# GPT Pedagogy

Matthew Pisano[1], Tiburon Benavides[1], Ryan Zhou[1], Yanshen Lin[1], and
Cai YiYang[1]

[1]Rensselaer Polytechnic Institute

March 15, 2023

## Abstract

GPT-3 is a Large Language Model which, through overuse, is often used to
deprive students of the opportunity to learn effectively. Our intended use case of
GPT enables the transparent use of the technology between instructor and student.
We aim to create a more active and participatory learning environment through the
usage of the model in active learning. Our long-term goal for higher education is
along the lines of the fourth UN SDG:

> Ensure inclusive and equitable quality education and promote lifelong
> learning opportunities for all.

We view GPT as a way to create an adaptive learning experience which promotes
the educational endeavor rather than detracts from it.

Our plan is to develop a GPT-3 based learning assistant for the *Introduction
to Biology* course here at RPI. Through a partnership with the professor, we will
gather sufficient amounts of course material to fine-tune a pre-trained GPT-3 model.
This will create a knowledgeable and focused learning assistant. By creating this
personalized AI tutor we can make it easier and more transparent for students to
learn the material and reduce their stress.

One of our goals is for the model to maintain its conversational abilities while
embedding additional knowledge about faculty defined key learning objectives. The
model will generate a series of topic-relevant questions, evaluate the answers of those
questions, and give useful feedback or counter-examples to the student. The model
benefits from human-in-the-loop reinforcement learning by storing previous chats
from students and faculty alike.

We also aim for this model to be generalizable to other classes and disciplines
in the future. The model will work especially well for courses where it is difficult
to give personalized feedback to each learner in each class meeting time, such as in
classes that have a high student to faculty ratio. It will also work well for courses
with students interested in AI who cannot adequately engage with that interest
through the course material.