

Generative AI augmentation to [www.tutors.dev](http://www.tutors.dev)  
Project Proposal

**Student Name:** Ruslan Zhabskyi

**Student Number:** 20104105

**Programme:** Higher Diploma in Science in Computer Science

**Project Type:** Independent

**Project Category:** Component of Larger System

**Stakeholders:**

- SETU – tutors web app
- If applicable, potential collaboration with Peter Fortune's "Multi-modal search feature for Tutors"

## Overview

**What?** Generative AI augmentation to [www.tutors.dev](http://www.tutors.dev). This is an additional feature that will enhance students' learning experience. It will provide students with opportunities to adjust content without leaving the web app.

GenAI augmentation means that students will have an option to select a portion of text that they find difficult to understand and select from multiple choices to regenerate the original text using an Open Source AI Large Language Model. For example, students can request the text to be rephrased, explained with an analogy, or simplified using the "explain it like I'm five" approach (Figure 1).

GenAI augmentation will enhance [www.tutors.dev](http://www.tutors.dev) as an online learning platform. It will minimize the time lecturers spend explaining basic concepts, allowing them to dedicate more attention to addressing advanced questions. It will also give details on what concepts students find more challenging to understand which will lead to further content improvements.

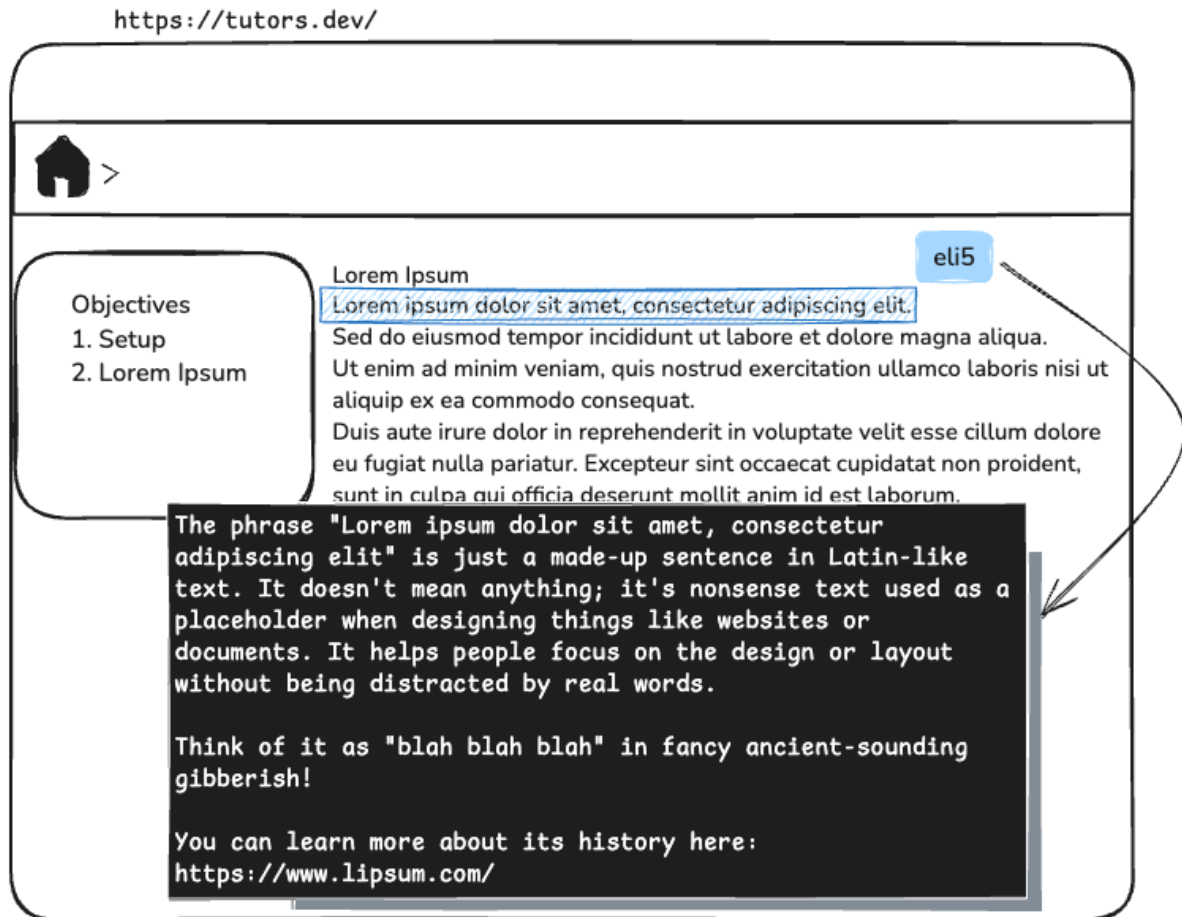


Figure 1. Augmented GenAI into the tutors web app.  
Note: eli5 stands for "explain like I am five"

**Why?** In my own studies, I found certain concepts challenging to understand, especially those that were abstract or conceptual. I started to look outside of tutors to find videos that could provide an alternative explanation.

At the same time I was taking the "Learn how to learn" Coursera course to improve learning efficiency and increase content memorization. One of the highlights was to use analogies to improve understanding of complex systems and memorise content.

Eventually I started to use GenAI to explain content asking to provide analogies. I found that I could learn faster and understand better. However, accessing these explanations required extra steps outside the tutors web app.

I believe that augmenting AI into [www.tutors.dev](https://tutors.dev) will:

- Improve learning efficiency
- Enhance understanding of the content
- Help students to memorise the content

Additional features like Analytics will help tutors to identify areas where students struggle, enabling them to refine future content.

