AI Practitioner Competence Framework DRAFT

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Questions to Dominik.Lukes@ctl.ox.ac.uk.

Contents

AI Competence Levels

Understand the nature and purpose of the levels of competence

These competence levels stand independent of any course. They describe an individual's ability to navigate a particular area of activity and help establish a baseline for further development.

Uses of competence levels

The competence levels are formulate to make it easy to:

1. Self-assess areas of competence generally
2. Track progress of individuals and set development goals
3. Design professional development strategies and goals
4. Make judgements about individuals' ability to succeed in particular areas
5. Estimate levels of effort and time required to improve competence

Components of competence

The progression of competence takes notice of changes in:

- Quality of performance
  - Independence of performance
  - Fluency of performance
  - Accuracy of performance
- Quality of mental models
  - Ability to identify good and bad examples of practice
  - Ability to make useful inferences
  - Ability to name key concepts and actors
- Ability to respond to change
  - Ability to engage with sources of information
  - Ability to serve as a resource for others
  - Quality of personal learning network

Levels and sub-levels of competence

- **Novice (Beginner/Waystage):** Can only perform selected basic tasks with assistance and following pre-set routines; makes many errors and requires help to solve them; often unable to take advantage of any but the most simple guidance; often does not start certain tasks because of lack of knowledge or skill.
- **Apprentice (Intermediate/Vantage):** Can perform all common tasks fully with limited assistance; can solve some common problems and will develop abstractions; may have to refer to guidance; is limited in ability to use complex guidance; often hits limits of capacity and will not perform certain actions due to lack of knowledge or skill.
- **Practitioner (Advanced/Mastery):** Can perform even most uncommon tasks with ease (and refer to help when necessary); can utilise even advanced online guidance. Will almost never abandon a task within the area of competence because of difficulty. Has developed sophisticated abstractions and can use to identify and solve problems.
- **Expert (Contribution):** Can perform advanced tasks across a number of areas of competence; continuously seeks to improve productivity; has access to sophisticated abstractions; can interpret and create advanced

guidance. Never avoids a task within area of competence; contributes to the development of tools; participates in professional communities.

Each level is subdivided into:

- **Low:** Can perform at that level 30% of the time in some areas
- **Mid:** Can perform at this level reliably at 80% of the time across almost all areas
- **High:** Can perform at this level all the time across all areas and 15% of the time at the higher level in limited areas

Progression through levels of competence

The progression through the levels of competence is not linear. This means that it take more time and effort to progress to each subsequent level.

Also, it is impossible to directly compare the precise skills of two people with the same level of competence in the more advanced stages because the competence covers two wide an area.

Illustration of the funnel like nature of competence.
It takes progressively more time, effort, experience, knowledge and skill to fill the metaphorical cone of competence.

Expert

Practitioner

Apprentice

Novice

Competencies and Learning Outcomes

Competencies across five modes of engagement

This is a generic description of skills across modes of engagement. A similar table could be constructed for more specific areas of competence, modalities and methods of engagement. The chart can be used to self-assess competence and/or monitor skill development.

The **five modes of engagement** are:

1. Choosing the appropriate tools for the task
2. Formulating appropriate prompts
3. Interpreting prompt outcomes
4. Integrating tools into professional practice
5. Making decisions about tool development

Mode of engagement	Novice	Apprentice	Practitioner	Expert
Tool choice	Has only heard of ChatGPT and can create an account with assistance. Only uses the basic chat interface, if they use ChatGPT at all. No awareness of paid options or distinction between the features. Has no awareness of alternative tools, assumes ChatGPT = AI. Relies on mainstream media and random	Is aware that ChatGPT is not the only chatbot and can name at least one alternative (most likely Bard, Bing). Can name one or two basic feature differences related to their personal need but has no awareness of the source of the difference. Has some awareness of the difference between ChatGPT and ChatGPT Plus.	Can name the four major chatbots and make appropriate choice between them to suit their practical need. Is aware of additional tools and how they relate to the major chatbots through Large Language Models but may not be able to articulate the differences. Regularly uses at least two tools, choosing one based on their	Can fully articulate the difference between various tools – the company behind them, the language model, the feature differences. Regularly uses multiple tools both for testing their features and to achieve practical tasks. Uses all tools across multiple use cases with advanced techniques. Regularly engages with multiple sources of

