



# Zero-Cost Educational Portal Stack

Building [educational.ac-tech.pro](https://educational.ac-tech.pro) with \$0/month recurring costs

**Research Date:** 2026-01-02 | **Target:** 100-500 initial students

## YES, It's Possible!

You can build and run a fully functional educational portal with **genuinely \$0/month in recurring costs** using the stack below. The only costs are:

- **Stripe transaction fees:** 2.9% + \$0.30 per sale (only when you make money)
- **Domain:** Already included in your Hostinger plan
- **AI (optional):** Pay-per-use only (~\$0.10-0.50 per tutoring session)

## 1. The Zero-Cost Stack

COMPONENT	SERVICE	FREE TIER LIMITS	COST
Hosting	Cloudflare Pages	Unlimited sites, 500 builds/mo, unlimited bandwidth	\$0 FOREVER
Serverless API	Cloudflare Workers	100k requests/day, 10ms CPU per request	\$0 FOREVER

COMPONENT	SERVICE	FREE TIER LIMITS	COST
Database	Supabase Free	500MB DB, 1GB file storage, 50k MAUs	\$0 FOREVER*
Authentication	Supabase Auth	50,000 monthly active users	\$0 FOREVER
Video Storage	Cloudflare R2	10GB storage, 10M reads/mo, FREE egress	\$0 FOREVER
Video Alt	YouTube Unlisted	Unlimited storage, unlimited bandwidth	\$0 FOREVER
CDN	Cloudflare Free	Unlimited bandwidth, DDoS protection	\$0 FOREVER
Payments	Stripe	No monthly fee, only per-transaction	2.9% + \$0.30 per sale
Email	Resend Free	3,000 emails/month, 100 emails/day	\$0 FOREVER
AI Tutor	Gemini API Free	~1000 requests/day (Flash-Lite model)	\$0 (limited)
AI Tutor Alt	OpenAI API	Pay-per-use, no monthly fee	~\$0.10-0.50/session

\* Supabase Free tier pauses projects after 7 days of inactivity. A simple cron job keeps it alive.

## 2. Why Cloudflare Over Vercel?

While Vercel is excellent, its Hobby tier has two issues for commercial use:

- **Commercial Use Prohibited:** Vercel Hobby explicitly prohibits commercial projects. Educational courses sold for money = commercial.
- **Hard Limits:** 100GB bandwidth cap, 100 deployments/day.

**Cloudflare Pages + Workers** has no commercial restriction and offers:

- Unlimited bandwidth (truly unlimited)
- 500 builds/month (plenty for a single project)
- Workers: 100,000 requests/day free tier
- R2: 10GB storage with FREE egress (critical for video)

**Architecture Change:** Instead of Next.js (Vercel-optimized), use **SvelteKit**, **Astro**, or **Next.js with Cloudflare adapter**. All work on Cloudflare Pages.

### 3. Video Strategy: Two Options

#### Option A: YouTube Unlisted (Recommended for Start)

- **Cost:** \$0, unlimited storage, unlimited bandwidth
- **Pros:** Zero maintenance, auto-transcoding, mobile-optimized player
- **Cons:** YouTube branding, potential for students to find via search if not careful
- **How:** Upload videos as "Unlisted" → Embed in your platform

#### Option B: Cloudflare R2 + Custom Player

- **Cost:** \$0 for first 10GB storage, FREE egress
- **Pros:** Full control, no YouTube branding, professional look
- **Cons:** Need to transcode videos yourself (use FFmpeg locally)
- **Upgrade Path:** When you exceed 10GB, R2 costs \$0.015/GB/month (10 hours of video ≈ \$0.15/month)

## 4. AI Features: Pay-Per-Use Only

AI tutoring is a "premium" feature. You have two free/low-cost options:

SERVICE	FREE TIER	PAY-PER-USE COST	BEST FOR
Gemini Flash-Lite	1000 requests/day	\$0.0375 per 1M tokens	High-volume basic Q&A
OpenAI GPT-4o-mini	None (pay-per-use)	~\$0.05 per session	High-quality tutoring

**Recommendation:** Start with Gemini Flash-Lite (free) for initial students. If quality isn't sufficient, switch to GPT-4o-mini (pennies per interaction). *AI cost is revenue-dependent: you only pay when students use it.*

## 5. Capacity Analysis: Can This Handle 500 Students?

**50k**

Monthly Active Users  
(Supabase)

**100k**

API Requests/Day (Workers)

**10M**

R2 Reads/Month (Video)



Bandwidth (Cloudflare)

## 500 students using the platform daily:

- 500 logins/day = 500 auth checks → **Well under 100k/day limit**
- 500 students × 5 API calls each = 2,500/day → **2.5% of limit**
- 500 students × 2 video watches/day = 1,000 R2 reads → **0.03% of monthly limit**

**Verdict:** This stack can comfortably handle 500-5,000 students before hitting any free tier limits. You have **massive headroom**.

## 6. Upgrade Triggers (When to Start Paying)

TRIGGER	WHAT TO UPGRADE	COST
> 500MB database	Supabase Pro	\$25/month
> 10GB video storage	R2 paid tier	\$0.015/GB/month
> 100k Workers requests/day	Workers Paid (\$5/mo)	\$5/month
Need better AI quality	OpenAI pay-per-use	~\$50-200/month at scale

**Reality check:** You'll likely hit 500MB database before anything else. That happens around 1,000-2,000 enrolled students. At that point, \$25/month is trivial compared to revenue.

## 7. Recommended Stack Summary

## Frontend

- **Framework:** Astro + React (or SvelteKit) — works on Cloudflare Pages
- **Styling:** Tailwind CSS 4
- **Hosting:** Cloudflare Pages (free, unlimited BW)

## Backend

- **API:** Cloudflare Workers (100k req/day free) or Supabase Edge Functions
- **Database:** Supabase PostgreSQL (500MB free)
- **Auth:** Supabase Auth (50k MAUs free)
- **Storage:** Cloudflare R2 (10GB free, FREE egress)

## Integrations

- **Videos:** YouTube Unlisted (start) → R2 (premium look later)
- **Payments:** Stripe (only pays when you earn)
- **Email:** Resend (3k/month free)
- **AI:** Gemini Flash-Lite (1k/day free) → OpenAI (pay-per-use)

## 8. What's Different from Previous Recommendation?

COMPONENT	PREVIOUS (HAD COSTS)	NEW (ZERO COST)
Hosting	Vercel (Pro \$20/mo eventually)	Cloudflare Pages (free forever)
Video	Cloudflare Stream (\$5/mo min)	YouTube Unlisted or R2 (free)
AI	OpenAI (~\$500/mo at scale)	Gemini free tier or pay-per-use
Total Fixed Cost	~\$50-150/month	<b>\$0/month</b>

## Ready to Build

With this stack, you can launch `educational.ac-tech.pro` with:

- **\$0/month fixed costs** until you have thousands of students
- **Only transaction-based costs** (Stripe, optional AI)
- **Massive free tier headroom** for growth

When you're ready, I can start implementing Phase 1: Cloudflare Pages + Supabase + Astro setup.

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