Product Requirements Document (PRD): StudyPal

Document Owner: Shamsi Mumtahina Momo
Version: 1.0

---

1. Purpose

StudyPal is an AI-powered academic assistant designed to help college students centralize their study materials, transform raw course content into structured, digestible notes, and provide adaptive learning tools that improve comprehension and retention.

Today, students manage scattered resources across cloud drives, email attachments, screenshots, and recordings, making it hard to review efficiently and consistently. StudyPal solves this by acting as a *"study command center"* by storing, organizing, and analyzing all materials, and then delivering personalized study aids like summaries, flashcards, and quizzes.

The goal is to reduce the time and cognitive effort spent on manual study prep so students can focus on understanding and applying their knowledge.

---

2. Background & Business Case

Market Context

- Global edtech market expected to reach **$404B by 2025**, driven by AI adoption.
- Hybrid and asynchronous learning models are becoming the norm post-pandemic.
- Students increasingly rely on AI tools but lack integrated platforms tailored to their specific coursework.

Problem

- Students waste significant time collecting, cleaning, and organizing study materials.
- Generic AI chatbots provide answers without context or alignment to coursework.
- Many existing tools (Notion AI, ChatGPT, QANDA) focus on either note-taking or Q&A, but not both in a unified, adaptive platform.

Opportunity

StudyPal differentiates by:

- Handling multi-modal input (text, audio, video, images).
- Grounding all AI output in the student's own materials for context accuracy.
- Offering active & passive learning modes (quizzes, spaced repetition, micro-recaps).

Business Value

- Direct-to-student subscription model (freemium to premium).
- Potential partnerships with universities for campus-wide adoption.
- Strong brand positioning in the AI-in-education market.

---

3. Goals & Non-Goals

3.1 Goals (MVP Scope)

1. **Centralized Material Management**: Allow students to upload, store, and organize academic content in multiple formats (PDF, PPT, DOCX, TXT, video, audio, image) with automatic tagging.
2. **Contextual AI Summaries**: Generate structured notes, visual mind maps, and transcripts grounded in the user's uploaded materials.
3. **Personal AI Tutor**: Enable contextual Q&A with adjustable explanation depth ("ELI5" to graduate-level).
4. **Passive Learning**: Provide short, digestible daily study prompts ("What to Know" cards, audio recaps) to reinforce learning.
5. **Self-Testing Tools**: Generate flashcards and quizzes from user content with progress tracking and spaced repetition reminders.
6. **Search & Retrieval**: Offer fast, accurate keyword and natural language search across all uploaded materials.

7. **Accessibility & Usability**: Deliver a simple, intuitive interface that works for non-technical users.

3.2 Non-Goals (Out of Scope)

1. **Full Mobile App**: MVP will be web-based; mobile optimization and native apps are post-MVP.

2. **Collaborative Real-Time Editing**: Only single-user editing of AI-generated notes; real-time multi-user editing is out of scope.

---

4. Target Users & Personas

4.1 Primary Audience

- Undergraduate and graduate students in higher education.
- Ages 18–30, digitally literate, balancing coursework with other responsibilities.
- Rely on multiple digital sources for learning (slides, PDFs, video lectures, recordings, handouts).

4.2 Secondary Audience

- Adult learners and career switchers enrolled in online programs.

4.3 Personas

Persona 1: Emily Chen, "The Overwhelmed Freshman"

Profile

- Age: 19
- Major: Psychology

- Tech Comfort: Medium
- Study Habits: Takes photos of whiteboards, saves PDFs in random folders, often misses key lecture points.

Pain Points

- Feels lost keeping track of multiple courses' materials.
- Struggles to summarize readings into concise study notes.
- Doesn't know which topics to review before exams.

Goals

- Have all materials in one organized place.
- Receive AI-generated summaries that cut down reading time.
- Get reminders about concepts she hasn't reviewed in a while.

How StudyPal Helps

- Auto-tagging and folder organization for each class.
- Quick bullet-point summaries for dense reading assignments.
- Passive review via "What to Know" cards and spaced repetition.

