PRODUCT DESIGN CASE STUDY • EDUCATION WORKFLOW SAAS

Paper Plane

A secure, collaborative way to create, review, approve, and print school exam papers.

CREATE	REVIEW
Draft and reuse questions	Comment and request changes
APPROVE	PRINT
Track decisions and versions	Deliver the approved document

UX/UI Case Study • Discovery • Research synthesis • IA • User flows • Design system • Screen specifications • Validation plan

Prepared as a portfolio-ready working case study. Research inputs are separated from assumptions and proposed solutions. No usability outcomes or performance gains are claimed without evidence.

Visual direction: Academic Green — forest green, sage, warm white, muted mustard, and neutral gray.

How to read this case study

This document records the current design thinking for Paper Plane based on the workflow details shared for the project. It distinguishes input, synthesis, hypotheses, and proposals.

Evidence label	Meaning
Project / interview input	Workflow or constraint described in discovery conversations.
Synthesis	Design interpretation connecting multiple inputs.
Hypothesis / opportunity	A plausible problem or solution to validate; not a proven finding.
Design proposal	Recommended interface or workflow for stakeholder review.
To validate	Open question requiring a client decision, user test, or technical check.

Project at a glance

Item	Current definition
Product	Paper Plane: multi-organization SaaS for school exam-paper workflows.
Users	Teachers, reviewing teachers/senior teachers, administrators/coordinators, final authority, printing staff.
Platforms	Mobile-first, with the same core capabilities on responsive web and mobile.
Core journey	Create → Review → Correct / Resubmit → Approve → Secure finalization → Print.
Design challenge	Coordinate a high-stakes document lifecycle across roles while keeping ownership, versions, and security clear.
Status	Concept, workflow definition, wireframe and visual direction. Usability outcomes are not yet available.

Important: do not present proposed personas, metrics, or UI as validated findings until they have been confirmed with users.

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1. Executive summary

Paper Plane is a proposed exam-paper management platform for schools. It brings the paper lifecycle into one traceable workflow: a teacher creates a paper, a reviewer checks content and structure, the teacher resolves corrections, designated authorities approve the final version, and printing staff receive the correct approved document.

The opportunity is not simply to digitize a form. It is to make handoffs visible, reduce ambiguity around the next action, and protect the final approved paper.

Design challenge

How might we help school teams create accurate exam papers, collaborate on corrections, and move the right version through school-specific approval stages to secure printing—with clear ownership at every step?

Design direction

- One paper workspace: paper details, questions, comments, revisions, approvals, and final document are connected.
- Role-aware tasks: each user sees the work they can act on and the next required step.
- Configurable workflow: schools can adapt approval stages rather than follow one universal process.
- Visible version history: reviewers and final approvers can identify the version being reviewed.
- Preview before handoff: import and print layouts are checked before the paper moves forward.
- Security by design: final approval and printing permissions are distinct responsibilities.

Success definition

Success should be measured through task completion, error recovery, status comprehension, correction closure, version accuracy, and accessibility testing. No numeric improvement is claimed at this stage.

2. Context, problem statement, and goals

Background

School exam papers are assembled from multiple sources and passed between people for review, correction, approval, and printing. The workflow includes content decisions as well as document-quality and security checks. Different schools may use similar steps but need different approval arrangements.

Problem statement

The current process relies on disconnected files, manual handoffs, and repeated checks. This can make it difficult to know which version is current, what feedback remains unresolved, who owns the next action, and whether the file being printed is the final approved document.

Why it matters

Role	Need	Risk if unsupported
Teacher	Create and revise a paper without losing structure or feedback.	Repeated manual work, missed corrections, formatting errors.
Reviewer	Check quality and communicate exact changes.	Vague feedback or review of an outdated version.
Coordinator / admin	Manage staff, assignments, and school-specific workflow.	Unclear ownership or process mismatch.
Final authority	Approve the correct version with confidence.	Accidental approval of an outdated or incomplete paper.
Printing staff	Receive and verify the authorized final file.	Wrong-version printing or sensitive-file exposure.