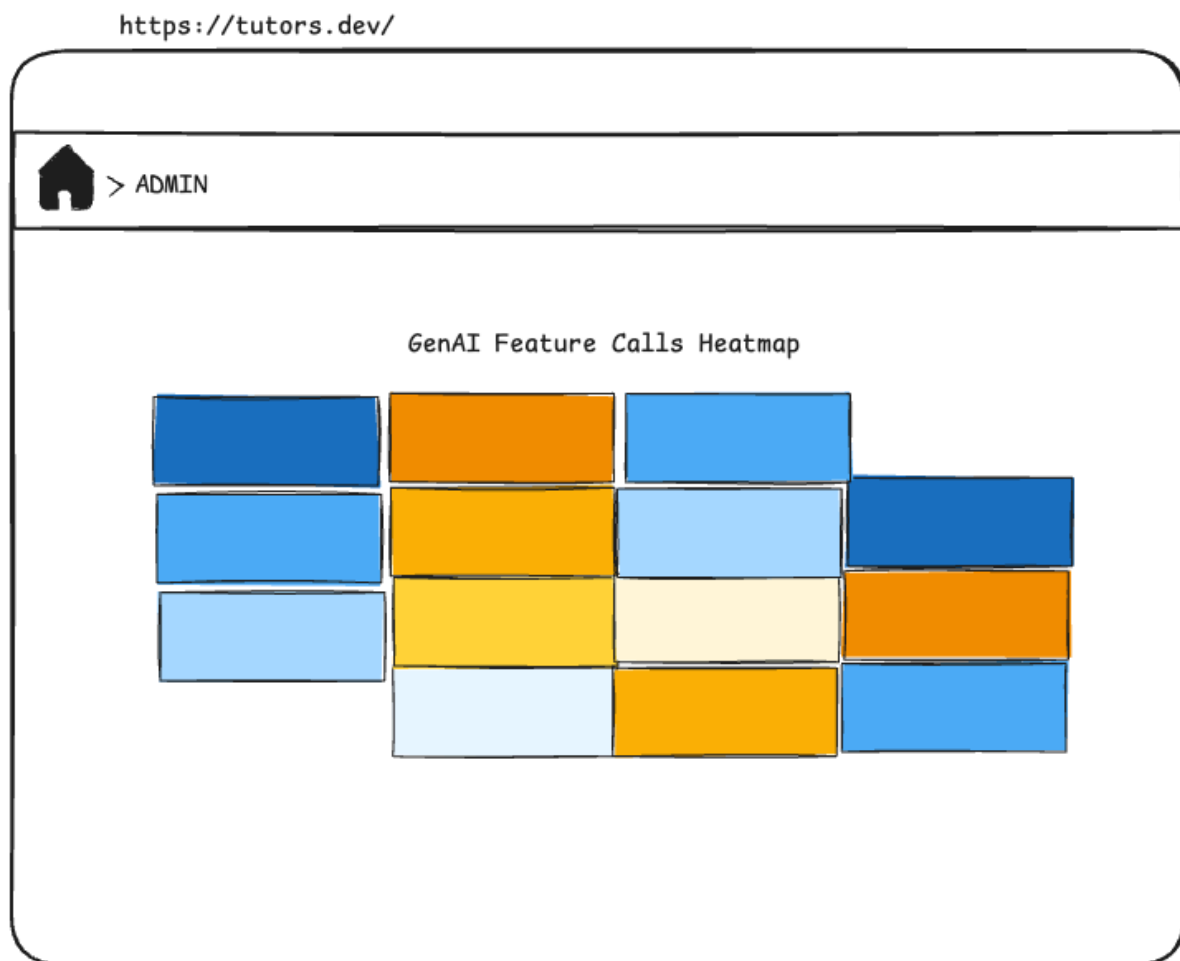


Figure 2. Metrics and Analytics. GenAI calls heatmap

Adding RAG and custom trained models will help to provide more accurate and factual responses with content references. Adding a custom LLM will help to rephrase content in a way that is clear and student-friendly, capturing nuances of language used by tutors.

## Data

- Augment GenAI into the tutors web app – NA (a feature will request LLM response via API using pre-made prompts)

- Add retrieval-augmented generation (RAG) – tutors-content will be crawled
- Train model on tutors web app content – tutors documentation will be used for training
- Add metrics and analytics – event data will be collected (ex. Feature was called to rephrase content at specific location)