Persona 2: Raj Mehta, "The Busy Senior"

Profile

- Age: 22
- Major: Computer Science
- Tech Comfort: High

- Study Habits: Uses multiple cloud storage accounts, watches lecture recordings on double speed, crams before deadlines.

Pain Points

- Wastes time searching across platforms for specific notes or lectures.
- Needs deeper, technical explanations to prepare for advanced exams.
- Wants efficient revision methods to balance internship work and academics.

Goals

- Retrieve any material instantly via search.
- Have quizzes generated from his own notes for self-testing.
- Customize learning depth from quick refresh to technical deep dive.

How StudyPal Helps

- Fast keyword and natural language search across transcripts and slides.
- Auto-generated flashcards and quizzes from lecture notes.
- Multi-level explanations for different preparation scenarios.

Persona 3: Sofia Martinez, "The International Student"

Profile

- Age: 25
- Program: Master's in Business Administration (MBA)
- Tech Comfort: Medium
- Study Habits: Reads slowly in English, prefers visual learning aids, rewatches lectures multiple times.

Pain Points

- Struggles with long, complex readings in a second language.
- Needs simple explanations before diving into advanced concepts.
- Prefers visual and audio learning over text-only resources.

Goals

- Have AI simplify complex material into beginner-friendly terms.
- Use mind maps and visual aids to connect concepts.
- Listen to short audio recaps during commutes.

How StudyPal Helps

- Adjustable explanation depth (simple - intermediate - advanced).
- 2-minute audio summaries for on-the-go learning.

5. Competitive Landscape

5.1 Key Competitors

Competitor	Core Offering	Strengths	Weaknesses	Differentiation for StudyPal
Notion AI	AI-powered note-taking and document organization.	Highly flexible workspace, integrations, clean UI.	Not education-specific; lacks adaptive learning features; no contextual Q&A from a student's own materials.	StudyPal is purpose-built for students, with adaptive quizzes, spaced repetition, and explanations at multiple complexity levels.

ChatGPT (Study Mode)	Conversational AI with study prompts and question answering.	Strong reasoning abilities, customizable tone.	Generic answers without grounding in user-provided coursework; no built-in organization system.	StudyPal's AI only answers from the student's uploaded files, ensuring relevance to coursework.
Khanmigo (Khan Academy)	AI tutor integrated with Khan Academy's curriculum.	Trusted brand, structured lesson paths.	Only works with Khan Academy content; not customizable to user's own materials.	StudyPal adapts to any course content from any institution.
YouLearn.ai	Adaptive learning platform with AI-driven quizzes.	Strong personalization, good for test prep.	Limited file format support; weaker organizational tools.	StudyPal supports multi-modal uploads (PDF, PPT, video, audio, image) with auto-tagging and search.

5.2 Differentiation Summary

- **Multi-Modal Input Support**: Handles PDFs, PPTs, DOCX, TXT, audio, video, and images.
- **Context-Aware AI**: All responses grounded in the student's own content, improving accuracy and relevance.
- **Active + Passive Learning**: Combines quizzes and flashcards with micro-reviews and audio recaps.
- **Adjustable Explanation Depth**: Lets students choose the complexity of explanations.
- **Integrated Organization & Retrieval**: Automatic tagging, folder structuring, and fast search across materials.

---

6. Requirements

6.1 Functional Requirements

Epic 1: Smart Organization of Study Materials

Objective: Enable students to upload, manage, and retrieve academic content in multiple formats.

Feature	User Story	Acceptance Criteria
Multi-Format Upload	As a student, I want to upload PDFs, PPTs, DOCX, TXT, MP4, MOV, MP3, WAV, JPG, PNG into course/topic folders.	Files upload without corruption; preview available; supports min. 100MB per file in MVP; drag-and-drop and manual selection supported.
Auto-Tagging	As a student, I want files tagged with course, topic, and upload date.	Tags generated automatically based on metadata; editable in UI; updates propagate to search index within 10 seconds.
Search by Content	As a student, I want to search inside documents and transcripts.	Returns relevant results in <2 seconds for ≤1,000 files; highlights keyword in snippet preview.
Natural Language Search	As a student, I want to ask “Show me lecture notes on supply chain models” and see relevant files.	AI ranks results with ≥80% relevance in pilot testing; displays top 5 matches by default.
Filtering	As a student, I want to filter search results by file type.	Filters update instantly; multiple filters combinable.

