Ref. No.	

(For office use only)

Teaching Development Grant (TDG) 2022-25

Proposal Form

Part I: General Information

1. **Project title:** Evaluating reflective journals by NLP to facilitate students' learning and teachers' grading

2. **Funding category:** (a) Projects on deepening VTL adoption (focus area: <u>Pedagogy development</u>)   [V]

(select one only)   (b) Small-to-medium scale projects   [ ]

(c) Sustaining and extending the impact of past projects   [ ]

3. **Particulars of the applicant(s):**

	Name	Dept	Post	Email	Net ID
Project Leader/RCPL	Pauli Lai	EIE	Teaching Fellow	pauli.lai@polyu.edu.hk	enpauli
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Consultant	Kenneth Lo	SLLO	Service-Learning Manager	kenneth.wk.lo@polyu.edu.hk	wkwanlo

4. **External partners (if any):**

5. **Total funding requested:** _____ (HKD)

From TDG: _____ (HKD)

From departmental/faculty matching fund: _____ (HKD)

6. **Expected duration of project:** _____**18**_____ months

Proposed commencement date: __01/07/2023__ (dd/mm/yyyy)

Expected completion date: __31/12/2024__ (dd/mm/yyyy)

Part II: Details of the Proposal

Executive summary (150 words max.)

Provide a succinct statement to help the panel understand what this proposal is about. What is the issue that is being addressed? What will the project do to address it? What is the expected scope of impact?

Students usually do not know how to write a good reflective journal with reference to rubrics. Research on students' perception of rubrics-based assessment indicates that many undergraduates do not perceive rubrics as a learning tool but merely a mark scheme to fulfil teachers' demands. Meanwhile, manual evaluation and feedback on reflective writing by teachers are time-consuming. Hence, we proposed developing a platform for evaluating students' reflective journals of service-learning subjects by Natural Language Processing (NLP), which is one area under Artificial Intelligence (AI). This AI platform with machine learning can evaluate certain aspects of reflective journals with regard to the given rubrics and guide students to write a better reflective journal by providing feedback. It can also extract some main points and generate an estimated grade for teachers' reference so as to relieve teachers' workload in reading and increase their efficiency in grading students' reflective journals.

1. Background

What is the issue/need to be addressed? What studies have been conducted previously on the issue/need? How does the project make use of existing knowledge and prior experience? What is the theoretical background underlying the design of the project? What are the practice guidelines and/or benchmarks adopted for guiding the project? Why is this issue important to PolyU/students? Why is it crucially important that this project should be undertaken now?

Reflection is one of the key components in service-learning subjects, and a reflective journal is usually one of the assessment items to assess reflection. However, students sometimes do not know how to write a good reflective journal even though assessment rubrics are provided. Research on students' perception of rubrics-based assessment indicates that many undergraduates do not perceive rubrics as a learning tool but merely a mark scheme to fulfil teachers' demands [1]. There is room for us to guide students on how to write a good reflective journal with reference to rubrics.

On the other hand, it takes time for teachers to grade the reflective journals. Manual evaluation and feedback on reflective writing are time-consuming [2]. Teachers cannot give instant feedback for students to make good their writing promptly in return. Besides, students' writing may be lengthy and not organized. It would be good if there exists automated tools that could extract some main points and estimate the grade for teachers' reference.

There is little work covering the potential of automated analysis of reflective writing. Existing studies cover automated analysis of pharmacy students' reflective writing, using AI to grade students' essay writing according to language components, and helping students in EFL (English as Foreign Language) writing [2-3]. Most modern systems train the system with thousands of pre-assessed essays (corpus). After training, the system can automatically generate a grade and feedback when a new essay input is given. Hence some of these systems can be used for self-learning by students as well as by teachers for grading huge amount of essays. Figure 1 shows a common framework for the existing Automated Essay Grading (AEG) Systems [4]. However, all these automated analyses mainly focus on the language components (such as grammar, organization, and vocabulary usage) of essay writing.