### List of technologies:

- TypeScript
- Large Language Model (LLM)\*
  - [Pythia \(Eleuther AI\)](#)
  - [OLMo \(AI2\)](#)
  - [Amber and CrystalCoder \(LLM360\)](#)
  - [T5 \(Google\)](#)

*\*these are true open source models that I am considering to use*

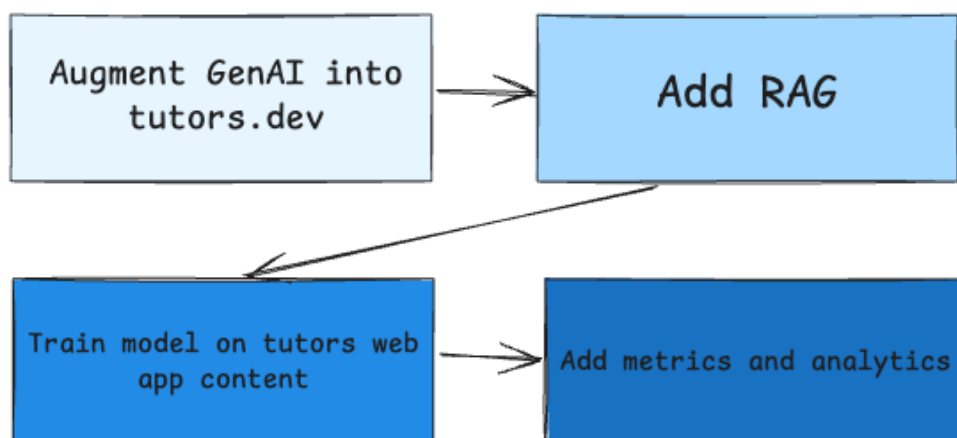
### Tools and Frameworks:

- SvelteKit
- Tailwind & Skeleton

### Project Process\*\*:

- Augment GenAI into the tutors web app
- Add retrieval-augmented generation (RAG)
- Train model on tutors web app content
- Add metrics and analytics

*\*\* I am planning to implement AI augmentation as a series of production quality releases where more functionality is added as I go along.*



