YAS – AI-driven Grading Assistant for K-12 Teachers
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Abstract (**150–250 words**)

YAS is a human-in-the-loop grading assistant specifically engineered for K-12 educators in mainland China. It addresses the most intensive yet undervalued segment of teaching: after-hours grading and progress reporting. Research within the YAS repository shows that teachers work approximately 52.5 hours per week, with 8–13 hours spent on unpaid, after-work grading tasks via platforms like WeChat or DingTalk. While AI grading for objective items has reached high precision (>99%), subjective grading often suffers from hallucinations and generic feedback.

YAS introduces a **"Teacher-Centric Verification Workflow"**: instead of replacing the teacher, the AI acts as a pre-processor that drafts scores and explanations based on rubrics, allowing teachers to rapidly review and approve feedback. This "Traffic Light" system directs teacher attention only to potential errors or low-confidence assessments. Built with compliance-by-design principles, YAS aligns with 2024-2025 education policies by implementing automated redaction of student identifiers, data minimization, and flexible deployment models. The project transitions from individual productivity tools to a school-wide infrastructure for trustworthy, data-driven education.

Keywords: teacher workload, AI grading, human-in-the-loop, data compliance, K-12

Project Track: Technology Innovation & Future Industries

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Project introduction

YAS is a teacher-centric SaaS that reduces grading time while staying compliant with rapidly tightening AI-in-education policies. The core idea is to automate what is already reliable (objective questions) and assist what is still risky (subjective responses) via a teacher-in-control workflow.

1.1 Industry Background China's K-12 education system is undergoing accelerated digitalization. However, teacher adoption is polarized: teachers resist "digital formalism" (check-ins, screenshots, and administrative logging) yet actively pay out-of-pocket for tools that genuinely save time (YAS internal synthesis, 2025). The market is also shaped by two structural shifts: (1) hidden overtime is widespread and increasingly recognized as overtime when performed through messaging platforms, raising compliance costs; (2) 2024-2025 policies emphasize human agency, data security, and student protection (e.g., strict limits on uploading identifiable student data to public platforms; tighter constraints for primary students; and tool whitelisting for public-school entry).

1.2 Product or Service Overview
1. **Batch capture/import**: Continuous photo capture and multi-page PDF import.
2. **Objective grading**: Automatic scoring and item analysis at near-perfect accuracy.
3. **Subjective assistance**: Rubric-based point extraction, step checking (math), and comment drafts; teachers review and finalize.
4. **Class analytics**: Error distribution, misconception clustering, and parent-facing reports.
5. **Compliance by design**: One-click redaction (names/IDs/faces), role-based access, audit logs, and deployment options (public-cloud compliant mode, private cloud, or on-prem).

1.3 Business Model
- **Type**: SaaS subscriptions.
- **Revenue**: Individual subscriptions; Advertisements; School/region seat licensing; Enterprise add-ons (private deployment, custom question types, advanced dashboards).
- **Distribution**: Start B2C (teacher communities and referrals), then expand B2B (pilot schools, teaching-research groups, and procurement/whitelist pathways).

Market analysis

2.1 Positioning

The proposed product is positioned as a **teacher productivity tool** rather than a "fully automatic grading EdTech solution". Based on empirical observations from the Chinese K12 context, fully automated grading—especially for subjective assignments—faces **high policy risk, trust fragility, and adoption resistance**. Teachers are ultimately accountable for grading outcomes, and schools require traceability, explainability, and human oversight. Therefore, our core positioning emphasizes **"teacher-in-control, audit-ready grading."** AI is designed to function as an assistive layer that accelerates grading workflows (e.g., objective item automation, answer clustering, draft feedback generation), while **final scoring authority, adjustments, and sign-off remain with teachers**. This positioning aligns with existing regulatory guidance in China that frames AI as an auxiliary tool rather than a replacement, and mirrors best practices observed in high-stakes examination systems where AI is used for pre-scoring, consistency checks, and quality control rather than final judgment. In contrast to general-purpose AI tools or student-facing homework apps, our product is **teacher-only**, workflow-oriented, and optimized for batch-by-class usage under real school constraints.

2.2 Target Segments and Needs

Primary segment**:** Middle and high school teachers in Chinese public and international schools, especially those teaching math and science with large classes (40+ students**).** Secondary segment: Elementary school, vocational school and univerisitiy teachers and also oversea users in English-speaking countries.

Across these segments, multiple studies indicate that Chinese K12 teachers typically spend 1–2+ hours per day on grading**,** often extending into evenings and weekends, with strict requirements for "full correction by teachers" under the Double Reduction policy.

2.3 **Competitive Landscape**

To-B hardware-integrated or private-cloud solutions
Examples include large vendors offering AI grading combined with scanning hardware or campus systems. These solutions are **highly compliant and well-integrated**, making them suitable for public procurement. However, they typically involve **slow iteration cycles, high upfront costs, and long deployment timelines**, limiting flexibility for individual teachers.

