**Quiz + RAG Integration Approaches**

**Approach 1: Structured Quiz (Rigid / Multiple-Choice)**

* Students pick from predefined options (e.g., *AI, Biology, Cybersecurity*).
* Each answer maps directly to structured **JSON fields** (skills, interests, goals).
* **Pros:**
  + Simple & deterministic
  + Easy to connect answers to RAG
* **Cons:**
  + Limited flexibility — students can’t express nuance

**Approach 2: Open-Ended Quiz**

* Students answer in free text (e.g., *“I enjoy solving problems with math and helping doctors.”*).
* System uses an **LLM step** to:
  1. Interpret and classify responses
  2. Convert them into JSON tags (or)
  3. Summarize answers and feed them directly to RAG
* **Option A: Open-ended → JSON → RAG**
  1. Keeps structured outputs
  2. Risk of misclassification
* **Option B: Open-ended → Summarize → RAG**
  1. Most natural
  2. Less control over consistency

A screenshot of a black screen

AI-generated content may be incorrect.

**Final Approach:**  
**Hybrid (MCQ Core + Open-ended Optional)**

* MCQs = structured baseline for recommendations
* Open-ended = personalization layer for extra context
* RAG handles both → structured answers narrow down curriculum matches, open-text answers refine results (maybe electives)

**1. Technical Comfort MCQ:** “How comfortable are you with coding or programming?”

* I have strong experience (multiple languages, projects)
* I have basic experience (Python/R/others)
* I’m a beginner
* I haven’t coded yet

**Optional Open-ended:** “If you have coding experience, describe a project or task you enjoyed most.”

**2. Math & Statistics Confidence MCQ:** “Which best describes your math/statistics background?”

* Advanced (Calculus, Linear Algebra, Probability & Stats)
* Intermediate (basic stats and algebra)
* Beginner
* Minimal exposure

**Optional Open-ended:** “Which areas of math or stats do you enjoy or feel confident in?”

**3. Learning Style Preference MCQ:** “What type of learning excites you most?”

* Hands-on projects & applied learning
* Theoretical & concept-heavy
* Mix of both
* Other

**Optional Open-ended:** “Give an example of a learning experience you found most rewarding.”

**4. Domain Interests MCQ:** “Which domains interest you for applying data science?” (Select all that apply)

* AI/ML research
* Healthcare & Bioinformatics
* Business & Finance
* Social Impact / Public Policy
* Cybersecurity / Data Privacy
* Environmental Science
* Communications
* Mathematics & Statistics

**Optional Open-ended:** “If other, please describe your area of interest.”

**5. Problem-Solving Approach MCQ:** “How do you prefer to approach problems?”

* Structured, step-by-step logical analysis
* Creative, out-of-the-box exploration
* Collaborative teamwork
* Independent trial-and-error

**Optional Open-ended:** “Describe a problem you solved and how you approached it.”

**6. Career Goals MCQ:** “What’s your ideal career path?”

* Research / Academia / PhD
* Industry technical role (Data Scientist, ML Engineer)
* Management / Analytics Leadership
* Entrepreneurship / Startup
* Not sure yet

**Optional Open-ended:** “Explain why this path appeals to you.”

**7. Soft Skills & Collaboration MCQ:** “How comfortable are you with teamwork and communication-heavy projects?”

* Very comfortable, I enjoy collaboration
* Moderate, I can adjust
* Prefer working independently
* I struggle with group work

**Optional Open-ended:** “Share an experience working on a team or leading a project.”

**8. Application vs Theory MCQ:** “When learning a new topic, what motivates you most?”

* Applying knowledge to real-world projects
* Understanding the underlying theory deeply
* Both equally
* Other

**Optional Open-ended:** “Give an example where applying theory in practice helped you learn better.”

**9. Innovation & Curiosity MCQ:** “How often do you explore topics outside your curriculum?”

* Frequently, I like self-learning
* Sometimes, when it’s interesting
* Rarely, I follow required coursework
* Never

**Optional Open-ended:** “Describe a topic you learned independently and what you gained from it.”

**10. Personalized Motivation Open-ended (optional, all students can answer):**

* “If you could design your ideal academic path in data science, what would it look like?”
* “What kind of impact do you hope to have in your career?”

Basic QUESTIONS:

* What is your main motivation of joining this amazing field of data science?
  + Just learning trending technology
  + Demanding field
  + Money
  + Research
  + Inspired by someone
  + Passion Projects
  + Others
* How better do you understand this concept of data science?
  + Scale 1-10, 1 being very new inexperience 10 being always on mark with the trending DS technologies.
* From the following select what you think is a role or data scieniests
  + Options will include a variety of responsibilities a data science has and doesn’t have. Basically, right and wrong answers, this will help the rag model understand how well this student knows data science. Maybe sometimes they don’t have a right idea of what it is.
* Is computer Science and Data Science the same?
  + List will include phrases that describe how those fields are different, for instance, computer science is developing applications whereas data sicene is putting them into use.
  + And multiple of these phrases show how they are different
  + Some wrong answers too so the RAG knows that student isn’t expereiced enough.
* What other programs or other opportunities have you explored in the UNCC catalog, if any.
  + None, only know about the major core courses
  + Planning to add another major/minor – which?
  + Explored Research
  + Already reached out to faculties
* Lets start to draft your Degree Plan!
* How comfortable are you with coding / programming / handling technical operations?
  + I have strong experience (multiple languages, projects)
  + I have basic experience (knows one language, understanding logic/syntax)
  + I’m a beginner
  + I haven’t coded yet

**Optional Open-ended:** “If you have coding experience, describe a project.”

**Optional Open-ended:** “How would you rate the difficulty level and the reward altogether?

* Which best describes your math/statistics skills?
  + Advanced (College Calculus, Linear Algebra or Advanced Statistics)
  + Intermediate (basic high school stats, calc and algebra)
  + Beginner
  + Minimal exposure

**Optional Open-ended:** “Rate how are these topics significant to Data Science?”

* What type of learning excites you most?
  + Hands-on projects & applied learning
  + Theoretical & concept-heavy
  + Mix of both
  + Other
* What Describes your writing skills:
  + Creative writing
  + High School Research paper
  + Written a Qualitative Research Paper
  + Have made a publication
  + No exposure to writing
  + Other
* Rate how these above topics are significant to Data Science.
* how much about data ethics you have explored and how significant are they.
  + Very, I read articles related to it and aware of the problems
  + Fairly, but not that aware of whats going on out there
  + Not sure, what is data ethics?
  + Data Science is more of a technical field, why eithcs?
  + Other..
* What field do you wish to apply data science to? (Select all that apply)
  + AI/ML research
  + Healthcare & Bioinformatics
  + Business & Finance
  + Social Impact / Public Policy
  + Cybersecurity / Data Privacy
  + Environmental Science
  + Communications
  + Mathematics & Statistics
  + Journalism
  + Music / signal processing
  + Other..add more

**Optional Open-ended:** “If other, please describe your area of interest.”

* Which of the following approaches been the best for you when problem solving?
  + Structured, rigid, step-by-step logical instructions
  + Creative, out-of-the-box exploration
  + Collaborative teamwork
  + trial-and-error
  + Using AI
  + Using Textbooks
  + Having a mentor
  + other

**Optional Open-ended:** “Describe a problem you solved and how you approached it.”

* What’s your ideal career path?
  + Research / Academia / PhD
  + Industry technical role (Data Scientist, ML Engineer)
  + Management / Analytics Leadership
  + Entrepreneurship / Startup
  + Something extraordinary, out-of-the-box
  + Teaching
  + Not sure yet

**Optional Open-ended:** “Explain why this path appeals to you.”

**Soft Skills & Collaboration MCQ**

* How comfortable are you with teamwork and communication-heavy projects?
  + Very comfortable, I enjoy collaboration
  + Moderate, I can adjust
  + Prefer working independently
  + I struggle with group work

**Optional Open-ended:** “Share an experience working on a team or leading a project.”

* **Application vs Theory MCQ:** “When learning a new topic, what motivates you most?”
  + Applying knowledge to real-world projects
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  + Never

**Optional Open-ended:** “Describe a topic you learned independently and what you gained from it.”

* **Personalized Motivation Open-ended (optional, all students can answer):**
  + “If you could design your ideal academic path in data science, what would it look like?”
  + “What kind of impact do you hope to have in your career?”
* How confident and well planned is your goal regarding academics and career
  + Nothin solid, taking it step by step
  + I know what I want to do - \_\_\_\_\_\_\_\_ (profession)
  + Slightly have an idea till graduation
  + Already have interned
  + Very lost, just trying to get a degree