**Development Brief: Bilingual Academic Bridge Agent (BABA)**

**Purpose:** Demonstrate an autonomous AI agent that supports bilingual (Arabic–English) students in understanding, improving, and producing academic work — showing both **pedagogical value** and **agentic autonomy**.

**1. Objective**

Develop a browser-based prototype of **BABA**, an AI agent that helps Arab university students bridge the gap between Arabic and English academic writing and comprehension.

The MVP must:

* Work in a **web browser (e.g. Streamlit or Gradio)**
* Handle **English and Arabic text inputs**
* Provide **bilingual academic explanations and improvements**
* Demonstrate **autonomous, multi-step behaviour** (not a single-turn chatbot)

**2. Core User Scenario**

**User:** A bilingual AOU student struggling with English-medium coursework.  
**Goal:** Understand complex academic concepts and improve written assignments.

**Example interaction:**

* Student inputs:

“I don’t understand what critical thinking means.”

* Agent responds with:
  + **Plain English explanation**
  + **Arabic translation with local example**
  + **Follow-up action** (e.g. short bilingual quiz or writing exercise)

**3. MVP Features (Buildable in One Day)**

| **Feature** | **Description** | **Outcome** |
| --- | --- | --- |
| **Concept Explainer** | Input: academic term or paragraph → Output: bilingual explanation (English + Arabic) + one contextual example (preferably from Gulf/Kuwait). | Helps comprehension. |
| **Academic Rewriter** | Input: student paragraph (in English, Arabic, or mixed) → Output: polished academic English + Arabic feedback explaining tone/grammar/style corrections. | Teaches academic expression. |
| **Autonomous Workflow Chain** | After each task, agent decides next step (e.g. “Would you like a quick bilingual quiz to practise this concept?”). | Demonstrates autonomy. |
| **Short Bilingual Quiz** | Optional mini-quiz (2–3 Qs) generated from previous response. | Reinforces learning. |
| **Basic Session Memory** | Retain previous 1–2 interactions for contextual continuity. | Makes it feel persistent. |

**4. Autonomous Logic Flow (Simplified LangGraph-style)**

Input

↓

Task Classifier Agent

- Detects if user wants explanation or writing improvement

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If Explanation → Explainer Agent

- Generates bilingual academic explanation + example

- Passes to Quiz Agent for optional micro-test

If Writing → Writer Agent

- Rewrites to formal English

- Invokes Feedback Agent for Arabic explanation of improvements

- Suggests next learning step

Each “sub-agent” can be implemented as a single function or prompt chain.  
Autonomy is shown via **conditional decision-making** and **self-initiated next steps**.

**5. Technical Requirements**

| **Component** | **Specification** |
| --- | --- |
| **Frontend** | Streamlit (preferred) or Gradio web app should be accessible via a sub-page of my businesses website – this is the website (and can create subpage): https://genfutures.co.uk |
| **Backend** | OpenAI GPT-4-Turbo or GPT-4 API |
| **Languages** | English + Arabic handled natively via prompt design |
| **Hosting** | Streamlit Cloud or Hugging Face Spaces |
| **Session State** | Streamlit session\_state or in-memory dictionary |
| **UI Structure** | Tabs: “Explain Concept” |
| **Design Tone** | Clean, academic, bilingual interface (right-to-left support optional) |

**6. Example Prompts**

**a. Concept Explainer**

You are a bilingual academic tutor for a university in Kuwait.

Explain the following term or idea in clear academic English and Arabic.

Include one example from Kuwait or Gulf context.

Concept: {{user\_input}}

**b. Academic Rewriter**

You are an academic writing coach for bilingual students.

Rewrite the paragraph below into formal academic English.

Then, explain the key changes (grammar, structure, tone) in Arabic.

Paragraph: {{user\_input}}

**c. Quiz Generator**

Based on the previous explanation, create 2 bilingual multiple-choice questions

(English + Arabic) to test understanding.

**7. Deliverables**

* Working **Streamlit or Gradio app** hosted publicly (or similar)
* Single URL for demo access (e.g. https://genfutures.co.uk/baba)
* Source code in .py file with modular prompts
* Short video (30–60 seconds) showing end-to-end flow

**8. Evaluation Criteria**

| **Area** | **Indicators** |
| --- | --- |
| **Functionality** | Bilingual explanations and writing improvements work accurately. |
| **Autonomy** | Agent self-selects next step (quiz, feedback, or new topic). |
| **Clarity** | Interface simple and usable for non-technical students. |
| **Local Relevance** | Examples reference Kuwait/GCC context. |

**In a nutshell**

The **Bilingual Academic Bridge Agent (BABA)** MVP should function as an *autonomous, bilingual learning companion* that helps students understand academic concepts and improve their writing — while visibly demonstrating agentic reasoning and step-sequenced autonomy.