To-C general AI or homework apps
These products iterate rapidly and are often low-cost or freemium. However, they are usually **student-facing or general-purpose**, with limited support for teacher workflows, batch operations, class-level analytics, or compliance requirements. Data risk and lack of auditability further restrict their adoption in formal school environments.

Observed gap:
A **teacher-only, workflow-native product** that combines:

- Batch-by-class grading flows
- Objective-item automation plus assisted subjective grading

- Explainable, rubric-aligned feedback
- Built-in audit trails and compliance controls
- Flexible deployment (SaaS + private/hybrid options)

This gap is consistent across both Chinese and English-speaking markets, although it is more acute in China due to larger class sizes and stricter regulatory constraints.

Product, Technology, or Service Details

3.1 Product and Technology Overview

YAS is a cross-platform AI grading solution designed for high accessibility and scalability. It combines **Vision-Language Models** with a specialized **"Review-Audit" workflow**. The system pre-analyzes student work features, redacts sensitive info, and presents a drafted evaluation. Teachers use a high-efficiency console to confirm or adjust these drafts, ensuring every grade is human-verified but produced at 10x speed.

- **Phased Deployment**: The product will launch as a **WeChat Mini-program** demo to leverage its low friction and viral potential within teacher communities for rapid MVP validation.
- **Evolution**: Following initial traction, standalone **iOS and Android applications** will be released to provide a more robust, high-performance environment for batch processing and heavy workloads.

3.2 Product Positioning and Advantages

The product is positioned as a teacher-only, class-scale grading assistant rather than a single-problem query tool. Its advantages come from **batch operations** for an entire class, a **human-in-the-loop workflow** that aligns with policy and teacher trust, and **compliance defaults** that reduce adoption friction.

Specifically, YAS is redaction-first and data-minimizing by design. It emphasizes auditability: teachers can see what the system suggested, modify it quickly, and retain an auditable record that supports parent communication and internal review. This combination differentiates YAS from consumer AI apps that may be fast but do not fit class-level operations or school-grade privacy expectations.

3.3 User Experience

YAS implements a feasibility-first "fast capture, fast review" grading workflow for K-12 teachers:

1. **Input**: Teachers upload photos or multi-page PDFs, with optional structured templates such as answer sheets.
2. **Processing**: The system processes submissions through OCR and layout parsing to reconstruct question blocks and student responses.
3. **Grading**: It applies the appropriate scoring path—objective items are matched to a provided key, while subjective items use rubric-based extraction to propose point allocations and evidence-backed checks (e.g., missing steps in math).
4. **Review**: Outputs are delivered as a draft score with rationale and suggested comments. Teachers approve or edit in a queue-style interface.
5. **Finalization**: YAS logs final decisions and edits for traceability.

3.4 Core Technology

Core technology is deployed with staged maturity to balance practicality, cost, and reliability. Objective grading is production-ready; subjective assistance runs in pilot mode with mandatory teacher review enforced. We will progressively expand subject-specific rubrics and error taxonomies through co-design with pilot teachers.

3.5 Cost Considerations

Key cost drivers are **model inference** (optimized via small-model/local inference for OCR and objective items), **compliance and security assessments** (e.g., MLPS/"dengbao"), **teacher support**, and limited labeling for rubrics.

3.6 Intellectual Property and Technical Assets

Planned technical assets include **software copyright** for the integrated grading + redaction workflow, **proprietary rubric templates** and analytics schemas, and **potential patent filings** around redaction-integrated capture and audit trails.

3.7 R&D Capability and Technical Support

The project is supported by a dedicated technical team (detailed in Section 5) with internal capabilities covering:

- **LLM Integration**: Custom prompt engineering and chain-of-thought logic for grading.
- **Full-Stack Development**: Cross-platform implementation using Taro and Next.js.
- **Security Infrastructure**: Data minimization and role-based access control systems.

3.8 Certifications and Standards

The technical roadmap prioritizes alignment with national standards, including **security compliance assessments** and **content-safety controls** required for public school deployment.

Marketing and Go-to-Market Strategy

The project adopts a phased and execution-oriented go-to-market strategy.

4.1 Pilot Phase (Validation)

Initial user acquisition begins within the team's immediate network of K–12 teachers in Tier-1 and Tier-2 cities in China, targeting approximately 15 pilot users for closed beta testing. The pilot phase focuses first on **middle school mathematics and science subjects**, where homework volume is high and grading criteria are relatively objective, making impact and efficiency gains easier to validate.

4.2 Growth Strategy (Expansion)

Following pilot validation, the project scales user acquisition through social media outreach and organic user referrals. Promotion and distribution leverage major Chinese social platforms commonly used by teachers:

- **Xiaohongshu (Rednote) & Bilibili**: Content-based promotion combining barter-based and paid collaborations to engage KOCs and KOLs.
- **Messaging**: Highlighting the product's **"Assistive"** value—seamless integration into workflows without replacing the teacher.