A previous study attempted to validate the use of machine learning approaches in automated analysis of reflection in writing. The study investigates eight categories that are often used in models to assess reflective writing, including the depth of reflection, the description of an experience, the expressions of feelings, personal beliefs, the awareness of difficulties, the perspective, the lessons learned, and the future intentions. The result shows that five out of eight categories can be detected automatically with substantial or almost perfect reliability, while the other three categories can be detected with moderate reliability. These findings indicate that machine learning makes it feasible to analyze reflective writing automatically [5]. However, there is a lack of research covering reflective journals for service-learning, which requires specific rubrics for grading.
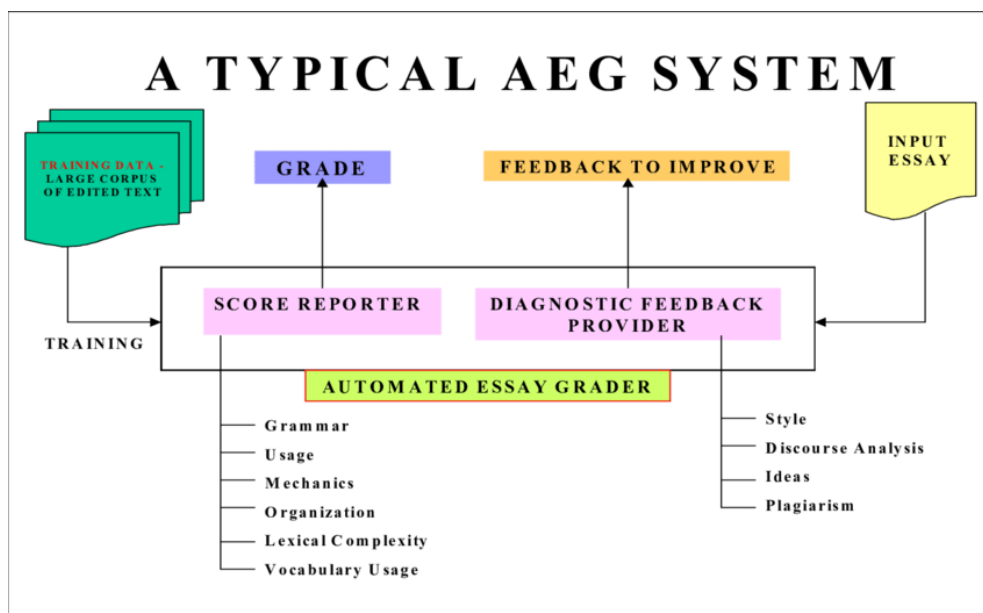
Figure 1 A common framework for the existing Automated Essay Grading (AEG) Systems (Source: https://www.researchgate.net/figure/A-common-framework-for-the-existing-Automated-Essay-Grading-Systems-shows-a-popular_fig2_224377338)

Hence, we proposed developing a platform for evaluating students' reflective journals of service-learning subjects by Natural Language Processing (NLP), which is one area under the umbrella of Artificial Intelligence (AI). This AI platform with machine learning can evaluate certain aspects of reflective journals with regard to the given rubrics and and guide students to write a better reflective journal by providing feedback. It can also extract some main points and generate an estimated grade for teachers' reference so as to relieve teachers' workload in reading and increase their efficiency in grading students' reflective journals.

Meanwhile, feedback is essential in reflective journals as feedback helps students develop their reflective ability [6]. Our proposal is important as students need feedback in reflective writing, and our platform can provide feedback promptly. It helps students to write journals focusing on the relevant requirements specified in the rubrics. With the platform, students are more at ease with writing a reflective journal.

References:
[1]   H. Andrade and Y. Du, "Student perspectives on rubric-referenced assessment," *Practical assessment, research & evaluation,* vol. 10, no. 3, pp. 1-11, 2005.
[2]   M. Liu, S. B. Shum, E. Mantzourani, and C. Lucas, "Evaluating Machine Learning Approaches to Classify Pharmacy Students' Reflective Statements," vol. 11625, (Lecture Notes in Computer Science. Cham: Springer International Publishing, 2019, pp. 220-230.
[3]   C. Liu, J. Hou, Y.-F. Tu, Y. Wang, and G.-J. Hwang, "Incorporating a reflective thinking promoting mechanism into artificial intelligence-supported English writing environments," *Interactive learning environments,* vol. ahead-of-print, no. ahead-of-print, pp. 1-19, 2021, doi: 10.1080/10494820.2021.2012812.
[4]   S. Ghosh and S. S. Fatima, "Design of an Automated Essay Grading (AEG) system in Indian context," 2008: IEEE, pp. 1-6, doi: 10.1109/TENCON.2008.4766677. [Online]. Available: https://www.researchgate.net/publication/224377338_Design_of_an_Automated_Essay_Grading_AEG_system_in_Indian_context
[5]   T. D. Ullmann, "Automated Analysis of Reflection in Writing: Validating Machine Learning Approaches," *International journal of artificial intelligence in education,* vol. 29, no. 2, pp. 217-257, 2019, doi: 10.1007/s40593-019-00174-2.
[6]   L. Rozental, D. Meitar, and O. Karnieli-Miller, "Medical students' experiences and needs from written reflective journal feedback," *Medical education,* vol. 55, no. 4, pp. 505-517, 2021, doi: 10.1111/medu.14406.

2 Objectives

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What does the project set out to do? What does it try to improve (e.g. student learning experience, learning outcomes, assessment practice, teaching quality, student support)? How does it present a feasible and sustainable solution to the problem identified? What are the specific objectives of the project?

Our proposal aims to develop a platform for evaluating reflective journals by NLP to facilitate students' learning and teachers' grading.