Mode of engagement	Novice	Apprentice	Practitioner	Expert
	conversations with friends for information about the tools. Has used ChatGPT once or twice.	Cannot differentiate between the chatbot on a company website and a chatbot based on LLMs. Is aware of additional AI-based tools but cannot articulate their relationship to Large Language Models. Has at least one source of reliable information about the tools but only engages with it intermittently or opportunistically (such as attending initial training or reading guidance). Uses one tool with some regularity but mostly only for testing or to achieve basic needs.	knowledge of the differences between their features (plugins, uploads) and/or particular strengths (such as context window, coding, language support). Uses at least one tool as their main tool to achieve common practical tasks. Can differentiate between paid and free versions of ChatGPT and articulate the case for one over the other. Uses multiple features of their tools such as history or Chat sharing in ChatGPT. Has some basic awareness of the existence of APIs but cannot fully articulate their relationship to providers. Periodically engages with multiple reliable sources of information beyond the media and	information about generative AI at different levels. Makes at least some contribution to the conversation about AI. Serves as a source of information for other users at all levels.

Mode of engagement	Novice	Apprentice	Practitioner	Expert
			opportunistic encounters with colleagues. Acts as an opportunistic source of basic information for others at lower levels.	
Prompt crafting	Only uses basic prompts, almost exclusively in the form of a question similar to a search engine or to give a basic task such as to write something. Uses prompts only in one or two areas (ask for recipes, ask to write a song or essay, etc). Almost never asks for elaboration or improvements. Has no awareness of prompt engineering and any of the basic feature such as personas. Has no awareness of the context window. Does not engage with any sources of information about prompting.	Mostly uses basic prompts but does sometimes ask for elaboration or iteration. Occasionally asks for results in different formats (lists, tables, etc.) Has some awareness of prompt engineering (for instance, personas or chain of thought) but cannot always use them appropriately. Has awareness of the context window but cannot always appropriately modify their approach to suit their needs (for instance, switching between chats). Cannot articulate why specific prompt	Uses a variety of prompt formats appropriate to the task. Routinely asks for iteration or elaboration. Frequently asks for results in different formats (lists, tables, poetry, code, etc.) Can use their understanding of the principles of prompt engineering to craft appropriate prompts to the task (chain of thought, personas, subtask, etc.) Can use their understanding of the context window to formulate tasks around longer texts and with	Uses a variety of prompts across formats, modalities using a whole known range of prompt engineering techniques. Regularly engages with new sources of information about prompting and may contribute new knowledge. Regularly experiments with different prompt formats across multiple tools. Acts as a regular and reliable source of information for users at all levels.

Mode of engagement	Novice	Apprentice	Practitioner	Expert
		engineering techniques are used. Opportunistically engages with sources of information when presented in casual conversation or on social media.	enough semantic information. Has basic awareness of how LLMs work to help them choose prompts appropriately. Periodically engages with source of information about prompt engineering and may have taken a formal prompt engineering course. Acts as an opportunistic source of information for users at apprentice and novice levels.	
Output interpretation	Treats the output of a chatbot at face value in the same way they may treat another source of information. Cannot differentiate between levels of reliability of chatbot output and information found using a web search or consulting Wikipedia.	Frequently treats the output of an LLM as similar to that of a search. Is aware of the problem of hallucination but cannot reliably identify areas in which there is the most danger of it. Frequently makes mistakes in over interpreting output as that	Treats the output of LLMs with the appropriate level of awareness of potential problems. Rarely if ever interprets the output as similar to that of a search or interprets the LLMs statement about what it is doing as a fact.	Uses their knowledge of how LLMs work to interpret the output and anticipate issues. Never attributes LLM output to anything other than token prediction – for instance, when LLM says it is doing a database look up.