4.3 Pricing & Monetization

The pricing strategy follows a **freemium model**:

- **Free Tier**: Up to 50 submissions per week for trial.
- **Subscription**: Affordable monthly/annual tiers complemented by referral-based discounts.
- **Success Metrics**: Validation focuses on real classroom use cases (weekly quizzes), measured by time saved and teacher satisfaction.

Company Management

On the based on YAS-AI 上海涯思人工智能科技有限公司, this product team mainly focusing on product R&D, GTM and operations, while financial and legal affairs will be handled by other YAS team members. Within the product team, Yibo serves as the Product Owner, overseeing product strategy, technical leadership, and design. He is responsible for product definition, feature planning, prototyping, interaction and visual design, as well as overall system architecture and technical implementation. Yibo is also accountable for key user growth and engagement metrics, including MAU/DAU and user retention. Jiahe serves as the Business Owner, leading market-entry strategy, go-to-market (GTM) strategy, and project management. His responsibilities include user and market research, competitive and data analysis, commercialization and monetization strategy, marketing and product promotion, as well as PMO functions such as schedule management, team coordination, cost and budget control, and risk and compliance management. Jiahe is accountable for overall revenue generation and business performance. Additionally, there are two software engineers Youran and Tiancheng, taking charge of front-end and back-end implementation respectively, reporting to Yibo.

Based at **YAS-AI (Shanghai Yas AI Technology Co., Ltd.)**, this product team mainly focuses on product R&D, GTM, and operations, while financial and legal affairs will be handled by other YAS team members.

- **Yibo Yan (Product Owner)**: Oversees product strategy, technical leadership, and design. He is responsible for product definition, feature planning, prototyping, interaction and visual design, as well as overall system architecture and technical implementation. Yibo is also accountable for key user growth and engagement metrics, including MAU/DAU and user retention.
- **Jiahe Chen (Business Owner)**: Leads market-entry strategy, go-to-market (GTM) strategy, and project management. His responsibilities include user and market research, competitive and data analysis, commercialization and monetization strategy, marketing and product promotion, as well as PMO functions such as schedule management, team coordination, cost and budget control, and risk and compliance management. Jiahe is accountable for overall revenue generation and business performance.
- **Youran Wang & Tiancheng Tan (Software Engineers)**: Correspond to front-end and back-end implementation respectively, reporting to Yibo.
  - *Youran Wang*: Leads UI implementation and cross-platform development (Taro/Next.js).
  - *Tiancheng Tan*: Focuses on LLM integration, API development (FastAPI), and data security infrastructure.

Financial Analysis, Capital Preparation, and Profit Projection

6.1 Cost Structure

The project's cost structure is primarily driven by AI inference and cloud infrastructure, product development, and early-stage promotion.

- **Core Expenses**: AI API usage, developer labor, user acquisition.
- **Cost Optimization**: A **tiered inference strategy** routes low-risk tasks (objective items) to lower-cost models, reserving advanced models for subjective grading assistance.

6.2 Capital Requirements

Initial capital requirements are modest and focused on validation.

- **Allocation**: Pilot deployments, compliance/security assessments, and model optimization.
- **Funding Sources**: Innovation competitions, university entrepreneurship funds, and small grants. Angel investment may be pursued in later stages conditional on metrics.

6.3 Revenue Projection

- **Year 1**: Prioritizes **To-C paid teacher subscriptions** and limited school pilots for rapid proof of value.
- **Year 2–3**: Scales through **school/region-level licensing** and compliant deployments.
- **Sustainability**: Relies on high retention driven by measurable time savings and switching costs created by accumulated audit trails.

Risk Analysis and Mitigation

The project faces several key risks that are addressed through proactive design and execution strategies.

- **Policy and Compliance Risk**: Particularly salient in China, where education regulation is highly sensitive (e.g., "Double Reduction"). *Mitigation*: Positioned strictly as an assistive tool, redaction-first defaults, optional on-premise/private deployments, and early pursuit of compliance assessments.
- **Model Error and Hallucination Risk**: *Mitigation*: Mandatory teacher review, surfacing uncertainty, explainable feedback with full edit trails, and continuous rubric refinement.
- **Data Security Risk**: *Mitigation*: Minimizing storage of sensitive student data, encryption, role-based access control, audit logging, and incident response procedures.

- **Go-to-Market Risk**: *Mitigation*: Start with teacher-led adoption to build evidence, then convert to structured school pilots with local partner support.

Impact and Expected Outcomes

The project is expected to generate meaningful social and educational impact in K–12 education.

1. **Reduce Teacher Workload**: Alleviates the heavy burden of grading (one of the most time-consuming tasks), supporting sustainable teaching practices and reducing stress.
2. **Personalized Feedback**: Enables targeted, formative feedback for individual students—something often impossible in large classes—helping students improve learning outcomes.
3. **Data-Driven Evaluation**: Aggregates assignment-level data for per-question accuracy and error pattern analysis, supporting evidence-based instructional adjustments.

Collectively, these outcomes align with the **Challenge Cup**'s emphasis on social value, educational innovation, and the sustainable improvement of teaching and learning quality.

REFERENCES

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DKU Innovation Incubator

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