

Tool Architecture Worksheet

This worksheet is to supplement TLEF applications that are requesting incubator help in developing AI in Teaching and Learning tools. This can be submitted as the PDF as part of your TLEF application.

Project title: please include the title of your project here

What does “done” look like? What defines success?

How do you want the student learning experience to change with the implementation of this tool?

Example:

The tutorbot transforms student learning experience by:

- *Before they had to wait for office hours, and now they get an answer immediately*

Your definition of done/success here:

What user stories do you want your tool to have? And how important is each user story?

Do any of the user stories in the table below fit your ideas for your tool?

If not, identify user stories you see as being important to your tool.

Indicate how fundamental each user story is (need versus nice).

You can use the table in this worksheet to record which user stories work for you or add new ones at the bottom.

User stories	NEED to have?	Nice to have?
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<p><i>As a student I want to be able to ask the tool a question about my subject and get an answer back from within the course materials so that I can learn materials relevant to the subject and study for the assessments.</i></p> <p><i>As an instructor, I want to create a set of common misconceptions for each topic so that I can develop materials that address and correct these misunderstandings.</i></p>		
<p><i>As a student, I want to generate practice questions about the course material I'm studying so that I can test my understanding and prepare for exams more effectively.</i></p> <p><i>As an instructor, I want to generate diverse sets of questions for my assessments so that I can save time on test preparation while ensuring comprehensive coverage of the course content.</i></p>		
<p><i>As a student, I want to input lengthy course readings and receive concise summaries so that I can quickly grasp the main ideas and manage my study time more efficiently.</i></p> <p><i>As an instructor, I want to summarize student discussion forum posts so that I can quickly assess class engagement and identify common themes or misconceptions.</i></p>		
<p><i>As an instructor, I want to assess the sentiment of class discussions or online forums so that I can identify topics that evoke strong reactions and adjust my teaching approach accordingly.</i></p> <p><i>As a student, I want to analyze the sentiment of peer reviews on my work so that I can better understand the overall reception of my assignments beyond just the grades.</i></p>		
<p><i>As an instructor, I want to input assessment questions and ideal answers so that I can automatically generate a detailed grading rubric for consistent and fair evaluation.</i></p> <p><i>As a student, I want to use the rubric generator to create self-assessment checklists so that I can evaluate my own work before submitting it for grading.</i></p>		
<p><i>As an instructor, I want to input a set of questions and their associated rubrics so that I can automatically grade student responses and provide consistent feedback.</i></p>		

<p><i>As a student, I want to submit my answers to practice questions so that I can receive immediate grades and feedback to gauge my understanding of the material.</i></p>		
<p><i>As an instructor, I want to verify the content generated by AI tools so that I can ensure the information provided to students is reliable and aligned with the curriculum.</i></p> <p><i>As a student, I want to see which answers/replies have been verified by an instructor so that I can trust the accuracy of the information I'm learning.</i></p>		
<p><i>As an instructor, I want to use the text-to-text chat feature to simulate student interactions so that I can anticipate potential questions and prepare more comprehensive teaching materials.</i></p> <p><i>As a student, I want to practice explaining course concepts through chat conversations so that I can improve my understanding and communication skills.</i></p>		
<p><i>As an instructor, I want to be able to identify the sequence or graph of concepts, such that looking at one concept in a graph you can see what concepts are necessary to understand it (inputs), and which it affords (outputs).</i></p> <p><i>As a student, I want the system to present me with topics in an order that makes pedagogical sense to support my learning.</i></p> <p><i>As a student I want to be taken back to more foundational concepts if my understanding of a current topic is weak.</i></p>		
<p><i>As a student, I want to engage with a diverse range of synthetic patient profiles so that I can improve my communication skills and clinical decision-making across various medical scenarios.</i></p> <p><i>As an instructor, I want to create synthetic customer service scenarios with detailed backstories so that business students can practice handling complex customer interactions.</i></p>		
<p><i>As an instructor, I want to generate formative assessment questions aligned with learning outcomes so that I can regularly check student progress throughout the course.</i></p>		