Product goals

- Make status and next actions understandable at a glance.
- Support creation from scratch, saved questions/sections, and file import.
- Keep review comments tied to the relevant question or document context.
- Make corrections and resubmissions traceable.
- Support school-configured approval stages and distinct roles.
- Make the approved-to-print handoff controlled and auditable.

First-release non-goals

- Replacing teacher subject-matter judgment with automatic question generation.
- Building AI scoring, plagiarism detection, or automatic difficulty grading before core workflows are validated.
- Assuming every school follows the same approval chain.
- Treating a password-protected PDF as the only security control.

3. Discovery inputs and current-state workflow

Inputs shared in discovery

- The yearly exam calendar guides when papers need to be prepared.
- Teachers use textbooks, AI tools, and previous-year questions as sources.
- Existing formats are often reused; new formats may require estimating marks from difficulty.
- Papers are submitted manually to senior teachers for review.
- Review covers class/subject fit, correctness, spelling, diagrams, difficulty, toughness, and marks.
- Corrections may be marked on physical paper; the teacher checks sources, edits, and resubmits.
- MCQ sections are often reused from previous years.
- Work may move between PDFs, hard copies, and email.
- Approval stages vary between schools and may involve multiple authorities.
- Printing staff receive approved PDFs through a manual handoff and may verify approver details.
- Final PDFs are password-protected; the final authority changes the password.
- Formatting issues can occur during printing.
- Staff assignments are decided by senior meetings and may be reassigned.
- The client wants an in-app sharing chain for question-bank material.

Current-state journey

Stage	Activity	Friction / risk
Plan	Use yearly exam calendar and assign work.	Responsibilities and deadlines may live outside the paper.
Create	Collect questions from books, AI, and past papers.	Content is spread across sources and formats.
Submit	Share file or hard copy with senior teacher.	Manual handoff and unclear status.
Review	Check correctness, spelling, diagrams, difficulty, marks.	Many checks rely on careful manual inspection.
Correct	Mark changes, edit, and resubmit.	Repeated loops are difficult to track across versions.
Approve	Complete school-specific stages.	Approval rules differ by school.
Finalize	Protect final PDF and prepare handoff.	Access and password handling need clear controls.
Print	Receive approved file and print.	Wrong-version and formatting risks remain.

This is a synthesized journey from shared project context, not a time-and-motion study. Frequency and severity should be validated with additional participants.

4. Research synthesis and opportunities

Theme 1 — Content is scattered

Questions come from textbooks, AI, previous papers, PDFs, and hard copies. Reusable MCQ sections are valuable, but reuse may depend on manual searching and sharing.

- Explore a searchable question bank with class, subject, chapter, type, and marks metadata.
- Allow saved sections to be reused without silently overwriting the original.
- Preview imported content before adding it to the editor.

Theme 2 — Review is detailed and repetitive

Reviewers check correctness, class/subject alignment, spelling, diagrams, difficulty, and marks. Feedback may be physical or general rather than attached to the exact question.

- Explore question-level comments and a review checklist.
- Use a clear Changes requested state with unresolved items.
- Let teachers mark each correction addressed and respond.

Theme 3 — Approval stages vary

Different schools have similar but non-identical approval flows. Responsibilities can change.

- Explore configurable stages, owners, and required/optional steps.
- Show approval history with actor, decision, timestamp, and version.
- Make the next-action owner visible.

Theme 4 — Printing is a risk point

The final document is handed to printing staff. Teams may verify approval details and protect the PDF, while formatting errors can still appear.

- Provide print-ready preview and validation.
- Separate printing permissions from editing and final approval.
- Consider controlled handoff and print-status history.

Prioritization

Priority	Opportunity	Reason
P0 / MVP	Statuses, comments, correction loop, approval history	Supports core lifecycle and reduces ambiguity.
P0 / MVP	Editor, basic question bank, import preview	Supports primary creation paths.
P0 / MVP	Role permissions and approved-file handoff	Protects responsibility boundaries.
P1	Version comparison, reassignment, advanced filters	Useful once core flows work.
Later / validate	AI generation, difficulty suggestions, duplicate detection	Potentially valuable but not necessary to prove the workflow.