To facilitate students' learning, we intend to help students with their writing of reflective journals with reference to the rubrics. Some students may regard a reflective journal as memory recall and miss the essence. A reflective journal lets students reflect on the service experience they have taken and the personal growth/benefits they have achieved. We will give the students a set of rubrics and guide them on how to write a reflective journal based on the rubrics. Our proposed AI platform will allow students to submit initial reflective journals and provide feedback for improvement. Students could learn from the feedback and refine their reflective journals before the final submission. Figure 2 shows the iterative process of refining submissions with feedback provided.
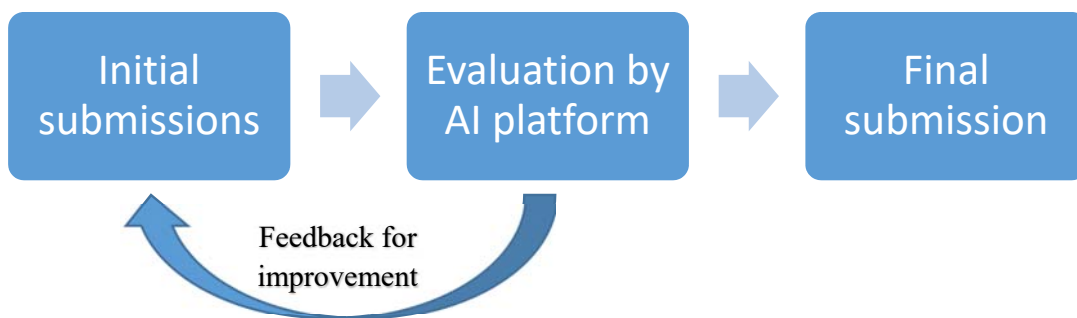

Figure 2 Iterative process of refining submissions with feedback provided

Meanwhile, it is time-consuming for teachers to grade and give feedback on reflective journals. Teachers cannot give instant feedback for students to make good their writing promptly in return. Besides, students' writing may be lengthy and not organized. The AI platform not only provides instant feedback to students on teachers' behalf, but it can also extract some main points and generate an estimated grade for teachers' reference so as to relieve teachers' workload in reading and increase their efficiency in grading students' reflective journals. Hence, the AI platform can facilitate teachers' grading in addition to students' learning. Figure 3 shows the evaluation of the final submission for teachers' reference.
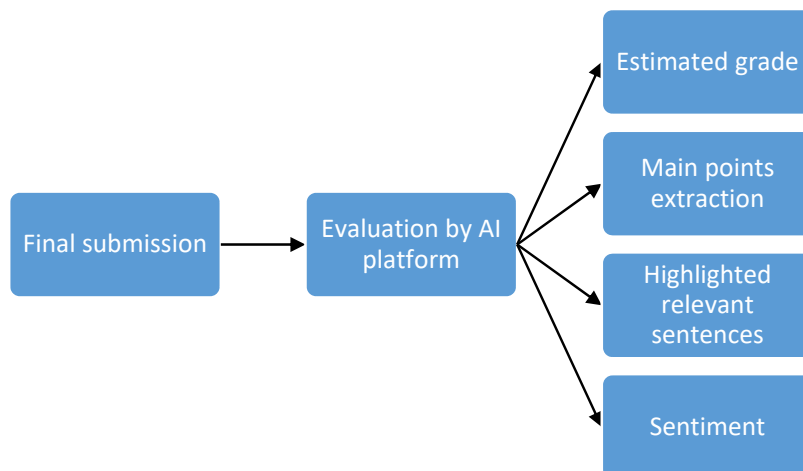

Figure 3 Evaluation of the final submission for teachers' reference

3   Method and analysis (development process)

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How will the deliverables (e.g. new pedagogy, learning tools, practical solutions) be developed? What are the scientific enquiry methods to be used to inform the development processes? How will students and teachers be involved? What are the procedures for collecting data from the participants and/or capturing users' experiences?

We develop our AI platform for evaluating reflective journals by:

(a)   Setting a standard set of rubrics for assessing reflective journals across all participating service-learning subjects

For our platform to identify the corresponding grade to each rubric dimension, we have to set up the standards to grade the journals. In our proposal, all the participating subjects are service-learning subjects with similar nature of service, i.e., teaching service. In the initial stage, all subject lecturers of the participating subjects have to discuss and devise a standard set of rubrics for assessing reflective journals so that the machine can learn how to grade based on this set of rubrics. Table 1 shows an example of one rubric dimension "Demonstrate empathy for people in need of digital literacy and a sense of civic responsibility".