Epic 2: AI-Generated Study Summaries

Objective: Turn raw course materials into digestible, structured study aids.

Feature	User Story	Acceptance Criteria
Smart Summaries	As a student, I want bullet-point or one-page summaries from my readings/lectures.	Summaries contain main ideas, definitions, formulas; ≥85% accuracy in pilot evaluation.
Transcription	As a student, I want my lecture videos/audio converted into text.	≥90% accuracy in quiet audio; timestamps included for each paragraph.
Handwriting Recognition	As a student, I want my scanned notes turned into editable text.	Output editable, with ≥80% accuracy for legible writing.
Mind Maps	As a student, I want visual mind maps from lecture slides.	Minimum of 3 main branches; sub-branches per slide section.

Editable Notes	As a student, I want to edit, highlight, and annotate AI-generated notes.	Edits persist in user account; highlights exportable to PDF.

Epic 3: Personal AI Tutor

Objective: Answer contextual questions based only on a student's uploaded materials.

Feature	User Story	Acceptance Criteria
Contextual Q&A	As a student, I want answers based only on my uploaded files.	Response contains citation; irrelevant info ≤10% of output.
Voice-to-Text Queries	As a student, I want to ask questions verbally.	≥95% transcription accuracy; works for ≤60-second input.
Multi-Level Explanation	As a student, I want explanations in simple, intermediate, and advanced forms.	Users can switch explanation depth without re-asking.
Source Transparency	As a student, I want to see which files/sections were used.	Sources link to specific file and timestamp/page.

Epic 4: Passive Learning Enablement

Objective: Support quick, low-effort study sessions.

Feature	User Story	Acceptance Criteria
"What to Know" Cards	As a student, I want top 5 facts per topic.	Facts ≤150 characters each; sourced from my materials; updated daily.
Audio Recaps	As a student, I want 2-min topic summaries in audio format.	Playable in-app; downloadable MP3.
Save to Review Queue	As a student, I want to store AI outputs for later.	Saved items retrievable in <1s; show timestamp and source.
Spaced Repetition	As a student, I want reminders to review saved items.	Default intervals: 1, 3, 7 days; user can adjust schedule.

Epic 5: Practice & Self-Testing

Objective: Reinforce retention through active recall.

Feature	User Story	Acceptance Criteria

Auto Flashcards	As a student, I want flashcards from my materials.	At least 10 per file; editable; shuffle mode supported.
Auto Quizzes	As a student, I want multiple-choice and short-answer quizzes.	Each question includes correct answer + explanation; ≥80% relevance accuracy.
Performance Tracking	As a student, I want to track my quiz results over time.	Dashboard shows trends by topic and accuracy %; data exportable to CSV.

6.2 Non-Functional Requirements

Requirement	Description
Performance	Search results in <2 seconds for ≤1,000 files; uploads processed in <10 seconds for ≤100MB.
Scalability	Architecture supports up to 10,000 files per user without significant performance degradation.
Security	All data encrypted at rest (AES-256) and in transit (TLS 1.3); compliant with GDPR and FERPA.
Availability	99% uptime during academic term; scheduled maintenance outside exam periods.
Cross-Platform Support	MVP optimized for Chrome, Firefox, Safari; responsive design for mobile browsers.

7. User Experience (UX)

7.1 Information Architecture

StudyPal will have five primary navigation sections:

1. **Dashboard**: Personalized overview of active courses, recent uploads, upcoming reviews, and quick access to AI study tools.

2. **Courses**: A dedicated space for each course, containing organized materials, summaries, quizzes, and notes.

3. **AI Tutor**: Contextual Q&A interface with text and voice input, adjustable explanation depth, and source display.