5. Personas and jobs to be done

These are provisional role-based personas derived from the described workflow. They are not demographic personas and should be validated with actual users.

Teacher / paper creator

Goal: create a complete, accurate paper and respond to feedback without losing invested work.

- Needs: easy question entry, reuse, marks totals, import preview, autosave, clear correction list.
- Pain points to validate: scattered sources, manual formatting, unclear feedback, uncertainty about current version.
- Success signal: paper is complete, submitted, and review status is clear.

Reviewing teacher / senior teacher

Goal: assess paper quality and communicate precise, actionable corrections.

- Needs: assigned queue, readable preview, question-level comments, checklist, version context.
- Pain points to validate: manual cross-checking and uncertainty about whether corrections were made.
- Success signal: required checks are completed and decision is tied to the reviewed version.

Exam coordinator / school administrator

Goal: coordinate staff, deadlines, assignments, and approval process.

- Needs: staff/roles, workflow configuration, assignment visibility, pending queues.
- Pain points to validate: reassignments and school-specific process differences.
- Success signal: responsibilities and required stages are configured and understandable.

Final authority

Goal: authorize the final version and ensure the correct document is released.

- Needs: completed review history, version identifier, unresolved-item warnings, explicit approve/return decisions.
- Should remain distinct from printing staff by default.
- Success signal: final decision is traceable and applies to a specific version.

Printing staff

Goal: print the correct approved paper with expected formatting and access controls.

- Needs: print queue, paper identity, approved version, preview, release status.
- Should not edit question content or approve papers by default.
- Success signal: correct authorized file is printed and status is recorded if required.

Jobs to be done

When…	I want to…	So I can…
Starting a paper	Choose scratch, question bank, or import	Use the fastest suitable starting point.
Reviewing	Comment on a question and record a decision	Make feedback precise and actionable.
Receiving feedback	See unresolved items and mark them addressed	Avoid missing corrections before resubmission.
Approving	Review the exact version and approval history	Approve with confidence.
Printing	Access the approved release and preview it	Avoid printing an outdated or badly formatted file.

6. Product principles, scope, and requirements

Principle	Meaning in the UI
Simple	Keep primary actions obvious; hide administrative complexity until needed.
Clear	Use explicit labels such as Request changes, not ambiguous Done.
Traceable	Show who did what, when, and to which version.
Role-aware	Only expose actions the current role can perform.
Consistent	Reuse editor, status language, and paper overview across platforms.
Accessible	Readable text, sufficient contrast, visible focus, and status beyond color.
Secure	Separate editing, final approval, and print-release permissions.

MVP functional requirements

ID	Requirement	Acceptance signal
FR-01	Create organization and isolate its data.	Users cannot view another organization’s papers or bank.
FR-02	Invite staff and assign roles.	Unauthorized actions are blocked server-side.
FR-03	Create from scratch, question bank, or file import.	All paths lead to the same editor and preview.
FR-04	Edit sections/questions and calculate marks.	Totals update and mismatches are surfaced.
FR-05	Save draft and submit for review.	Status and next owner update clearly.
FR-06	Comment on questions and request changes.	Comments link to a question/version.
FR-07	Resolve feedback and resubmit.	Resolved and pending items remain distinct.
FR-08	Configure approval stages.	School defines stage sequence and owners.
FR-09	Record approval history.	Actor, timestamp, decision, and version are visible.
FR-10	Release approved document for printing.	Only authorized releases enter print queue.
FR-11	Preview and validate content.	Users inspect the document before submission and printing.

Non-functional requirements

- Organization-level data isolation and server-side permission enforcement.
- Reliable autosave or clear unsaved-change warnings.
- Responsive layout and equivalent core capabilities across mobile and web.
- Audit events for submissions, comments, approvals, releases, and permission changes.
- File validation, malware scanning, safe storage, and retention rules to be defined with engineering.
- Performance suitable for long papers and large question lists.