Table 1 *An example of one rubric dimension "Demonstrate empathy for people in need of digital literacy and a sense of civic responsibility".*

	Criteria Descriptors				
	Excellent/outstanding	Good	Satisfactory	Barely satisfactory	Inadequate
Grade	(A+/A/A-)	(B+/B/B-)	(C+/C/C-)	(D+/D)	(F)
Assessment Dimension					
Demonstrate empathy for people in need of digital literacy and a sense of civic responsibility	The student was able to: o Demonstrate an in-depth awareness of the underlying digital literacy needs and feelings of service users, and address them responsively and accurately o Take the perspectives of the service users in understanding their digital literacy needs and situations o Respond to the digital literacy needs of service users by showing intense care and concern o Maintain positive and purposeful relationships with service users o Articulate the situations of service users and mobilize different resources to help	The student was able to: o Demonstrate a high awareness of the digital literacy needs and feelings of service users, and address them responsively and accurately o Take the perspectives of the service users in understanding their digital literacy needs and situations o Respond to the digital literacy needs of service users by showing care and concern o Maintain positive and purposeful relationships with service users	The student was able to: o Demonstrate an awareness of the digital literacy needs and feelings of service users o Attempt to take the perspectives of the service users in understanding their digital literacy needs and situations. o Respond to the digital literacy needs of service users by showing some care	The student was able to: o Demonstrate little awareness of the service users, only with the instructions/ guidance of the others (instructor, team members etc.) o Make a little attempt to take the perspectives of the service users in understanding their digital literacy needs and situations	The student <u>failed</u> to: o Demonstrate any awareness or understanding of feelings and digital literacy needs of service users o Take the perspectives of the service users in understanding their digital literacy needs and situations o Make any attempt to care for the service users

(b)   Selection of past reflective journals of various grades and labelling of sentences for machine learning

For our platform to identify the corresponding grades to each rubric dimension, we have to train the machine with sufficient data. The teachers of the participating subjects will select past reflective journals of various grades. For finer granularity, we will need to label the reflective journals sentence by sentence for each rubric dimension. Figure 4 demonstrates the machine learning process, where reflective journals labelled with grades are input to the machine for training. Then, a machine learning model is generated. When a new reflective journal with an unknown grade is input, the machine learning model can generate an output grade for this journal.
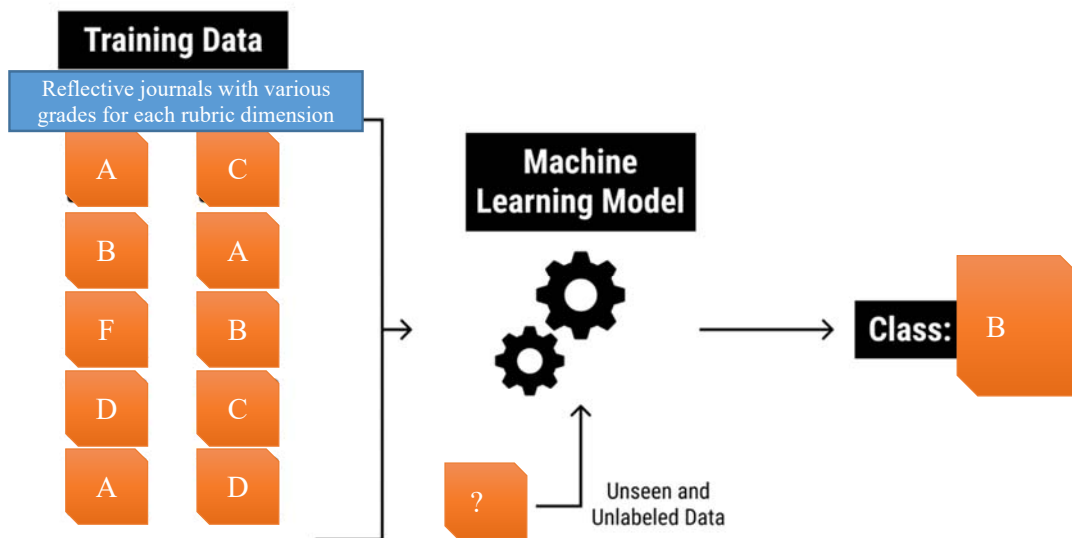
Figure 4 Machine learning process.

(c) Development of the NLP features

How NLP can help:
1. Grade estimation
    With machine learning, the platform can estimate the grade of the reflective journal for each rubric dimension.
2. Question and answering
    In NLP, Question and Answering can retrieve a relevant answer from a context for a given question.
    Figure 5 shows an example of Question and Answering with an extract of the reflective journal given as the context. The question is, "How does the service learning experience impact my personality?" The machine can retrieve the corresponding answer "I have become a better person" from the given context. In this way, we can extract the main points from the reflective journal by providing relevant questions to the machine.

context_prof = "Through this service-learning experience, I believe I have become a better person and one who has gained the heart to be willing to do more for the community around him. It is my wish that I will be able to receive opportunities like this more often to continue inspiring interest in digital literacy among all age groups. Being in close proximity for the five service days with the local kids, I have come to respect their kindness, willingness to face challenges and eagerness to attain new skills. I have no doubt in my mind that they will, in the future, improve the well-being of the community around them."

```
[26]: nlp({
          'question': 'How does the service learning experience impact my personality?',
          'context': context_prof
      })

[26]: {'score': 0.1337525099515915,
       'start': 52,
       'end': 81,
       'answer': 'I have become a better person'}
```

Figure 5 An example of Question and Answering.

