediate surroundings and in their larger world.

- **Educational material in digital and physical formats.**
- **Existing quiz-generation tools (mostly manual or semi-automated).**
- **Competitors offering similar but less efficient solutions.**

e. **What do they SAY?**

Description: This section captures what the user might say in public, such as comments or feedback they give in conversations or on social media.

- **"It takes too long to create quizzes manually."**
- **"I need a tool that generates high-quality questions."**
- **"AI-based quiz generation should be reliable and customizable."**

f. **What do they DO?**

Description: This section focuses on what the user does, the actual behaviors they exhibit, and actions they take in different situations.

- **Search for online quiz generators.**
- **Manually create questions from textbooks.**
- **Use AI tools but struggle with low accuracy or lack of customization.**

g. **What do they HEAR?**

Description: This addresses what information the user receives from external sources, such as colleagues, media, or industry trends. It helps map the influences surrounding the user.

- **Recommendations from other educators/trainers.**
- **Feedback from students on quiz quality.**
- **Insights from ed-tech platforms about AI-driven education.**

h. What do they THINK and FEEL?

Description: This is one of the most insightful sections, addressing the internal emotions, concerns, and motivations of the user. It helps identify their deep-rooted feelings.

- **Fears: AI-generated quizzes may lack accuracy.**
- **Motivations: Reduce workload, improve efficiency.**
- **Desires: A seamless, user-friendly tool for high-quality quiz generation.**

i. Pains and Gains

Description: This section focuses on the user's frustrations and their desired outcomes. It helps to frame the user's challenges (pains) and the benefits they seek (gains).

- **Pains:**
- **Manual quiz creation is tedious.**
- **Lack of well-structured, difficulty-based quizzes.**
- **Gains:**
- **Time-saving AI-generated quizzes.**
- **Improved knowledge assessment and retention.**

8. Persona of Stakeholders

Stakeholder Name: M.R Sai Vamsy

Demographics:

- **26 years old, Software Engineer at ARM.**
- **Based in India.**
- **Tech-savvy, detail-oriented, and values efficiency.**

Goals:

- **Wants to upskill and stay updated with the latest technology.**
- **Seeks an efficient way to test his knowledge on technical documentation.**
- **Aims to streamline learning by automating quiz generation.**

Challenges:

- **Manually creating quizzes from technical documents is tedious.**
- **Difficulty in assessing comprehension of complex concepts.**
- **Limited time to prepare structured self-assessments.**

Aspiration:

- **Learn new concepts efficiently.**
- **Use AI-powered tools to enhance productivity in self-learning.**
- **Leverage automation for better retention of technical knowledge.**

Needs:

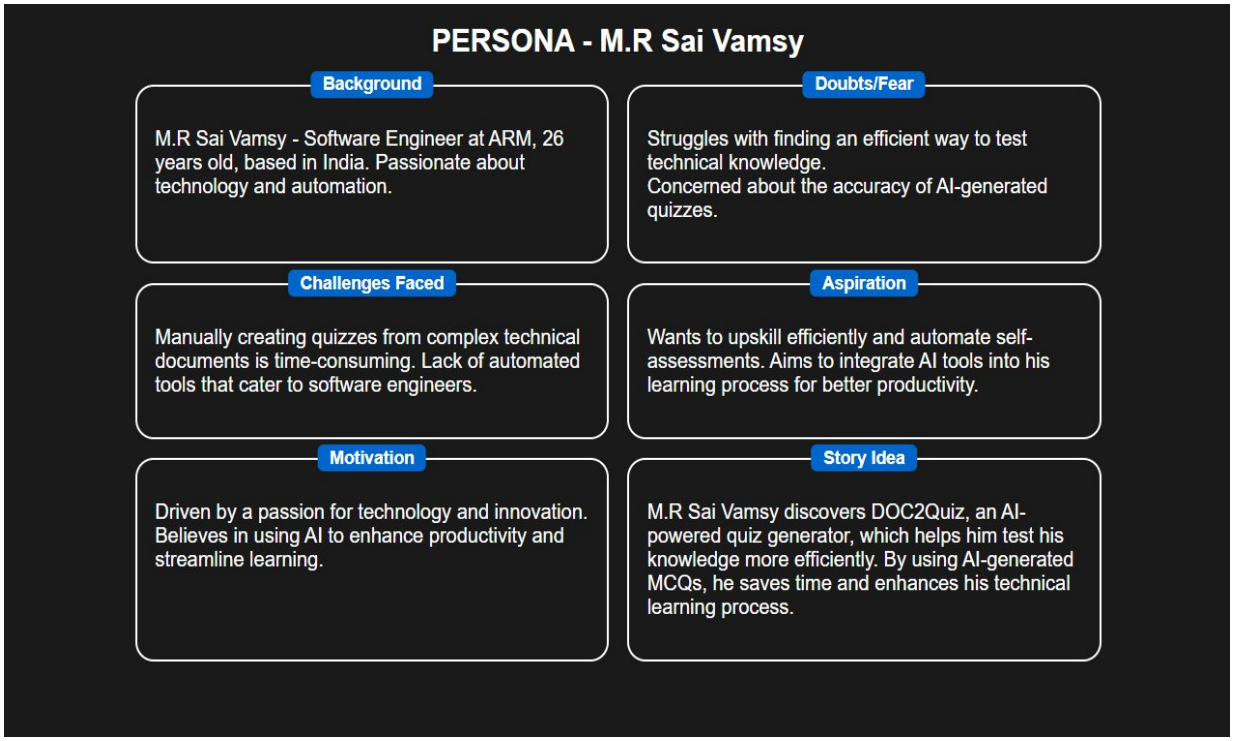
- **An AI tool that can generate quizzes from technical documents.**
- **A system that can categorize questions based on difficulty level.**
- **A way to review and refine AI-generated questions for accuracy.**