4. **Practice**: Flashcards, quizzes, performance tracking, and spaced repetition settings.

5. **Profile & Settings**: User preferences, file storage usage, and account management.

7.2 Key User Flows

Flow 1: Upload & Auto-Tag Materials

1. **Trigger:** User clicks “Upload” button in a course folder.

2. **Action:** User drags/drops or selects file(s).

3. **System:** Auto-tags with course name, topic, date.

4. **Outcome:** File preview appears; tagged data is searchable immediately.

Flow 2: Generate AI Summaries

1. **Trigger:** User selects a file and clicks “Summarize.”

2. **Action:** User chooses summary type (bullet-point, one-page, mind map).

3. **System:** AI processes file; displays structured output with “Edit” mode enabled.

4. **Outcome:** Users can highlight, annotate, or save to Review Queue.

Flow 3: Ask Contextual Question

1. **Trigger:** User opens AI Tutor tab.

2. **Action:** User types or speaks question; selects explanation depth.

3. **System:** AI retrieves and cites relevant sections from uploaded files only.

4. **Outcome:** Answer displayed with expandable source links.

Flow 4: Practice with Auto-Generated Quiz

1. **Trigger:** User clicks “Generate Quiz” in the Practice tab.
2. **Action:** User selects course/topic and question type (MCQ or short-answer).
3. **System:** AI generates a quiz with correct answers and explanations.
4. **Outcome:** User completes quiz; results stored in performance dashboard.

Flow 5: Passive Learning Review

1. **Trigger:** User logs in; sees “What to Know” cards on Dashboard.
2. **Action:** User clicks card to expand; can save to Review Queue.
3. **System:** Spaced repetition reminders appear at configured intervals.

7.3 Wireframe Descriptions (MVP)

Dashboard

- **Top Bar:** Logo, global search bar, profile menu.
- **Main Panel:**
    - Left: Quick Upload, “What to Know” cards.
    - Right: Upcoming reviews, recent uploads.

Course Page

- **Tabs:** Materials, Summaries, Practice, Notes.
- **Materials View:** Grid/list toggle with file preview thumbnails.

AI Tutor

- **Left Panel:** Conversation history.
- **Main Panel:** Q&A window with depth selector and voice input.

- **Right Panel:** Sources used with clickable links.

Practice Page

- Flashcard carousel, quiz generation settings, performance charts.

Profile & Settings

- Preferences for summary style, notification frequency, file management.

---

8. Success Metrics / KPIs

The success of StudyPal's MVP will be evaluated based on student learning impact, user engagement, and business performance.

8.1 Learning Impact Metrics

These metrics validate whether StudyPal improves students' academic performance and study efficiency.

Metric	Definition	Target (MVP)
Quiz Score Improvement	Average % increase in user quiz scores after using StudyPal for 2+ weeks.	≥15% improvement
Recall Accuracy	Accuracy rate in flashcard reviews after spaced repetition.	≥80% retention after 7 days
Time-to-Concept Understanding	Time taken to answer correctly after requesting an explanation.	20% faster than baseline
Self-Reported Confidence	Students report higher understanding of topics post-use.	≥70% report "better" or "much better"

8.2 Engagement Metrics

These measure how consistently and deeply students use StudyPal.

Metric	Definition	Target (MVP)
Weekly Active Users (WAU)	% of registered users active in a given week.	≥60%
Daily AI Interactions	Avg. number of AI actions (summaries, Q&A, quizzes) per active user/day.	≥3
File Upload Frequency	Avg. number of files uploaded per user/week.	≥5
Passive Learning Engagement	% of users interacting with “What to Know” cards or audio recaps.	≥50% of WAU

8.3 Business Metrics

These ensure the product’s market viability and growth potential.