<p><i>As a student, I want to request additional practice materials for specific learning outcomes so that I can focus on areas where I need more improvement.</i></p>		
<p><i>As an instructor, I want to upload course-specific materials to the tool so that student queries are answered primarily using this curated content rather than general knowledge.</i></p> <p><i>As a student, I want to receive responses that prioritize information from my course materials so that I can ensure the answers align with what I'm expected to learn in class.</i></p>		
<p><i>As an instructor, I want to receive alerts when a significant number of students are struggling with a particular concept so that I can provide timely additional support or clarification.</i></p> <p><i>As a student, I want to view a personalized dashboard of my learning analytics so that I can identify my strengths and weaknesses across different course topics.</i></p>		
<p><i>As a student, I want to use voice commands to interact with the tool so that I can have a more immersive and accessible learning experience.</i></p> <p><i>As an instructor, I want to incorporate animated data visualizations in the UI so that I can help students better understand trends and relationships in complex datasets.</i></p>		
<p><i>As a student with visual impairments, I want to use speech input to interact with the learning materials so that I can access course content more easily and independently.</i></p> <p><i>As an instructor, I want to convert my text-based lectures into animated video presentations so that I can offer more engaging and accessible content for diverse learning styles.</i></p>		
<p><i>Add rows as needed!</i></p>		

Example:

For Socrates, the need-to-have user stories were:

- *As a student, I want to engage in a chat-like interface so that I can receive contextual, socratic questions that challenge my thinking on course topics.*
- *As a student, I want to critically examine my arguments or position statements so that I can improve my critical thinking skills and strengthen my understanding of complex topics.*
- *As an instructor, I want to provide contextual links to content as part of the socratic conversations they are having so that they have extra research material beyond my course notes to consider when answering the questions posed by the tool.*

The nice-to-have user stories were:

- *As an instructor I would like to be able to publish “News of the week” content with a minimum of effort so that students can stay up to date.*

Example:

For Tutorbot, the need to have user stories were:

- *As a student, I want to ask questions about course material and receive immediate answers so that I can clarify my understanding at any time, even outside of class hours.*
- *As a student, I want to engage in a text-based conversation about course topics so that I can explore concepts more deeply and at my own pace.*
- *As a student, I want to flag answers that I think need verification so that my instructor can review and confirm their accuracy.*
- *As an instructor, I want to upload my course materials to the tool so that it can provide accurate, course-specific answers to my students' questions.*
- *As an instructor, I want to review and verify automatically generated answers so that I can ensure the information provided to my students is correct and aligns with my teaching.*

The nice to have user stories were:

- *As an instructor, I want to customize the tool's response style so that it aligns with my teaching approach and encourages critical thinking.*
- *As an instructor, I want to view anonymized chat logs so that I can understand how students are engaging with the course material outside of class time.*
- *As a student, I want to see my interaction history with the tool so that I can review my learning progress and revisit important explanations.*

What software components will your tool have?

Given the user stories you identified, do any of the components below seem to fit your needs? Identify the components below that fit your needs or add your own components and user stories in the space provided at the bottom of the table.

If you needed this user story then you may need this component	Fits My Needs
<p><i>As a student I want to be able to ask the tool a question about my subject and get an answer back from within the course materials so that I can learn materials relevant to the subject and study for the assessments.</i></p> <p><i>As an instructor, I want to create a set of common misconceptions for each topic so that I can develop materials that address and correct these misunderstandings.</i></p>	<p>Answer generator answers questions</p>	
<p><i>As a student, I want to generate practice questions about the course material I'm studying so that I can test my understanding and prepare for exams more effectively.</i></p> <p><i>As an instructor, I want to generate diverse sets of questions for my assessments so that I can save time on test preparation while ensuring comprehensive coverage of the course content.</i></p>	<p>Question generator generates questions</p>	
<p><i>As a student, I want to input lengthy course readings and receive concise summaries so that I can quickly grasp the main ideas and manage my study time more efficiently.</i></p> <p><i>As an instructor, I want to summarize student discussion forum posts so that I can quickly assess class engagement and identify common themes or misconceptions.</i></p>	<p>Content summarizer given content, provides a summary</p>	
<p><i>As an instructor, I want to assess the sentiment of class discussions or online forums so that I can identify topics that evoke strong reactions and adjust my teaching approach accordingly.</i></p> <p><i>As a student, I want to analyze the sentiment of peer reviews on my work so that I can better</i></p>	<p>Sentiment analyzer given content, analyzes and provides the general sentiment</p>	