3. Sentiment analysis
    In NLP, the sentiment is an interpretation of positive, neutral, and negative emotions associated with the content. Positive sentiment is when a topic is being described favourably. They usually list positive words for sentiment analysis like "great", "hero", "outstanding", etc. Neutral sentiment can contain both positive and negative signals. Negative sentiment implies the usage of detrimental statements in the content. They may be presenting the topic in an unfavourable way or focusing on the downsides and flaws. They tend to use words

like "hate", "weak", "stubborn", "boring", "danger", etc. With sentiment analysis, we can assess the tone of the reflective journal, whether it is positive, neutral or negative.
(Reference: https://surferseo.com/blog/sentiment-analysis-seo/)
Figure 6 shows some examples of sentiment analysis for the extracted paragraphs of reflective journals.
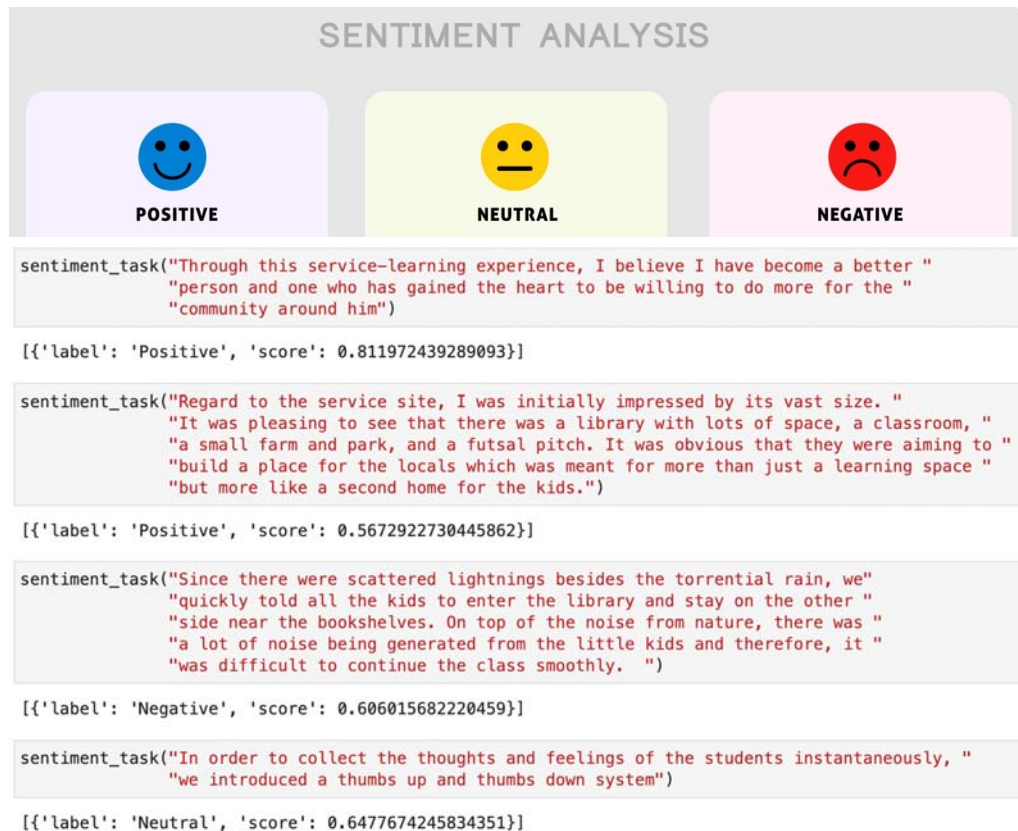

Figure 6 Examples of Sentiment Analysis for the extracted paragraphs of reflective journals.

Other optional features for future development (depending on the available time and resources):

4. Speech to text (for presentation) (optional for future development)
   For service-learning subjects with reflections given through presentations instead of reflective journals, we can use a speech-to-text function to convert the voice recording of the presentation into text, which could be fed into our platform for further evaluation.

5. Grammar check (optional for future development)
   In addition to evaluating the content based on rubrics, we can also use a grammar checking function, like Grammarly, to evaluate the language components of the reflective journal.

6. Plagiarism (optional for future development)
   To check plagiarism, we can also use a plagiarism checking function, like Turnitin, to check if the students copy content from their peers, the Internet, or elsewhere.