Metric	Definition	Target (MVP)
Conversion Rate (Free to Paid ratio)	% of free users upgrading to premium plans.	≥5%
Churn Rate	% of paid users who cancel within 3 months.	≤10%
NPS (Net Promoter Score)	Measures user likelihood to recommend StudyPal.	≥30
CAC (Customer Acquisition Cost)	Cost to acquire a new paying user.	≤20% of LTV

---

9. Risks & Mitigation

9.1 Product Risks

Risk	Impact	Likelihood	Mitigation
AI outputs irrelevant or inaccurate	Loss of trust and reduced engagement.	Medium	Implement source citation for every AI response; allow users to flag and correct errors; introduce

			human-in-the-loop review for critical outputs during pilot.
Feature creep before MVP	Delayed launch and bloated scope.	High	Lock MVP feature set in PRD; maintain strict backlog prioritization; use MoSCoW method for future features.
Low adoption among target students	MVP fails to gain traction.	Medium	Run early campus ambassador programs; integrate feedback loops during pilot phase.

9.2 Technical Risks

Risk	Impact	Likelihood	Mitigation
AI model latency	Poor UX if responses take too long.	Medium	Optimize prompt structure; pre-process materials on upload; use async loading with partial responses.
Speech-to-text inaccuracies for non-native accents	Reduced tutor usability for international students.	Medium	Use multiple STT models with confidence scoring; allow text input fallback.
Scalability issues with large file volumes	Performance degradation.	Low (MVP)	Start with file size limits; optimize storage architecture; use cloud-based scalable infrastructure (AWS S3 + Lambda).

9.3 Operational Risks

Risk	Impact	Likelihood	Mitigation
Data privacy concerns from universities	Potential rejection in academic partnerships.	High	Transparent privacy policy; encryption at rest and in transit.

10. Release Plan & Dependencies

10.1 MVP Release Timeline (3 Months)

Month 1: Foundations & Core Infrastructure

- Finalize UX/UI designs and user flows.
- Set up cloud infrastructure (AWS S3 for storage, AWS Lambda for processing).
- Implement user authentication (OAuth with email + university SSO option).
- Build multi-format file upload & storage with auto-tagging.
- Develop basic keyword search with filters.

Month 2: AI Processing & Core Learning Features

- Integrate summarization AI for PDFs, PPTs, DOCX, TXT.
- Implement transcription for MP4, MOV, MP3, WAV.
- Build contextual Q&A engine (grounded in user's materials).
- Add editable notes and highlighting functionality.
- Begin internal QA testing with mock datasets.

Month 3: Learning Tools & Pilot Launch

- Implement flashcard and quiz generation from uploaded materials.
- Add "What to Know" cards and audio recaps (passive learning).
- Build spaced repetition and review queue.
- Integrate performance tracking dashboard.
- Conduct closed beta with 20–30 students.
- Collect feedback and iterate pre-public launch.

10.2 Dependencies

Technical Dependencies

- **OpenAI API**: For summarization, Q&A, and explanation depth.
- **AWS:** File storage and retrieval.
- **Whisper API**: Speech-to-text for lecture audio/video.
- **MongoDB:** User data and metadata storage.

Operational Dependencies

- University partnerships for pilot user recruitment.
- Student ambassadors for early adoption marketing.

10.3 Post-MVP Roadmap (6–12 Months)

Phase 2 (Month 4–6)

- Mobile app (iOS + Android).
- Multi-user collaborative study rooms.
- Advanced analytics for student performance.

Phase 3 (Month 7–12)

- AI-driven personalized study plans.
- Support for handwritten note capture using mobile camera.
- Institutional licensing for universities.

Conclusion

StudyPal is positioned to fill a critical gap in the student learning ecosystem by combining centralized organization, contextual AI assistance, and adaptive learning tools into a single, accessible platform. Unlike generic AI chatbots or single-purpose note-taking apps, StudyPal is

designed for students, with students grounding all outputs in their own coursework, and supporting both active recall and passive reinforcement.

The MVP balances impactful core features (multi-format uploads, AI summaries, contextual Q&A, self-testing tools) with a lean build timeline that enables rapid pilot testing, user feedback, and iteration. By focusing on measurable learning outcomes, strong engagement metrics, and early institutional partnerships, StudyPal can establish itself as a trusted academic companion and a scalable edtech business.