Mode of engagement	Novice	Apprentice	Practitioner	Expert
	Relies entirely on the media or limited personal experience for information on reliability of LLM output.	of a search or database look up. Has little to no awareness of the predictive nature of LLMs and assumes that they perform similar algorithms to that of normal computer software.	Understands the problem of hallucination and can make appropriate predictions as to whether to treat the output of the LLM as sufficiently reliable relative to their need. Has some understanding of the predictive nature of LLMs not make assumptions about the algorithmic nature of the processes.	Can take advantage of hallucination for practical purposes. Can interpret the sequence of a chat from the perspective of prediction in context and make decisions about prompt modification.
Integration into practice	Generative AI plays almost no practical role in their personal or professional life. Cannot articulate a clear usecase for AI in their practice. Their uses of generative AI are limited to that of a curiosity.	Generative AI plays only a very limited practical role in one or two aspects of their personal or professional life. Their use is limited to one or two use cases (using only one tool) and they frequently choose not to use the tools even when it would be appropriate.	Uses multiple tools with at least one regularly to achieve a wide variety of practical tasks both in professional and personal life. Chooses to use generative AI at appropriate moments and for appropriate tasks and rarely in cases where it would not be appropriate.	Uses both free and paid tools regularly and can use API playgrounds for testing and comparison. Integrates AI with a complete productivity workflow (possibly even using APIs with an automation provider). Serves as a source of knowledge for others and their institution.

Mode of engagement	Novice	Apprentice	Practitioner	Expert
		Occasionally uses the tool in inappropriate situations. They have no established routines of using generative AI.	Has established routines for using the tools – such as bookmarks or dedicated virtual workspaces. May use a subscription to a paid tool alongside free tools.	
Building with AI tools (AI engineering – this interaction applies to coders or code managers)	Is aware of the existence of APIs but has cannot describe their functionality. Can name one or two providers of an API but cannot compare why one might be preferable. Can adjust existing code using an API but with no understanding of the details of the implementation. May have awareness of tools for building with AI but cannot choose an appropriate one for the task at hand. Has limited ability to independently use	Can name major API providers and suggest a choice. Can use basic tools for building with AI APIs such as Langchain or a vector store but only for the most basic proof-of-concept applications. Understands what an API provides and how costs are calculated (tokens, embeddings, context window) but cannot always make appropriate decision about their use without guidance. Can craft prompts appropriate to the simple level but has limited	Can choose an appropriate provider of an API to build a with AI using the appropriate tool such as Langchain or Llama index. Is able to anticipate difficulties and take steps to prevent future problems. Uses sophisticated systems for evaluating tool output and can describe potential limits based on their understanding of how foundation models work (e.g. fine-tuning vs few shot learning, embeddings and cosine	Uses their detailed knowledge of how different models work in their choices. Often runs smaller models on local machines as proof of concept. Builds sophisticated evaluation systems using a variety of techniques (from recognised benchmarks to custom tools). Has built a store of tacit knowledge and an extensive personal learning network. Contributes to public knowledge about building with AI.

Mode of engagement	Novice	Apprentice	Practitioner	Expert
	documentation to use the tools.	ability to evaluate the tool output beyond simple visual inspection. Can use documentation and guidance to build simple tools but had limited access to tacit shared knowledge.	similarity, context window, tokens, etc.) Can profitably use documentation for tools and APIs for help and blend it with both tacit knowledge and knowledge form a personal learning network. Might describe themselves as a junior AI engineer.	Might describe themselves as a senior AI engineer.
Educator	Is aware of ChatGPT and has tried it several times to paste in an assignment to see whether it can be used for cheating. Does not use any advanced methods to improve the performance. Does not use ChatGPT to create assignments for students.			
Student				