(d) Development of the user interface (UI) of the web-based AI platform

We will develop the AI platform as a web application so that users can use it with any browser on Desktop, Laptop, or mobile devices. The user will be required to log in with an account. The application supports multiple courses and multiple assignments for each course. There are teacher and student roles. From the student's perspective, students can submit their reflective journals for evaluation and feedback. They can re-submit before final submission. Figure 7 shows an initial draft of the user interface of the submission page from the student's perspective.

Student

Assignment 3

You are required to write a reflective journal regarding the service learning

Please type your answer below.

The service learning trip was a meaningful experience for me. I was glad to have participated in this service trip, to be a teacher instructing the young kids about information technologies. During the service trip, we found that kids had great interest in learning 3D technology. However, some of them did not even have a computer at their home. And that the computer at school was an old model that could not support the latest technology, which would probably hinder their learning. In the future, I would focus more on international affairs regarding education, and donate to help whenever possible.

Course 1 / Assignment 1
Course 2 / Assignment 2
Course 3 / Assignment 3

Submit

Figure 7 User interface of the submission page from the student's perspective.

From the teacher's perspective, teachers can view students' submissions one by one. For each submission, the relevant sentences and the estimated grade for each rubric dimension will be shown for teachers' reference. Teachers can accept the AI suggestion or make the final decision for the final grade. Figure 8 illustrates the initial draft of the user interface of the marking page from the teacher's perspective.

Teacher

Assignment 3

Student: ABC

Course 1
Course 2
Course 3

Student's Answer:

The service learning trip was a meaningful experience for me. I was glad to have participated in this service trip, to be a teacher instructing the young kids about information technologies. During the service trip, we found that kids had great interest in learning 3D technology. However, some of them did not even have a computer at their home. And that the computer at school was an old model that could not support the latest technology, which would probably hinder their learning. In the future, I would focus more on international affairs regarding education, and donate to help whenever possible.

Rubric selection: Demonstrate empathy for people in need of digital literacy and a sense of civic responsibility

List of sentences relevant to the above selected rubric:

1. However, some of them did not even have a computer at their home.

2. And that the computer at school was an old model that could not support the latest technology, which would probably hinder their learning.

Grading section:

Link their service-learning activities and experiences to demonstrate an awareness of the importance of digital literacy

Apply IT knowledge and skills to design and plan workshops that effectively teach IT knowledge and skills to the target community

Demonstrate empathy for people in need of digital literacy and a sense of civic responsibility

Confirm

Figure 8 An example of Question and Answering.

(e) Testing of the proposed AI platform

Once we complete the machine learning process of the rubrics by NLP with the training data, we will test the accuracy of the machine learning model using the testing data. If the accuracy is not satisfactory, we will need to fine-tune the model with more training data or adjustment of parameters. If the accuracy is satisfactory, we will have a pilot run of the platform that involves both students and teachers for testing. The process involves troubleshooting and fine-tuning the AI platform based on user experiences and collected feedback.

4.   Expected deliverables and impacts

What specifically will the project produce? What are the deliverables and/or tangible outputs? What impact on student learning or current practice can be expected? What are the indicators of their successful delivery?

	Deliverables	Indicators
(a)	A standard set of rubrics for assessing reflective journals across similar service-learning subjects	Students use the rubrics to learn to write a better reflective journal. Teachers use the rubrics to assess students' reflective journals.
(b)	A machine learning model for grading the reflective journals	The prediction accuracy of the machine learning model.
(c)	A web-based AI platform for evaluating reflective journals	By asking teachers and students about the usefulness of the AI platform via surveys and interviews.
(d)	Publications for education conference(s) and/or journal(s)	Records of education conference(s)/and or journal(s)

	Expected impact	Indicators
(a)	Students learn how to write a better reflective journal with reference to rubrics	Better grades in reflective journals as compared to initial submissions or previous cohorts' submissions
(b)	Facilitation of grading reflective journals by teachers with AI suggestions	Increased efficiency in grading reflective journals.

How are these deliverables relevant to the project objectives? How will the deliverables be used in teaching and learning? How do they bring the expected impact/enhancements to current practice and/or student learning?

The AI platform for evaluating reflective journals will use rubrics as the means for students to write better reflective journals. The platform will guide students on properly writing a reflective journal based on the rubrics by providing AI-generated feedback. This AI platform gives students AI-generated feedback when submitting their initial reflective journals. With the feedback, students can learn from the areas that need improvement. They can have their minds attached to the rubrics. Then they can revise their writing to produce improved versions corresponding to the rubrics. Hence, students will have a more precise outline to follow to write a journal with substance.

On the other hand, the AI platform also facilitates the grading of reflective journals by providing suggested grades, highlighting relevant sentences, extracting main points, and analyzing the sentiment. All these AI-generated hints can give teachers a better picture of the reflective journal and thus increase efficiency in finalizing the grade.

5.	**Scope of impact (planned applications and target groups)**

Who are the immediate target groups of the deliverables?