7. Information architecture and navigation

Area	Key pages / views
Home	Dashboard, upcoming exams, pending tasks, quick create.
Exam Papers	All, My papers, Drafts, Submitted, Approved, paper details.
Question Bank	Questions, saved sections, templates, import.
Review & Approvals	Assigned to me, awaiting correction, pending approval, history.
Printing	Ready to print, document preview, print status, handoff history.
Exams & Schedule	Exam calendar, class/subject context, deadlines.
Organization Settings	Staff, roles, approval workflows, permissions.
Notifications	Review requests, changes, comments, approvals, reassignment.
Profile	Account details, preferences, sign out.

Mobile navigation

Use five persistent destinations: Home, Papers, Create, Tasks, and Profile. Make Create the central primary action. Question Bank, exam schedule, settings, and printing can be reached contextually or through role-aware menus.

Web navigation

Use a left sidebar for main product areas and a top bar for organization context, search, notifications, and profile. Keep the paper workspace’s Overview, Questions, Review, and History tabs consistent with mobile.

Paper detail hierarchy

1. Overview: class, subject, exam, marks, duration, creator, status, next owner.
2. Questions: sections, content, marks, diagrams, and editor actions where permitted.
3. Review: comments, checklist, unresolved items, responses.
4. History: submitted versions, decisions, approvals, and document events.
5. Final document: print preview, approval state, controlled download/handoff.

8. Core user flows and state model

Flow A — Create an exam paper

1. Open dashboard and select Create Exam Paper.
2. Enter class, subject, exam, total marks, duration, and optional instructions.
3. Choose Start from scratch, Use question bank, or Import from file.
4. Add and organize content in the shared editor.
5. Check section totals, required fields, and formatting.
6. Preview the paper and resolve validation warnings.
7. Save draft or submit for review.
8. Show confirmation with status and next responsible role.

Creation error states

- Missing required exam details or invalid marks.
- Unsupported/corrupted import file.
- Imported equations, diagrams, or spacing need manual verification.
- Network failure or unsaved edits.
- User lacks permission to submit.

Flow B — Review, corrections, resubmission

1. Reviewer opens Assigned to me / Review Queue.
2. Selects paper and confirms version being reviewed.
3. Inspects questions and preview against review checklist.
4. Adds a question-level comment or general note.
5. Chooses Approve stage or Request changes; reason is required for the latter.
6. Teacher sees comments, updates paper, and marks feedback addressed or replies.
7. Teacher previews and resubmits.
8. Reviewer checks updated version and closes or reopens remaining items.

Flow C — Final approval and printing

1. Final authority opens a paper after required prior stages.
2. Reviews current version, comments, validation status, and approval history.
3. Approves or returns it for changes.
4. System locks or snapshots approved version so edits cannot silently alter it.
5. Authorized user finalizes PDF and follows the school’s agreed security process.
6. Printing staff access approved release and inspect print preview.
7. Printing staff record print status if tracking is required.

Proposed state model

Status	Meaning / next action
Draft	Creator can edit; not submitted.
Pending review	Waiting for assigned reviewer.
Review in progress	Reviewer checks current version.
Changes requested	Teacher must resolve one or more items.
Resubmitted	Updated version returned for review.
Pending approval	Required review stages complete; approver action needed.
Approved	Designated authority approved a specific version.
Finalization pending	Approved version awaits final document preparation.
Ready for printing	Authorized document is available to printing staff.
Printing in progress	Print work started, if tracking is enabled.
Printed	Print completion recorded.
Withdrawn / archived	Paper is no longer active or retained for history.

Status alone must not imply permission. Every state-changing action must be checked against role permissions and current version.

9. Wireframe-to-UI design decisions

What wireframes established

- Separate but connected surfaces for creation, review, correction, approval, and printing.
- One shared editor for all three creation paths.
- Paper status visible on list cards and in the detail timeline.
- Comments and correction states close to the question they describe.
- Preview and validation before submission and printing.
- Compact mobile navigation, scannable cards, and short primary labels.

High-fidelity direction

Academic Green uses forest green for primary actions and brand identity, sage for supportive surfaces, muted mustard for small highlights, warm white for the canvas, and neutral gray for borders and secondary information. Semantic status colors remain separate from the brand palette.