<p><i>understand the overall reception of my assignments beyond just the grades.</i></p>		
<p><i>As an instructor, I want to input assessment questions and ideal answers so that I can automatically generate a detailed grading rubric for consistent and fair evaluation.</i></p> <p><i>As a student, I want to use the rubric generator to create self-assessment checklists so that I can evaluate my own work before submitting it for grading.</i></p>	<p>Rubric generator given questions and answers, generates a grading scheme</p>	
<p><i>As an instructor, I want to input a set of questions and their associated rubrics so that I can automatically grade student responses and provide consistent feedback.</i></p> <p><i>As a student, I want to submit my answers to practice questions so that I can receive immediate grades and feedback to gauge my understanding of the material.</i></p>	<p>Grader asks a question from a set of provided questions, collects an answer from a student, and based on the associated rubric, provides a grade or feedback to students on their answers.</p>	
<p><i>As an instructor, I want to verify the content generated by AI tools so that I can ensure the information provided to students is reliable and aligned with the curriculum.</i></p> <p><i>As a student, I want to see which answers/replies have been verified by an instructor so that I can trust the accuracy of the information I'm learning.</i></p>	<p>Content verifier allows a user to verify an answer</p>	
<p><i>As an instructor, I want to use the text-to-text chat feature to simulate student interactions so that I can anticipate potential questions and prepare more comprehensive teaching materials.</i></p> <p><i>As a student, I want to practice explaining course concepts through chat conversations so that I can improve my understanding and communication skills.</i></p>	<p>Text-to-text chat Allows for a conversation between a user and a language model</p>	
<p><i>As an instructor, I want to be able to identify the sequence or graph of concepts, such that looking at one concept in a graph you can see what concepts are necessary to understand it (inputs), and which it affords (outputs).</i></p>	<p>Learning pathways: captures paths through the</p>	

<p><i>As a student, I want the system to present me with topics in an order that makes pedagogical sense to support my learning.</i></p> <p><i>As a student I want to be taken back to more foundational concepts if my understanding of a current topic is weak.</i></p>	<p>material, allowing different flows of conversation</p>	
<p><i>As a student, I want to engage with a diverse range of synthetic patient profiles so that I can improve my communication skills and clinical decision-making across various medical scenarios.</i></p> <p><i>As an instructor, I want to create synthetic customer service scenarios with detailed backstories so that business students can practice handling complex customer interactions.</i></p>	<p>Synthetic data creator: produces fake data for use in analysis</p>	
<p><i>As an instructor, I want to generate formative assessment questions aligned with learning outcomes so that I can regularly check student progress throughout the course.</i></p> <p><i>As a student, I want to request additional practice materials for specific learning outcomes so that I can focus on areas where I need more improvement.</i></p>	<p>Materials creator creates tutorials, exercises, or other materials based on learning outcomes</p>	
<p><i>As an instructor, I want to upload course-specific materials to the tool so that student queries are answered primarily using this curated content rather than general knowledge.</i></p> <p><i>As a student, I want to receive responses that prioritize information from my course materials so that I can ensure the answers align with what I'm expected to learn in class.</i></p>	<p>Local data (the RAG) allows data to be entered that the tool checks before checking the broader model. Responses to requests will (by default) come from materials in the local data first.</p>	
<p><i>As an instructor, I want to receive alerts when a significant number of students are struggling with a particular concept so that I can provide timely additional support or clarification.</i></p> <p><i>As a student, I want to view a personalized dashboard of my learning analytics so that I can identify my strengths and weaknesses across different course topics.</i></p>	<p>Data collection collects user data such that it can be analyzed later</p>	

<p><i>As a student, I want to use voice commands to interact with the tool so that I can have a more immersive and accessible learning experience.</i></p> <p><i>As an instructor, I want to incorporate animated data visualizations in the UI so that I can help students better understand trends and relationships in complex datasets.</i></p>	<p>Fancy UI user interface that is sophisticated or uses more involved technology</p>	
<p><i>As a student with visual impairments, I want to use speech input to interact with the learning materials so that I can access course content more easily and independently.</i></p> <p><i>As an instructor, I want to convert my text-based lectures into animated video presentations so that I can offer more engaging and accessible content for diverse learning styles.</i></p>	<p>Multimodal AI ability to handle more than text-to-text such as Speech to Text or Text to Video.</p>	
<p><i>If you added additional user stories, work with the Incubator team to see whether your stories could work with the existing components, or if a new component would be needed</i></p>		

Example:

Given the user stories we specified, our Tutorbot example is a combination of the **answer generator** and **content verifier**: the tool answers student questions, and instructors use the content verifier to verify the bot answers.

The Tutorbot user stories would be:

As a student I want to be able to ask the tool a question about my subject and get an answer back from within the course materials so that I can learn materials relevant to the subject and study for the assessments.

As an instructor, I want to create a set of common misconceptions for each topic so that I can develop materials that address and correct these misunderstandings.