(For projects that focus on **pedagogy development** and **teaching innovations**, list the subjects in which the pedagogy/innovation will be implemented. For projects that seek to develop **co-curricular activities**, **student support** or **staff training**, describe the scope of impact in terms of the target groups and the estimate number of students/staff using the proposed service during the project period instead.)

Programme/ subject code	Programme/subject title	Credit units	Host department	Student intake quota per year
EIE2S02	Promoting Digital Literacy in Developing Societies	3	EIE	40
BME2S04 (Sem 1+2)	Reducing the Scientific Divide in Primary and Secondary Students through STEM Projects	3	BME	160
BME2S04 (Sem 2+3)	Reducing the Scientific Divide in Primary and Secondary Students through STEM Projects	3	BME	130
BME2S04S (Sem 3)	Reducing the Scientific Divide in Primary and Secondary Students through STEM Projects	3	BME	160
AP2S01	Enhancing Scientific Literacy through Daily Physics	3	AP	80
ELC2S02	Serving the community through teaching English	3	ELC	160
AF3S01	Service-Learning: Financial Literacy for Low-income Youth in Hong Kong	3	AF	30

Other potential beneficiaries (if any)
Other service-learning subjects with the similar nature of service, i.e., teaching service.

Activity / support / training	Target groups	Estimate number of users

Other potential beneficiaries (if any)

6.	**Evaluation plan**

How will the quality of the deliverables and the impact of the project on current practice and/or student learning be evaluated? For projects that are expected to have a direct impact on student learning, the evaluation plan must answer questions (a), (b), (c), and (d) below.

	Questions to be answered	Methods	Indicators and analyses
(a)	Did students find the teaching innovation helpful to their learning?	Post-intervention student survey	Student ratings on a 5-point scale on the following items: − The AI platform was helpful to my learning. − I like the AI platform more than conventional teaching methods. − The AI platform helped me achieve the subject learning outcomes. − The AI platform helped me become a better learner.

(b)	Did teachers find the teaching innovation helpful to their teaching?	Post-intervention teacher survey	Teacher ratings on a 5-point scale on the following items: − The AI platform was helpful to my teaching. − Students were more engaged now than before this project's intervention. − I will continue to use the AI platform in my teaching.
(c)	Did the teaching innovation help to enhance the student learning outcomes?	Direct assessment of student performance	Impact on students' attainment of the subject learning outcomes: − Based on student performance in a direct assessment of the learning outcomes, conduct a test of differences and report the effect size, significance level, and sample size.
(d)	To what extent has the teaching innovation been adopted?	Count	− Number of subjects adopted the teaching innovation (also provide the subject codes and the number of students enrolled in these subjects)
(e)	To what extent do students engage in the AI platform?	Activity log; Pre and Post-Surveys; Teachers' Interview	− Submission and resubmission of reflective journals − Students liking of the AI platform in surveys − Teachers' observations according to the interview
(f)	To what extent does students' academic performance improve after using the AI platform?	Grades of the Reflective Journals	− Mark comparison with the previous year without the platform.
(g)	To what extent does the proposed platform help students write a reflective journal?	Pre and post-surveys	− Measure students' perception towards writing reflective journals by comparing the pre and post-surveys with questions on the availability of the AI platform to help students' writing of journal
		Focus group interviews	− In addition to measuring how the participants feel, more comments could be collected through online or face-to-face interviews.
		Teachers' Interview	− Ask teachers about their observations on the quality of the reflective journals.
(h)	To what extent does students' learning experience improved after the use of the platform?	Pre and post-surveys	− Measure how the participants feel by comparing the pre and post-surveys with questions on the availability of the AI platform to help students' writing of journals and its user-friendliness.
		Focus group interviews	− More comments could be collected through online or face-to-face interviews.

Elaboration on the evaluation design and methods

We adopt a combination of qualitative and quantitative research to study the effectiveness of applying the AI platform in helping students write their reflective journals.

Our research questions are as follows:
- Does the proposed AI platform help students learn to write reflective journals?
- Does the proposed AI platform facilitate teachers' grading of reflective journals?

At the end of the semester, we will compare the reflective journals' grades for the current year with those of the previous cohort when the platform was unavailable. Also, we will conduct a feedback survey and face-to-face interviews to collect students' views on the platform.

Measures to gauge students' engagement:
- Number of login times
- Date/time of login
- Number of submissions
- Grades according to the AI platform
- Breakdown of grades of each rubric

7. Sustainability strategies

How will the impact of the project (e.g. use of the deliverables) be sustained beyond the project period?

The AI platform, once implemented, is accessible to students for submission of reflective journals for AI evaluation. Since this is a web application, we will host it on a web server for several years, exceeding the project period. Therefore, students of the subsequent years can still use it to help them write a better reflective journal even after the project period.