Group	Screens in current concept
Entry & overview	Login/Splash, Dashboard, Notifications.
Paper management	Exam Papers list, Paper Details / Overview.
Creation	Create Exam Paper, Choose Creation Method, Question Bank, Import from File.
Editing	Paper Editor, Edit Question, Paper Preview / Validation.
Review	Review Queue, Review Paper, Add Comment, Review Decision.
Correction loop	Teacher Resubmission / Resolve Feedback.
Approval & print	Final Approval, Document Finalization, Printing Queue, Print Preview & Output.

Visual hierarchy rules

- One dominant primary action per screen where possible.
- Keep destructive actions separate and confirm them.
- Use status labels with text plus icon/shape; never rely on color alone.
- Keep paper identity—exam, class, subject, version—visible during review and approval.
- Use a compact summary for long forms and reserve space for validation.
- Make feedback scannable with question reference, author, time, and resolution state.

10. Design system — Academic Green

Brand concept

Paper Plane should feel educational, calm, reliable, and operationally clear. The paper-plane symbol suggests movement through a process; academic green differentiates it from generic purple SaaS styling without becoming overly playful.

Token	Hex	Usage
Forest Green	#245B45	Primary buttons, selected navigation, key brand marks.
Forest Dark	#173D31	High-emphasis headings.
Sage	#D9E8D8	Supportive panels and icon backgrounds.
Muted Mustard	#E7B653	Small highlights, not long text.
Warm White	#FAF8F1	Primary page canvas.
Charcoal	#252A27	Main text and headings.
Muted Gray	#626B65	Secondary text and metadata.
Border Gray	#E1E5E1	Dividers, input borders, card outlines.
Success	#218653	Approved/complete state, paired with text.
Warning	#B66A00	Attention needed and validation warnings.
Error	#C83E3A	Blocking errors and destructive feedback.
Info	#2868B2	Informational status and guidance.

Typography

Recommended typeface: Inter or a similar highly legible sans-serif. Keep a clear hierarchy and avoid tiny metadata on mobile.

Style	Size / line height	Use
Display	32 / 40 px	Product/page headline.
H1	24 / 32 px	Page title.
H2	20 / 28 px	Major section.
H3	18 / 24 px	Card/subsection title.
Body large	16 / 24 px	Important explanatory text.
Body	14 / 20 px	Forms and lists.
Body small	12 / 18 px	Metadata; use sparingly.
Label	12–14 px	Input labels and helper text.

Spacing and layout

- Use a 4 px base spacing scale: 4, 8, 12, 16, 24, 32, 40, 48.
- Mobile content padding generally 16–20 px.
- Use 8–12 px gaps inside compact components and 16–24 px between sections.
- Use consistent card padding and restrained elevation.
- Desktop web uses a 12-column grid and readable maximum width; mobile uses a single column.

Component rules

Component	Rules
Primary button	Forest green, white label, clear verb, 44 px minimum target where practical.
Secondary button	Neutral surface with visible border.
Text field	Persistent label, visible focus, helper/error text, clear required behavior.
Status chip	Short label plus icon or shape; maintain contrast.
Paper card	Title, class/subject, status, updated/submitted date, overflow actions.
Question row	Number, preview, type, marks, action menu.
Comment item	Question reference, author, timestamp, comment, resolution state.
Timeline	Ordered events with actor, time, version, decision, and next owner.
Confirmation	For destructive or irreversible actions, not routine navigation.

11. Detailed screen specifications

1. Login / Splash

Purpose: Build trust and get staff into the right organization.

Key UI elements: Email/password with visible labels; forgot password; sign-in feedback; organization context if users belong to multiple schools.

States to design: Invalid credentials, expired invite, locked account, network failure.

2. Dashboard

Purpose: Help each role understand today’s work.

Key UI elements: Role-aware summary; upcoming exams; quick create; pending review/correction/approval/printing cards.

States to design: New organization empty state; overdue items; no permission to create.

3. Notifications

Purpose: Surface events requiring attention.

Key UI elements: All/unread/mentions filters if supported; event, paper, timestamp, destination; predictable read state.