## **Appendix:**

<https://github.com/tutors-sdk/tutors/blob/development/README.md>

<https://github.com/tutors-sdk/tutors/blob/main/README.md>

<https://opensource.org/ai/open-source-ai-definition>

<https://opensource.org/ai>

<https://www.technologyreview.com/2024/08/22/1097224/we-finally-have-a-definition-for-open-source-ai/>

<https://huggingface.co/open-llm-leaderboard>

 How to Pick the Right AI Foundation Model

<https://www.kaggle.com/learn/intro-to-ai-ethics>

<https://excalidraw.com/#json=GVOR7By790WVsWJssb1m2,OqY2TtViljrfArc1c0Ot8g>

This Ethics Checklist must be completed for all final year undergraduate, taught postgraduate and research projects in the School of Science and Computing.

## View your response(s)

 Respondent: **Zhabskyi Ruslan** (Group: CM-HDIPCS) Submitted on: Sunday, 24 November 2024, 5:22 PM

### Ethics Checklist for Undergraduate, Taught Postgraduate and Research Projects in the School of Science and Computing

All students in the School of Science and Computing who are either (1) in the final year of an undergraduate/BSc degree, or (2) on a taught postgraduate/MSc programme **must complete this Ethics Checklist before conducting their project** regardless of the project type or discipline. The Checklist should also be completed by anyone (whether staff member or student) conducting a **research project** (whether programmatic or not) within the School.

The purpose of this Ethics Checklist is to **identify projects that will require formal ethical approval** from the School Research Ethics Committee, or the SETU Research Ethics Committee, before they can proceed.

Students/applicants should note that this Ethics Checklist is a **formal declaration**, and great care must be taken to **answer all questions accurately**. Students should consult with their project supervisors/advisors regarding any aspects or questions that they are unsure of before completing and submitting the Ethics Checklist.

Students/applicants must **answer all questions** presented to them until the Checklist questionnaire is completed.

## Feedback Report

No human experimentation issues (UG).

No animal experimentation issues (N/A).

No issues regarding the use of human tissues.

No animal tissue or biological fluids issues.

No ionising radiation issues.

No primary data collection issues (N/A).

No underage/vulnerable people issues (UG).

?

**No issues regarding existing/secondary data use (N/A).**

**No controversial data issues.**

**No issues related to the collection of rare or protected plants.**

**No issues regarding the use of genetically modified (GM) plant material.**

**Instructions:**

1. If the above feedback is **entirely green** then, based on your answers, there is **no need to apply for ethical approval** for your project.
2. If **any** part of the above feedback is **yellow/amber**, then there is at least one issue with your project that needs to be reviewed and **you must apply for ethical approval** to continue your project.
3. If **any** part of the above feedback is **red** then there is a serious ethical issue and **you cannot continue your project** as currently planned.

*It is recommended that you print this Feedback Report to a PDF file for your records. You should also forward and discuss this Feedback Report PDF with your project supervisor. They will be able to advise if you have any further questions or if you need to apply for ethical approval.*

**1 \*** Are you a student on a **final year undergraduate** programme, a **taught postgraduate** programme, or are you conducting a **research project**?

- ☒ Final Year Undergraduate  
☐ Taught Postgraduate  
☐ Postgraduate Research Project  
☐ Other Research Project

**2 \*** What is the **working title** of your project?

eli5 tutors – Generative AI augmentation to www.tutors.dev

**3 \*** Who are the project **supervisors/advisors/principal investigators**?

Colm Dunphy / TBC

**4 \*** Does your project involve **human experimentation**?

- ☐ Yes ☒ No

**5 \*** Does your project involve **live animal experimentation**?

- ☐ Yes ☒ No

**(6) \*** Is the planned animal experimentation limited to **non-invasive procedures only** (such as feeding, weighing, or taking naturally voided faecal or hair samples), and does **not** involve any invasive procedures (such as taking rectal faecal samples or blood) from live animals?

- ☐ Yes ☐ No

**7 \*** Does your project involve the use of **human** remains/cadavers/tissues/cells/biological fluids/embryos/foetuses?

- ☐ Yes ☒ No

**(8) \*** Do you intend to only use established **commercial human cell lines**, and no other **human** remains/cadavers/tissues/cells/biological fluids/embryos/foetuses in your project?