8. Dissemination plan

How will the project outcomes and deliverables be disseminated for wider impact?

After the project ends, lunch-time seminars will be held with Education Development Center to report on the result of the project. The seminar could serve as a platform for the stakeholders like students and teachers to share their experiences. These can also facilitate discussions and sharing of views among the audience for possible improvements on further development.

To widen the platform's impact, we can extend it to other similar service-learning subjects with the tasks of reflective writing in PolyU.

9. Work plan

What plans are in place for achieving the objectives of the proposed project? What factors may affect the successful implementation of the project and what measures are used to maximize the chance of success? What are the roles of each project team member?

We float the idea of an AI platform to evaluate the reflective journals of service-learning. Below listed the details on how to implement this idea.

First, we have the availability of previous reflective journals of different grades. We will pick up various journals of each grade for machine learning. We will then label individual sentences with grades for each rubric dimension. These data will be fed into the machine for training and testing.

At the same time, our development team will begin to develop the web-based AI platform featuring NLP.

Our Project Associate will study the process, raise research questions, and design survey questions for students and teachers. Once the AI platform is implemented and operational, we will perform a pre-survey in the initial stage.

At the end of the course, a post-survey with students will be conducted. For questions requiring further elaboration, we will also arrange interviews with the students and teachers to collect their views and learning experiences (for students) with the proposed AI platform.

To ensure that the platform functions normally, we shall keep testing the AI platform and troubleshooting problems. After collecting users' feedback, we shall fine-tune the system through an iterative process.

Roles of each project team member:

	Name	Dept	Role
Project Leader/RCPL	Pauli Lai	EIE	Project Leader and subject lecturer of EIE2S02
Team Member(s)	Ivan Lau	EIE	Subject lecturer of EIE2S02
	Richard Pang	EIE	Subject lecturer of EIE2S02
	Anna Ho	ELC	Subject lecturer of ELC2S02
	JIM Kwok Lung	AP	Subject lecturer of AP2S01
	CHOY Siu Hong	AP	Subject lecturer of AP2S01
	LAU Hin Chung	BME	Subject lecturer of BME2S04
	KAR Fung Yi	BME	Subject lecturer of BME2S04
	Derek Yim	AF	Subject lecturer of AF3S01
Consultant	Kenneth Lo	SLLO	Consultant from SLLO

The role of each participating subject lecturer is to:
1. Develop a set of standard rubrics for evaluating the reflective journal in common with other similar service-learning subjects
2. Provide samples of previous reflective journals for training the AI model
3. Ask the students to submit the reflective journals to the platform for AI evaluation based on the rubrics
4. Use the platform to assess the reflective journals from the teacher's perspective

10. Implementation timelines

What is the timetable for producing the deliverables? The progress of your project will be evaluated based on the information given in this section.

	Deliverable	End of 0.5 year	End of 1st year	End of 1.5 year	End of project
(a)	A standard set of rubrics for assessing reflective journals across similar service-learning subjects	100%	100%	100%	100%
(b)	A machine learning model for grading the reflective journals	40%	100%	100%	100%
(c)	A web-based AI platform for evaluating reflective journals	40%	80%	100%	100%
(d)	Publications for education conference(s) and/or journal(s)	0%	30%	100%	100%

Implementation timeline for the developmental and pilot testing elements of the project

Month/Year	Planned activities
Before project starts	Preliminary discussion on the common rubrics for assessing reflective journals across similar service-learning subjects;

	Pick up past reflective journals for machine learning;
07/2023-02/2024	Devise a standard set of rubrics for assessing reflective journals across similar service-learning subjects; Label sentences in reflective journals with respect to the rubrics; Design the AI platform for evaluating reflective journals. Develop the website for the AI platform. Train and test the machine learning model; Develop the NLP features of the AI platform.
03/2024	User Acceptance Test of the AI platform; Prepare the pre-survey questions.
04/2024- 06/2024	The pilot run of the AI platform; Conduct pre-survey and post-survey; Conduct interviews with students and teachers.
07/2024-08/2024	Fine-tune the AI platform based on the collected feedback; Data analysis for publications.
09/2024-11/2024	The second run of the AI platform; Conduct pre-survey and post-survey; Conduct interviews with students and teachers.
12/2024	Fine-tune the AI platform based on the collected feedback; Data analysis for publications.

Implementation timeline for the evaluation plan

Month/Year	Activities related to the evaluation of impact/quality of the project
03/2024	Design of pre and post-surveys with students; Design of interview questions with students and teachers
04/2024- 06/2024	Collect engagement data; Conduct pre-survey and post-survey; Conduct interviews with students and teachers.
07/2024-08/2024	Analyze survey and interview results
09/2024-11/2024	Collect engagement data; Conduct pre-survey and post-survey; Conduct interviews with students and teachers.
12/2024	Analyze survey and interview results