States to design: Duplicate/stale events; inaccessible paper.

4. Exam Papers list

Purpose: Find papers and understand state.

Key UI elements: Search, status filters, My Papers, Drafts, Submitted; title, class, subject, status, date; role-aware actions.

States to design: No results, loading, reset filters, archived paper.

5. Paper Details

Purpose: Single source of truth for paper identity and lifecycle.

Key UI elements: Exam/class/subject/marks/duration; creator; status timeline; next owner; Overview, Questions, Review, History.

States to design: Stale version, withdrawn paper, missing owner.

6. Create Exam Paper

Purpose: Collect minimum metadata before content.

Key UI elements: Required class, subject, exam, total marks; optional duration/instructions; inline validation.

States to design: Missing required field, invalid marks, duplicate warning if applicable.

7. Creation Method

Purpose: Offer clear starting paths.

Key UI elements: Start from scratch; use question bank; import file; explain what follows.

States to design: Unsupported import; empty bank; permission-limited content.

8. Question Bank

Purpose: Find and reuse suitable questions.

Key UI elements: Search; class/chapter/type/marks filters; preview, type, marks, source/owner if available; multi-select.

States to design: No matches, permission limits, duplicate selection.

9. Import from File

Purpose: Bring external content into editor safely.

Key UI elements: Formats/size limit; upload progress; extraction summary; preview before import.

States to design: Corrupted/unsupported file; altered diagrams/equations; failed extraction.

10. Paper Editor

Purpose: Structure and maintain a complete paper.

Key UI elements: Sections, question counts, add question/section, import, bank shortcut, autosave, total marks, settings/preview.

States to design: Unsaved edits, total mismatch, long paper, reorder conflict.

11. Edit Question

Purpose: Make a question easy to edit and validate.

Key UI elements: Question type, rich text, options/answer when relevant, marks, save and validation.

States to design: Missing option, invalid answer key, unsupported media, overflow.

12. Paper Preview

Purpose: Show likely printed document.

Key UI elements: Page navigation, zoom, page settings if supported, validation panel, save draft and submit.

States to design: Preview failure, overflow, clipped diagrams, export mismatch.

13. Review & Corrections

Purpose: Inspect and comment in context.

Key UI elements: Document/questions/comments/checklist; question reference, author, timestamp, resolution; approve/request changes.

States to design: Stale version, unsaved comment, unresolved checklist.

14. Teacher Resubmission

Purpose: Close the feedback loop.

Key UI elements: Pending/resolved filters; question reference; response; mark addressed; resubmit summary.

States to design: Blocking unresolved item, deleted question with comment.

15. Reviewer Queue

Purpose: Prioritize assigned work.

Key UI elements: Assigned/awaiting correction/completed; paper, class/subject, deadline if defined; search/sort.

States to design: Reassignment, duplicate item, overdue paper.

16. Review Paper

Purpose: Support complete quality review.

Key UI elements: Document view; question navigation; checklist for correctness, spelling, diagrams, class/subject, difficulty, marks.

States to design: Very long paper, inaccessible diagram, file cannot open.

17. Add Comment

Purpose: Capture actionable feedback.

Key UI elements: Select question/context; comment; optional category; save/cancel.

States to design: Empty comment, save failure, comment on old version.

18. Review Decision

Purpose: Make stage decision explicit.

Key UI elements: Separate Request changes and Approve; reason/actionable comment for changes; next owner.

States to design: Approve with unresolved required check; permission mismatch.

19. Final Approval

Purpose: Build confidence in release candidate.

Key UI elements: Review history and version; unresolved/validation warnings; approve/return; confirm version.

States to design: Paper changed after review; missing required stage.

20. Document Finalization

Purpose: Prepare approved version for release.

Key UI elements: Identify final document/version; security step per policy; authorized recipients; release confirmation.

States to design: Password mismatch, PDF failure, revoked access, expired link.

21. Printing Queue

Purpose: Show only released work.

Key UI elements: Approved paper identity, page count, class/subject, release date; ready/printing/printed if agreed.