Pain Points:

- **Time-consuming process of manually crafting quizzes from documentation.**
- **Lack of automated tools tailored for software engineers.**
- **Inconsistent difficulty levels in self-assessment quizzes**

Storytelling:

M.R Sai Vamsy, a software engineer at ARM, constantly works with complex technical documents. He struggles to test his knowledge efficiently, as manually creating quizzes is time-consuming. He discovers DOC2Quiz, an AI-powered quiz generator that transforms technical documents into structured MCQs. With its automatic categorization and difficulty adjustment features, he can now assess his understanding more effectively, saving time and improving retention.



10. Look for Common Themes, Behaviors, Needs, and Pain Points among the Users

Analyse the data from your affinity diagram to uncover recurring patterns among your users, helping you better understand their expectations and challenges.

Common Themes:

- AI-driven quiz generation and evaluation.
- Seamless user experience with automated question creation.
- Integration of Retrieval-Augmented Generation (RAG) for better quiz accuracy.
- Instant feedback on quiz performance.
- Accessibility for various users, including students and educators.

Common Behaviors:

- Users upload a PDF containing study material or lecture notes.
- They rely on the AI to generate relevant multiple-choice questions.
- Users take the quiz immediately after generation.
- They expect instant evaluation and feedback on their answers.
- Educators may review or refine the generated questions before assigning them to students.

Common Needs:

- Accurate and relevant question generation from the provided material.
- A user-friendly interface for uploading PDFs and accessing quizzes.
- Automated evaluation and scoring to save time.
- A way to refine or edit questions if needed.
- Secure storage or export options for quiz results.

Common Pain Points:

- Inaccurate or irrelevant question generation from the PDF.
- Slow processing time for quiz generation.
- Difficulty in understanding how to use the tool effectively.
- Concerns about data privacy and security when uploading PDFs.
- Lack of customization options for quizzes (e.g., difficulty level, question types).

12. Define Needs and Insights of Your Users

1. **Functional Needs:**
    - A reliable AI-powered tool to generate quizzes from PDFs.
    - Automated evaluation and instant feedback on quiz performance.
    - An intuitive and user-friendly interface for uploading documents and taking quizzes.
    - The ability to refine or customize generated questions.
    - Secure data handling to protect user-uploaded documents**.**
2. **Emotional Needs:**
    - Confidence in the accuracy and relevance of generated questions.
    - Reduced stress in quiz creation and evaluation for educators.
    - A sense of accomplishment when receiving instant feedback.
3. **Societal Needs:**
    - A tool that supports education by making learning more interactive and efficient.
    - Accessibility for diverse users, including students, teachers, and trainers.

User Insights:

- Users appreciate automation but still want control over the final quiz, requiring an option to edit or refine questions.
- Speed and accuracy are critical—delays in quiz generation or irrelevant questions can lead to frustration.
- Users expect AI-generated quizzes to mimic human-designed ones in structure and difficulty level.
- Privacy concerns arise when uploading study materials, so clear data security measures are necessary.
- Educators and trainers see this as a time-saving tool but may need additional features like exporting quizzes for external use.