☐ Yes ☐ No

**9 \*** Does your project involve the use of **animal cells, tissues or biological fluids**?

☐ Yes ☒ No

**(10) \*** Do you intend to only use (1) **established commercial animal cell lines**, or (2) **slaughterhouse-derived tissues/fluids**, or (3) **fluids collected as part of routine animal husbandry** (e.g. milk) and no other animal tissues or biological fluids in your project?

☐ Yes ☐ No

**11 \*** Does your project involve the **collection of rare or protected plants**?

☐ Yes ☒ No

**12 \*** Does your project involve the generation or use of **genetically modified (GM) plant material**?

☐ Yes ☒ No

**(13) \*** Do you agree to (1) only use **established genetically modified (GM) plant cell lines, seeds, or plant products** in your project, (2) **not generate new plant mutations** using chemical or other means, and (3) follow specified SETU **containment and use protocols** for GM plant materials at all times?

☐ Yes ☐ No

**14 \*** Does your project involve the use of **ionising radiation**? (e.g. use of gamma ray spectrometry)

☐ Yes ☒ No

**(15) \*** Do you agree to carefully **follow the instructions** of the SETU designated **Radiation Protection Officer (RPO)**, and **adhere to all legal requirements** as set out in the Radiological Protection Act 1991 (Ionising Radiation) Regulations ([2019](#)), regarding the use of ionising radiation materials and equipment?

☐ Yes ☐ No

**16 \*** Does your project involve the **collection of any new (or primary) data** from **individual people or groups**?

☐ Yes ☒ No

**(17) \*** Does your project involve the **collection of any new (or primary) individual or group data** that is **personally or uniquely identifying**? (e.g. data about people or organisations/companies/groups that could be used to identify those individuals or groups; data collection might take any form, including internet and social media data, etc.)

☐ Yes ☐ No

**(18) \*** Will you ensure that participants who you are collecting data from are provided with **fair warning** and must provide **explicit informed consent** for any data collected?

☐ Yes ☐ No

**(19) \*** Will you ensure that any project-related data collection, data storage, and data use is in **full compliance** with the **EU General Data Protection Regulation (GDPR)** and the **Data Protection Act (2018)**?

☐ Yes ☐ No

**(20) \*** Does any of the data that you intend to collect include **sensitive or private personal information** about individuals, or **commercially sensitive information** about organisations/companies/groups?

☐ Yes ☐ No

**21 \*** Does your project involve **persons under the age of 18 years** (i.e. minors), or **any vulnerable groups**? (e.g. prisoners, refugees, those in care, addiction service users, etc.)

☐ Yes ☒ No

**22 \*** Does your project involve the use of **existing (or secondary) human data**? (i.e. data originally collected for another purpose)

☐ Yes ☒ No



**(23) \*** Is the existing or secondary human data you intend to use either (1) **anonymous/non-personally identifying** and in the **public domain**, or (2) available with **explicit and specific informed consent or permission** for the data to be **legally** reused in the way you intend?

☐ Yes ☐ No

**(24) \*** Are any aspects of the primary/secondary data you intend to use for the project **controversial** in nature?

☐ Yes ☐ No

**25 \*** Before you submit the Ethics Checklist, you must **confirm all of the following**:

- ☒ I understand that the Ethics Checklist is a formal declaration.
- ☒ I have answered all questions on the Ethics Checklist carefully and truthfully.
- ☒ The supervisor/advisor (or principal investigator) for the project is present as the Ethics Checklist is being submitted, or they have given me explicit permission to submit it in their absence.
- ☒ I have had adequate ethics training and/or instruction prior to completing the Ethics Checklist.
- ☒ I understand, and agree to abide by, the general ethical principle of "do no harm" for this project.
- ☒ I will follow the instructions given in the Feedback Report.

**26 \*** Authentication Code (ask your project supervisor/advisor for this code)

Enter Student Number:

Enter the Authentication Code below and click "Verify Code"

**Note: If an INVALID authentication code is used then this submission is NULL and VOID**

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