States to design: Withdrawn paper, duplicate job, wrong version, expired access.

22. Print Preview & Output

Purpose: Catch layout issues before print.

Key UI elements: Page preview, page count, margins, diagrams, page breaks; role-controlled download/print; optional handoff record.

States to design: Clipped content, blank pages, wrong order, printer differences.

12. Accessibility, content, and responsive behavior

Accessibility checklist

- Use WCAG 2.2 AA as a working goal and verify against the shipped product and applicable requirements.
- Ensure sufficient contrast, especially for small labels and status chips.
- Do not use color alone for approval, warning, error, or correction states.
- Aim for interactive targets of at least 44 × 44 CSS pixels on mobile where practical.
- Support visible keyboard focus and keyboard operation on web.
- Associate every field with a persistent label and announce validation errors clearly.
- Use meaningful headings and logical focus order.
- Provide accessible names for icon-only buttons and announce status changes.
- Support text resizing; avoid clipping at high zoom.
- Provide accessible text or structured alternatives for document previews where feasible.

Content design examples

Avoid	Prefer
Done	Approve this stage / Save draft / Mark as addressed
Error occurred	We couldn't import this file. Try a supported file under the stated size limit.
Submit	Submit for review
Changes	Changes requested — 3 comments need attention
Approved	Approved by [role/name] on [date] — Version [ID]

Mobile and web parity

Parity means the same core jobs and data are supported, not that every layout is identical. Mobile should prioritize quick review, task status, and focused edits. Web can provide more room for long papers, side-by-side question/comment views, bulk operations, and workflow configuration.

Task	Mobile	Web
Create paper	Step-by-step form and section editor.	Metadata and editor in a wider workspace.
Review	Question-by-question navigation and expandable comments.	Document and comments side-by-side where useful.
Approval	Summary, history, clear approve/return actions.	Detailed audit trail and stage overview.
Print inspection	Quick preview and status.	Full page preview, zoom, layout checks.

13. Edge cases, risks, and security

Critical workflow rules to validate

- Approval applies to a specific version. Any later edit should invalidate or revoke approval according to policy.
- Final authority and printing staff are separate roles by default.
- Printing queue must not show drafts or changes-requested versions.
- Question-bank reuse must clarify whether content is copied or linked to a mutable source.
- Import cannot be assumed to preserve formatting; preview and manual verification are required.
- Required approval stages cannot be silently skipped; authorized exceptions should be recorded.
- Reassignment should preserve history and record new owner and reason where appropriate.

Security considerations — not a final technical specification

Control	Product design requirement	Engineering/security confirmation
Organization isolation	Visible organization context; no cross-school exposure.	Tenant architecture, API authorization, isolation tests.
Role permissions	Hide/disable unauthorized actions.	Enforce authorization on every server-side operation.
Version integrity	Identify version in review and history.	Immutable release artifact, version IDs, storage rules.
PDF protection	Explain authorized security step.	Encryption, password policy, credential handling.
File delivery	Show release status and recipient.	Secure links, expiry, logs, revocation.
Audit trail	Expose meaningful events to authorized roles.	Coverage, retention, tamper protection.
Data retention	Clear archived/withdrawn states.	Retention schedule, backups, deletion requirements.

Risk register

Risk	Level	Mitigation
Wrong version approved or printed	High	Version ID throughout; locked release artifact; stale-version tests.
Workflow does not fit a school	High	Map real workflows across schools; validate configuration rules.
Import damages diagrams/equations	High	Test representative files; preview; extraction warnings.
Sensitive paper exposed	High	Role access, secure delivery, expiry/revocation, audit events.
Mobile editing is cumbersome	Medium	Test long-paper tasks on devices; use focused edits and web for dense work.
Statuses are misunderstood	Medium	Plain-language labels; test interpretation.
Feature creep delays MVP	Medium	Prioritize core lifecycle; defer advanced AI/analytics.

14. Usability testing and measurement plan

No usability-test results or product analytics have been supplied for this case study. This plan defines what to test next; success criteria are proposed targets, not achieved results.