13. POV Statements

PoV Statements (At least ten)	Role-based or Situation-Based	Benefit, Way to Benefit, Job TBD, Need (more/less)	PoV Questions (At least one per statement)
Students need a way to generate quizzes quickly from their study materials because manually creating questions is time-consuming and inefficient.	Situation	Way to Benefit	How can we design a system that automates quiz generation while ensuring accuracy and relevance?
Educators need a way to assess students without manually creating quizzes because they have limited time to prepare assessments.	Role-based	Need (less effort)	How can we create an AI-powered quiz tool that reduces educators' workload?
Online course creators need a way to offer interactive assessments because engaging quizzes improve student learning and retention.	Role-based	Way to Benefit	How can we design a quiz generator that enhances student engagement?
Trainers need a way to generate quizzes from multiple documents because their training materials come from various sources.	Role-based	Need (more flexibility)	How can we enable multi-document input for comprehensive quiz creation?
Students need a way to receive instant feedback on their quizzes because waiting for manual grading can slow down learning.	Situation	Way to Benefit	How can we provide real-time automated quiz evaluation?
Educators need a way to edit AI-generated questions because sometimes, the AI may not perfectly match their teaching style.	Role-based	Need (more control)	How can we give users control over modifying quiz content?
Users need a way to trust the security of their uploaded PDFs because they may contain sensitive or proprietary content.	Situation	Need (more security)	How can we ensure privacy and security for uploaded documents?
Test-prep students need a way to generate practice questions from study guides because	Role-based	Need (more practice)	How can we create a quiz generator that supports personalized

PoV Statements (At least ten)	Role-based or Situation-Based	Benefit, Way to Benefit, Job TBD, Need (more/less)	PoV Questions (At least one per statement)
they need more self-assessment opportunities.			test preparation?
Teachers need a way to sort questions by difficulty level because students have different levels of understanding.	Role-based	Need (more customization)	How can we allow users to adjust quiz difficulty?
Learners need a way to understand incorrect answers because learning from mistakes improves retention.	Situation	Way to Benefit	How can we provide explanations for wrong answers in the quiz evaluation?

14. Develop POV/How Might We (HMW) Questions to Transform Insights/Needs into Opportunities for Design

1. **User Need:** Students need a way to generate quizzes quickly from their study materials.
    - **HMW Question:** How might we create a fast and accurate AI-driven quiz generator from PDFs?
2. **User Need:** Educators need a way to assess students without manually creating quizzes.
    - **HMW Question:** How might we automate quiz creation while ensuring educators can customize the questions?
3. **User Need:** Online course creators need a way to offer interactive assessments.
    - **HMW Question:** How might we integrate engaging quiz formats that improve student participation and retention?
4. **User Insight:** Users appreciate automation but still want control over the final quiz.
    - **HMW Question:** How might we provide an easy way for users to edit and refine AI-generated quizzes?
5. **User Need:** Students need instant feedback on their quizzes.
    - **HMW Question:** How might we enable real-time quiz evaluation with meaningful feedback?
6. **User Insight:** Privacy concerns arise when users upload study materials.
    - **HMW Question:** How might we ensure secure and confidential handling of uploaded PDFs?
7. **User Need:** Trainers need a way to generate quizzes from multiple documents.
    - **HMW Question:** How might we allow multi-document input for generating comprehensive quizzes?
8. **User Insight:** Users expect AI-generated quizzes to mimic human-designed ones in structure and difficulty level.
    - **HMW Question:** How might we ensure that AI-generated questions match human-created quiz quality?
9. **User Need:** Teachers need a way to sort questions by difficulty level.

- **HMW Question:** How might we allow teachers to adjust quiz difficulty levels dynamically?

10. **User Need:** Learners need to understand incorrect answers to improve retention.

- **HMW Question:** How might we provide explanations and learning insights after quiz completion?

Task:

Write 3-5 "How Might We" questions based on your analysis of user needs and insights. These questions should challenge you to think of innovative solutions that can address user problems in meaningful ways.

This task encourages participants to think creatively about solving user problems, transforming challenges into opportunities for innovation.

User Need/Insight	"How Might We" Question
Students need a way to generate quizzes quickly from their study materials.	**How might we create a fast and accurate AI-driven quiz generator from PDFs?**

Educators need a way to assess students without manually creating quizzes.	**How might we automate quiz creation while ensuring educators can customize the questions?**

Users appreciate automation but still want control over the final quiz.	**How might we provide an easy way for users to edit and refine AI-generated quizzes?**

Students need instant feedback on their quizzes.	**How might we enable real-time quiz evaluation with meaningful feedback?**

Privacy concerns arise when users upload study materials.	**How might we ensure secure and confidential handling of uploaded PDFs?**

16. Crafting a Balanced and Actionable Design Challenge

How might we create an AI-powered quiz generation system that allows users to seamlessly generate, customize, and evaluate quizzes from PDFs, ensuring accuracy, security, and instant feedback to enhance the learning experience?

17. Validating the Problem Statement with Stakeholders for Alignment

Ensure your problem statement accurately represents the needs and concerns of your stakeholders and users. This involves gathering feedback from these groups to confirm that the problem is relevant and significant from their perspective. By validating early, you can refine the problem statement to better align with real-world challenges, ensuring your solution addresses the correct issues.

