

# Thabani M. Takwena

## Software Engineer

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## SUMMARY

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Software engineer with about 2 years of experience building internal platforms, workflow systems, and AI-enabled applications. Most of my work focuses on automating manual workflows, connecting business processes, and building software used in day-to-day operations.

## EXPERIENCE

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### Founding Engineer (Contract)

May 2025 – Present | Remote

*Cerebro Novus AI* 📄

I build the platform used internally to create and manage WhatsApp automation systems for clients using the WhatsApp Business Platform API.

- Built a visual workflow builder in Next.js that allows internal teams to create chatbot flows for lead generation, customer support, and automated messaging.
- Wrote the workflow execution logic that determines which WhatsApp message, template, or action should run next based on user interactions.
- Built integrations for WhatsApp Business Platform onboarding, template management, and phone number connection flows.
- Built separate dashboards for internal staff and client management workflows.
- Initially used Inngest for workflow handling, then moved critical flow execution to API endpoints after noticing response latency during chatbot interactions.
- Migrated backend infrastructure from Firebase to Supabase and added Clerk for authentication.
- Currently working on AI agent workflows and retrieval-based AI responses using RAG patterns and vector search.

**Stack:** Next.js, TypeScript, React Flow, Supabase, PostgreSQL, Clerk, WhatsApp Business Platform API

### Full-Stack Engineer (Contract)

Sep 2024 – Present | Germiston, South Africa

*Hambanathi Training Centre* 📄

I maintain and rebuild the organisation's internal management system used by staff to manage training programmes, student enrollments, attendance, certification records, finance workflows, and operational records across branches.

- Built and maintained an internal IMS platform using Laravel, React, and MySQL.
- Built workflows for managing training projects linked to SETAs, programme types, and occupational certifications.
- Added student enrollment management with supporting document uploads and record tracking.
- Built attendance tracking workflows for recording daily attendance across training projects.
- Added a certification module for storing issued student certificates for future retrieval.
- Built RBAC permissions using Spatie roles and permissions to separate admin, finance, and operational access.
- Added audit logs, authentication logs, and system logs for tracking platform activity.
- Built an asset register module for recording business assets inside the platform.
- Set up automated deployment pipelines using GitHub Actions and SSH deployment to cPanel so production updates could be deployed directly from GitHub.
- Currently rebuilding the system using Next.js, Supabase, Clerk, and PostgreSQL to support:
  - branch-based operational workflows
  - finance workflows for invoicing and quotes
  - LMS functionality
  - connected enrollment and payment approval flows
  - standardized workflows across departments and branches

**Stack:** Laravel, PHP, React, Next.js, TypeScript, MySQL, PostgreSQL, Supabase, Clerk, GitHub Actions, Shadcn UI

# PROJECTS

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## SymbioLearn [↗](#)

Dec 2025 – Present

Founder/Solo Developer

Voice-first AI tutoring platform built for students who want conversational learning sessions, study planning, quizzes, and textbook-assisted tutoring.

- Started as a final-year IT project focused on PDF-based AI tutoring using RAG pipelines with Pinecone and LangChain.
- Built document ingestion and retrieval workflows so uploaded textbooks could be queried during tutoring sessions.
- Rebuilt the platform in 2025 around voice-first tutoring using the Gemini Live API.
- Built a real-time tutoring pipeline using WebSockets and Gemini Live API session handling.
- Added support for uploaded PDFs using Gemini embeddings and Supabase pgvector retrieval.
- Built a custom retrieval tool that searches embedded textbook content and injects relevant textbook passages into live tutoring sessions with page references.
- Added automatic flashcard, quiz, summary, and notes generation after tutoring sessions.
- Built spaced repetition and forgetting-curve based study planning workflows that generate study schedules around exam dates, subject difficulty, and available study hours.
- Added multilingual tutoring support using Gemini Live API voice capabilities.

**Stack:** Next.js, TypeScript, Supabase, PostgreSQL, pgvector, Gemini API, Gemini Live API, LangChain, Pinecone, WebSockets

## YTTG (AI Thumbnail Generator) [↗](#)

Nov 2025 – Present

Founder/Solo Developer

AI-based YouTube thumbnail generation and editing platform.

- Built a full-stack application that generates YouTube thumbnails from text prompts using Gemini image generation models.
- Added prompt-based image editing workflows where users can modify generated thumbnails using natural language instructions.
- Built Firebase-based authentication and backend workflows.
- Launched the product publicly and currently maintain paying users at \$40 MRR.

**Stack:** Next.js, TypeScript, Firebase, Gemini Image Generation API, DaisyUI

# SKILLS

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## Languages

TypeScript, JavaScript, PHP, SQL, HTML/CSS

## Frontend

React, Next.js, Tailwind CSS, Shadcn UI, DaisyUI

## Backend & Infrastructure

Node.js, Laravel, Supabase, Firebase, PostgreSQL, MySQL, REST APIs, RBAC, GitHub Actions

## AI & Data

RAG pipelines, vector search, pgvector, Pinecone, LangChain, Gemini API, Gemini Live API

## Tools

Git, GitHub, Vercel, Clerk

# EDUCATION

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## BSc in Information Technology (Software Development), Cum Laude

May 2024

Richfield Graduate Institute of Technology

- Designed a Python (Pandas) data pipeline to clean historical stock market data for predictive analysis.
- Participated in the development and training of a Machine Learning model. (1st Place, Richfield Hackathon 2023).