Research questions

- Can teachers choose a creation path and reach the editor without help?
- Can users distinguish Save draft from Submit for review?
- Can reviewers comment on the correct question and make a decision?
- Can teachers resolve feedback and identify what remains pending?
- Can a final approver identify the exact version and verify required stages?
- Can printing staff confirm the released version and spot formatting issues?

Suggested test tasks

Task	Observe	Success signal
Create a 50-mark paper from saved questions.	Path choice, metadata, marks validation.	Completes without rescue and understands total.
Import a file and verify result.	Extraction summary and preview warnings.	Notices and explains a detected issue.
Review a spelling issue.	Find question, add comment, request changes.	Comment links to correct question; next step understood.
Resolve two corrections and resubmit.	Pending/resolved distinction.	Identifies remaining items before resubmitting.
Approve and release final version.	Version check, role boundaries, handoff.	Identifies approved version and does not bypass stage.

Measurement framework

Metric	Definition	Why it matters
Task completion	Share completing each core task.	Checks workflow clarity.
Time on task	Elapsed time with task context.	Highlights friction; not proof by itself.
Error/recovery	Wrong actions and unaided recovery.	Reveals risky ambiguity.
Status comprehension	Can user explain status and next owner?	Measures lifecycle clarity.
Correction closure	Can teacher find and address all feedback?	Tests review-loop integrity.
Version accuracy	Can approver/print staff identify release?	Tests a critical safety requirement.
Accessibility issues	Keyboard, screen reader, contrast, zoom barriers.	Finds exclusion and compliance gaps.

Analytics events to consider

- paper_created, paper_saved_draft, paper_submitted
- review_started, comment_added, changes_requested
- correction_marked_addressed, paper_resubmitted
- approval_granted, approval_returned
- document_finalized, print_release_created, print_status_updated

Collect only what is needed for improvement, respect school privacy requirements, and avoid storing exam content in analytics events.

15. Roadmap, open questions, and portfolio reflection

Phased roadmap

Phase	Focus	Exit criteria
1 — Validate	Confirm roles, approval paths, file formats, security expectations, mobile/web needs.	Stakeholders agree on workflow rules and MVP criteria.
2 — Core MVP	Organization/roles, paper creation, editor, bank basics, import preview, review/corrections, approvals.	Paper completes configured workflow with traceable states.
3 — Secure print release	Approved-version snapshot, final document, controlled handoff, print preview.	Authorized staff identify and access correct release.
4 — Improve	Version comparison, reassignment, advanced search, reminders, analytics.	Prioritized by evidence from real use.
5 — Explore	AI assistance, duplicate detection, difficulty suggestions, integrations.	Proceed only after core workflows are stable.

Open questions for the client

1. Who can configure workflows? Can multiple reviewers be assigned to a stage?

2. Can workflows vary by exam, class, subject, or paper type?

3. Which file formats must be supported first: DOCX, PDF, images, or others?

4. Must equations, tables, and diagrams remain editable, or is faithful preview enough?

5. How is the question bank shared: school-wide, department, class, or selected people?

6. Can reviewers edit papers directly or only comment and request changes?

7. What happens to approvals if a paper changes after a stage is approved?

8. Who creates/changes the final PDF password and how is it securely shared?

9. Must printing staff mark jobs as printing/printed, or is this only a handoff tool?

10. Which paper sizes, languages, headers, footers, and page-number rules are required?

11. What audit history is required and for how long?

12. Which devices and operating systems must be supported?

What is not yet proven

• That the interface reduces completion time.

• That all users prefer mobile editing for long papers.

• That proposed status names are understood without explanation.

• That one question-bank structure works for every school.

• That the security flow satisfies client policies or a technical threat model.

Portfolio reflection

The strongest story in this project is workflow complexity: multiple roles, repeated correction loops, school-specific approvals, and secure printing. Show how those constraints shaped the information architecture and interactions—not only the visual screens.

After research and testing, add anonymized participant quotes, observed task breakdowns, usability findings, iterations, and measured outcomes. Do not invent statistics or label assumptions as findings.

PAPER PLANE • CREATE → REVIEW → APPROVE → PRINT

End of working case study