Validation Plan:

Stakeholder/User Feedback (Min. 10 Stakeholders/Experts):

Stakeholder/User Role		Feedback on Problem Statement	Suggestions for Improvement
M.R Sai Vamsy	Software Engineer at ARM	Finds it difficult to manually create quizzes for self-assessment while learning new technologies. Sees potential in an AI-powered quiz generator but worries about accuracy.	Ensure AI-generated questions align with technical document complexity. Provide an option to review and modify quiz questions for better reliability.

18. Ideation

Ideation Process:

Idea Number	Proposed Solution	Key Features	Challenges
Idea 1	AI-powered Quiz Generator from PDFs	Automatically generates quizzes from uploaded PDFs, saving time for students and educators.	Ensuring AI-generated questions are accurate, relevant, and free from

			errors.
Idea 2	**Customizable Quiz Editor**	**Users can edit, add, or remove questions after AI generates them.**	**Provides flexibility and ensures quizzes align with specific syllabus requirements.**
Idea 3	**Instant Quiz Evaluation with Feedback**	**AI instantly grades quizzes and provides explanations for answers.**	**Helps students understand mistakes and improve learning.**

19. Idea Evaluation

Evaluate the Idea based on 10/100/1000 grams

Idea	Impact (10/100/1000 grams)	Feasibility (10/100/1000 grams)	Alignment (10/100/1000 grams)	Total Weight
Idea 1 (AI-powered Quiz Generator from PDFs)	1000	100	1000	**2100**
Idea 2 (Customizable Quiz Editor)	1000	1000	1000	**3000**
Idea 3 (Instant Quiz Evaluation with Feedback)	1000	100	1000	**2100**
Idea 4 (Topic-Based Question Categorization)	100	1000	100	**1200**
Idea 5 (Secure Cloud-Based Quiz Storage)	100	1000	100	**1200**

Solution Concept Form

1. Problem Statement:

Students and educators struggle to efficiently generate high-quality quizzes from learning materials. Manually creating quizzes is time-consuming, and existing tools lack automation, personalization, and accurate evaluation.

2. Target Audience:

- Students: Seeking quick self-assessment tools to reinforce learning.
- Teachers/Educators: Needing an easy way to generate quizzes from PDFs and evaluate responses.
- Institutions: Looking for an automated solution to improve learning outcomes.

3. Solution Overview:

This project utilizes Gemini API and Retrieval-Augmented Generation (RAG) to generate automated quizzes from PDFs. Users can upload documents, and the system extracts key information to create multiple-choice questions (MCQs) that are automatically evaluated within the platform.

4. Key Features:

Feature	Description
AI-Generated MCQs	Extracts key concepts from PDFs and generates relevant multiple-choice questions.
Automated Evaluation	Instantly checks answers, providing explanations and scores for immediate feedback.
RAG Integration	Ensures accurate and contextually relevant quiz questions using an advanced retrieval model.

5. Benefits:

Benefit	Description
Time-Saving	Eliminates manual quiz creation, allowing educators and students to focus on learning.
Improved Learning	Generates tailored quizzes, reinforcing key concepts from study materials.
Scalable & Efficient	Can process various subjects and difficulty levels, adapting to diverse educational needs.

6. Unique Value Proposition (UVP):

Unlike generic quiz generators, this solution leverages AI and RAG to produce contextually accurate quizzes directly from uploaded PDFs. It not only creates relevant questions but also evaluates responses instantly, offering a seamless learning experience for students and educators.

7. Key Metrics:

Metric	Measurement
Quiz Generation Accuracy	Percentage of AI-generated questions that are contextually relevant and correctly aligned with the source material.
User Engagement	Number of quizzes generated and completed by users per week/month.
Response Evaluation Efficiency	Time taken for the system to analyze and provide feedback on quiz responses.
User Satisfaction	Feedback scores and reviews from students and educators on ease of use and effectiveness.

8. Feasibility Assessment:

This solution is highly achievable given modern AI advancements. Key considerations:
✓ Resources: Requires API access (Gemini API), backend integration, and a frontend for user interaction.
✓ Time: A MVP (Minimum Viable Product) can be developed within a few weeks with continuous improvements.
✓ Technology: Utilizes React frontend, Python backend, and MongoDB for database management, making it scalable and adaptable.

Potential challenges include fine-tuning RAG retrieval, handling large PDF processing, and ensuring bias-free AI-generated quizzes.

9. Next Steps:

1. Finalize Backend Development
    - Improve AI model fine-tuning for accurate quiz generation.
    - Implement automatic evaluation with real-time scoring.
2. Enhance User Experience
    - Refine the React UI for better accessibility and usability.

- Implement live testing with a sample user base (students/teachers).

3. Optimize Performance & Scalability
    - Ensure smooth handling of large PDFs and complex documents.
    - Deploy cloud-based infrastructure for scalability and speed.
4. Launch Beta Testing & Collect Feedback
    - Conduct controlled testing with educators and students.
    - Gather user insights to refine features before public launch.