As an instructor, I want to verify the content generated by AI tools so that I can ensure the information provided to students is reliable and

aligned with the curriculum.

As a student, I want to see which answers/replies have been verified by an instructor so that I can trust the accuracy of the information I'm learning.

How will you put your tool in front of your target audience?

Will it be built as a stand-alone application - if so, will it be a web application, or one that someone will download? Will it be integrated into an already-available application such as Canvas or WordPress? Will it need CWL authentication to use?

Example:

TutorBot is built as a standalone [web application](#) and deployed on EduCloud. It has [CWL authentication](#) integration.

Example:

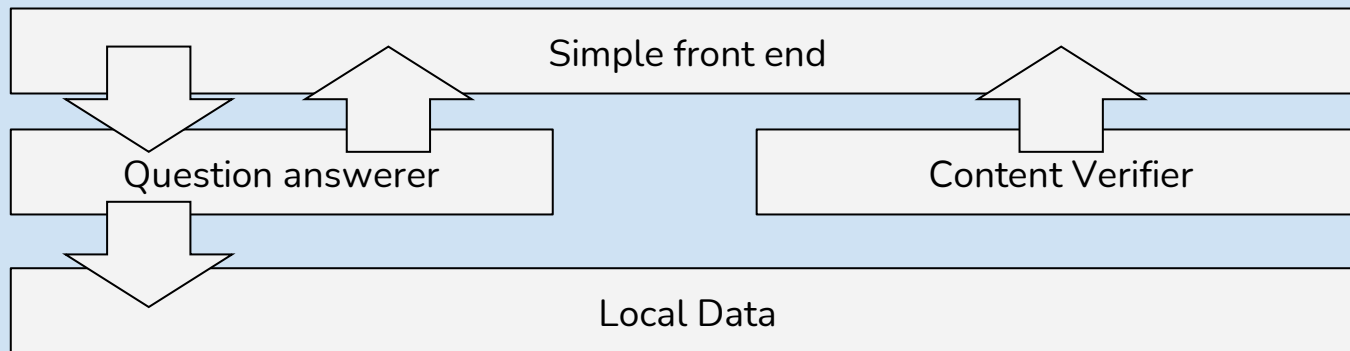
Socrates is built as a [WordPress plugin](#) and made available with the service owner's permission on UBC CMS and UBC Blogs. Students need to sign in to the service - using their CWL as part of the service's [CWL Integration](#) - to use the tool.

Your approach here:

What's a possible architecture from your perspective?

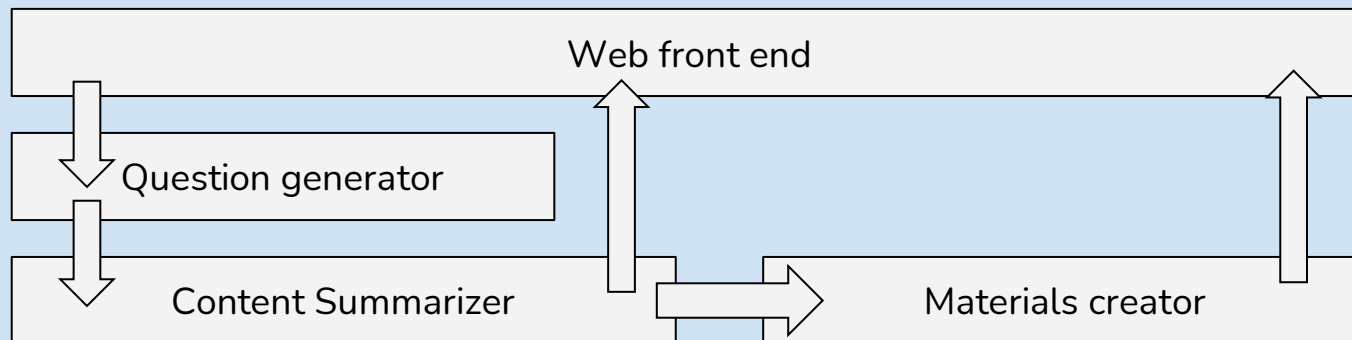
Optionally using the components above, what might your tool look like architecturally? Providing a block diagram like the examples below will help us see the flow of data through your application and help us piece everything together. Your diagram won't necessarily be how the architecture looks in the end, but understanding an example of a solution from your perspective helps us better understand your needs.

Example: Tutorbot



Example: Socrates

More Info: <https://cms.ubc.ca/support/cms-manual/socrates-guide-socratic-dialogue-tool-augmented-with-generative-ai/>



Your diagram here: