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Designing an Agentic Artificial Intelligence Career Coach: A Human-in-the-Loop Framework for Personalized Career Guidance

Xiahan (Dilapsky) LI[a] and Miwa Omori[b]

[a]Sakuraseisai Co., Ltd
[b]EngagePro Inc.

Abstract
This study introduces a framework for an agentic artificial intelligence (AI) career coach designed to provide personalized guidance based on specific student personas. The system architecture features a specialized chatbot interface driven by a five-section prompt design and integrated with a five-component evaluation process that generates structured insights for human advisors. Pilot implementations were conducted at two Japanese universities, using the Career Adapt-Abilities Scale and qualitative feedback to explore the framework's potential impact. Quantitative and qualitative findings suggest that the proposed framework may support student career readiness, self-discovery, and career reflection and indicate the potential value of a hybrid AI–human coaching model

Background

Artificial intelligence (AI) career coaches are often framed as tools that augment human coaching rather than replace human coaches. Some recent studies have demonstrated that clients can establish strong working alliances and collaborative partnerships with AI tools (e.g., Barger, 2025), whereas other researchers advocate a human-in-the-loop approach to coaching. Saxena and Ganuthula (2026) support a collaborative model in which AI manages analytical and data-intensive tasks, whereas humans provide relational and ethical oversight. Building on this division of responsibilities, Bozer and Kotte (2026) suggest that coaches can navigate role ambiguity and reduce the risk of replacement by strengthening competencies in which human coaches have particular strengths, such as empathy and the ability to manage psychological complexity.

Framework for an AI Career Coach

Unlike the approaches described above, we designed a framework for an AI career coach wherein an AI chatbot acts as an independent agent that interacts with the user, career coach, and school or company.

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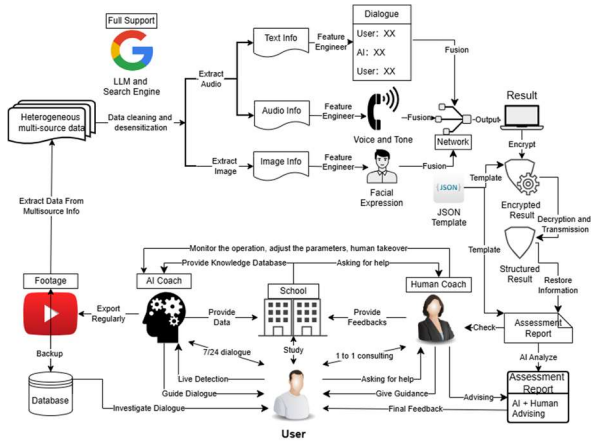

Figure 1. *Framework for AI-supported career coaching in which an AI chatbot acts as an agent that interacts with other stakeholders*

Chatbot Prompt Design

We designed prompts to enable the chatbot to interact with users and substitute for a human career coach during repetitive stages of traditional coaching sessions.

Section 1: Career design

The concept of career design suggests that individuals should develop three distinct life and career plans rather than follow a single standard path (Burnett & Evans, 2016). The developed prompts encourage students to consider multiple life and career trajectories by asking them to design scenarios such as “I want to work for a company,” “I want to start my own business,” or “I want to provide for my family.”

Section 2: Building trust

If users perceive a career coaching session with an AI system as a burdensome assignment, they may provide short responses simply to complete it quickly, and these responses may be vague or potentially misleading. Human career coaches build trust through rapport-building activities, whereas the prompts instruct the AI to maintain an empathetic tone, use nonjudgmental language, and ask open-ended questions that encourage reflection.

Section 3: Example questions

Repeatedly answering the same questions can be tedious for coaches. This part of the coaching process can be automated by incorporating guidance for responding to these common questions into the AI system. For example, one prompt states:

If a student says, "I am thinking about getting a good job," ask "When you imagine a good job, is your first thought focused on learning new things and feeling accomplished or on a high salary and a strong reputation?"

Section 4: Guidance for vague responses

Users commonly respond with phrases such as “I do not know,” “I am not sure,” or “anything is fine,” often because they feel uncertain. Such vague responses make it difficult for coaches to determine how to proceed productively. To address this problem, the AI uses a process of elimination or simple scenario-based reflection to identify users’ preferences. For instance, one prompt specifies:

When a user says, “I do not know what kind of job I really want,” respond, “Let us imagine two options: (A) doing something you are good at, but the pay is initially low; or (B) following a popular path that others recommend but that you do not personally like. Which one would you prefer?"

Section 5: Evaluation metric

The evaluation metric enables a quantitative assessment of changes in career adaptability after interaction with the AI career coach. For example, the Career Adapt-Abilities Scale measures four key dimensions of a user’s career readiness: concern, control, curiosity, and confidence (Savickas & Porfeli, 2012).

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Evaluation Process Design

The evaluation process yields a comprehensive career report for the user and provides the human career coach with initial insights and guidance.

Section 6: Role transition

Specific conditions govern the chatbot's transition from the career coach role to the report generator role. For example, the following transition prompt is used:

Track the number of dialogue turns as *n*. When *n* = 11, end the AI career coach role-play and generate a "Career Development Information Analysis Report" based on the criteria in Sections 7–10.

Section 7: Background information

The AI system collects background information from user interactions and automatically extracts frequently occurring keywords from the dialogue. These tasks would otherwise require time-consuming manual review by human coaches. The prompt instructs the AI system to include the following information:

- Persona profile: Basic details such as academic major, grades, and hobbies.
- Frequently occurring keywords: Keywords accompanied by occurrence counts (e.g., "stability": five occurrences; "interest": four occurrences).
- Behavioral patterns: Notable patterns, such as expressions of anxiety about deadlines.

Section 8: Assessment results

After collecting basic information, the AI system generates preliminary hypotheses about the user's Holland code based on the preceding dialogue. Traditional approaches require users to complete separate questionnaires, whereas the AI system infers the user's Holland code through a more conversational and reflective process.

Section 9: Concerns and contradictions

The AI system identifies both user concerns and contradictions in the dialogue. Concerns are issues directly expressed by the user, whereas contradictions are inconsistencies or tensions between statements and may require further exploration.

For example, a user may express a desire for a stable job early in the conversation but later describe stability as "boring." The AI system flags such contradictions for subsequent discussion with a human career coach.

Section 10: Human confirmation items

During the final stage of the evaluation, the AI system identifies specific areas that require validation by a human career coach. The prompt instructs the AI system to list at least five ambiguous points that require clarification.

For example, if a user mentions work experience but does not specify the type of job, the AI flags this information as a "Human Confirmation Item" so that a career coach can assess its relevance to the user's intended career direction.

Research Steps

A pilot implementation of the proposed framework was performed with five students from Ritsumeikan Asia Pacific University. Due to the exploratory nature of the study and the small sample size, the findings should be interpreted as preliminary evidence regarding the feasibility of the framework rather than as statistically generalizable results. The methodology involved four steps:

1. Students completed the Career Adapt-Abilities Scale for the first time.
2. Students engaged in 10 rounds of dialogue with the AI career coach via Google Gemini and received a final report.
3. Students completed the Career Adapt-Abilities Scale for the second time.

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4. Data collected in steps 1 and 3 were compared to identify changes in Career Adapt-Abilities Scale scores.

Appendix 2. Career Adapt-Abilities Inventory — International Version 2.0

Name _____ Age _____ Circle one: Male or Female

Different people use different strength to build their careers. No one is good at everything, each of us emphasizes some strengths more than others. Please rate how strongly you have developed each of the following abilities using the scale below.

5 = Strongest
4 = Very Strong
3 = Strong
2 = Somewhat strong
1 = Not strong

STRENGTHS	5	4	3	2	1
Thinking about what my future will be like	___	___	___	___	___
Realizing that today's choices shape my future	___	___	___	___	___
Preparing for the future	___	___	___	___	___
Becoming aware of the educational and vocational choices that I must make	___	___	___	___	___
Planning how to achieve my goals	___	___	___	___	___
Concerned about my career	___	___	___	___	___
Keeping upbeat	___	___	___	___	___
Making decisions by myself	___	___	___	___	___
Taking responsibility for my actions	___	___	___	___	___
Sticking up for my beliefs	___	___	___	___	___
Counting on myself	___	___	___	___	___
Doing what's right for me	___	___	___	___	___
Exploring my surroundings	___	___	___	___	___
Looking for opportunities to grow as a person	___	___	___	___	___
Investigating options before making a choice	___	___	___	___	___
Observing different ways of doing things	___	___	___	___	___
Probing deeply into questions I have	___	___	___	___	___
Becoming curious about new opportunities	___	___	___	___	___
Performing tasks efficiently	___	___	___	___	___
Taking care to do things well	___	___	___	___	___
Learning new skills	___	___	___	___	___
Working up to my ability	___	___	___	___	___
Overcoming obstacles	___	___	___	___	___
Solving problems	___	___	___	___	___

Figure 2. *Career Adapt-Abilities Scale comprising 24 items (Savickas & Porfeli, 2012)*

Results

The largest changes in item scores were observed for the following items:

- Q5 (Planning how to achieve my goals): 46.5% increase (from 3.14 to 4.60)
- Q6 (Concerned about my career): 10.4% decrease (from 3.57 to 3.20)
- Q16 (Observing different ways of doing things): 7.3% increase (from 4.29 to 4.60)
- Q17 (Probing deeply into questions I have): 11.0% increase (from 4.14 to 4.60)
- Q24 (Solving problems): 11.0% increase (from 4.14 to 4.60)

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Preliminary Findings

Interaction with the AI career coach was associated with positive changes in several items on the Career Adapt-Abilities Scale, including the following:

- Career planning (Q5): Students developed more concrete, actionable plans for achieving their career objectives.
- Self-exploration (Q16): Students reported higher scores related to curiosity and exploration-oriented behaviors.
- Problem-solving skills (Q17 and Q24): Students reported higher confidence in addressing career-related challenges.

Some outcomes were unclear:

- Career concern (Q6): Students reported slightly lower scores on career concern after interacting with the AI career coach. The meaning of this change remains unclear and should be explored in future research.

We also conducted a similar session at Nagano University to collect subjective feedback. The qualitative results are summarized below:

- Articulation: Students were able to express thoughts about their careers that were previously difficult to verbalize.
- Self-discovery: Students identified personal keywords and traits they had not previously recognized.
- Approachability: The AI enabled students to contemplate their future paths in a more accessible, less intimidating manner.

Conclusion

The findings suggest that interaction with the AI career coach was associated with higher mean scores across most dimensions of the Career Adapt-Abilities Scale than at the baseline. Although the findings are based on a small pilot sample, they suggest that the proposed framework may support career reflection, planning, and self-exploration. For students, the model may broaden perspectives and encourage proactive career development. For career advisors, the model may reduce repetitive information-gathering tasks, allowing for greater focus on human-centered guidance.

Discussion

Although this study focused on student career coaching, the framework may be applicable in other educational and workplace settings. Future research could examine the integration of ontologies and competency models. Ontologies may support formal representations of occupations and career pathways, whereas competency models may facilitate alignment between individual capabilities and organizational requirements (Gruber, 1993; McClelland, 1973). Future studies could investigate how these approaches can be combined with agentic AI systems to support talent development in educational and workplace settings.

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