

中國文化大學教師教學創新暨教材研發獎勵成果報告書

壹、計畫名稱

Utilizing AI and Extensive Listening to Facilitate English Oral Fluency, Listening Comprehension, and Autonomous Learning

貳、實施課程、授課教師姓名

實施課程: 英語實習

授課年級: 大一通識課程

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參、前言

Compared to receptive listening and reading skills, productive speaking and writing skills are considered more challenging. In most university classrooms, writing courses are often designed in smaller class size than listening & speaking ones. The listening and speaking General Education classes in private universities are taught in large class sizes. With an average enrollment of 64 students each semester in my university, assessing individual student's speaking fluency could be a big undertaking and overwhelming on weekly basis, not to mention the prospect of giving overall class reading progress immediately.

A recently released app in Microsoft Teams in August of 2021, Reading Progress enables language learners to “independently read aloud, record themselves, and grow their reading skills while allowing educators to better support students' progression. Students share the audio or video recordings of themselves with their teachers, who can then track the progress, provide feedback, and discover trends and opportunities for student growth” (Nagel, 2021). Needless to say, repeated oral practices enhance speaking fluency (Chang, 2019).

With the advent of advanced Artificial Intelligence (AI), teachers' workloads in evaluating and analyzing individual and overall class reading progress are lightened to a large extent and without a shadow of a doubt, creation of on-the-spot overall class reading progress has accelerated both formative and summative assessments to become more time efficient and teaching effectiveness. Figure 1 below is the screenshot of my student's reading progress report on Microsoft Reading Progress in the fall semester of 2021. Traditionally all these tasks were done manually and very time-consuming for the teachers as well as students. But with the AI technology, students' reading rate, reading accuracy, and speaking errors could be detected. Teachers could just double-check the accuracy of those AI-detected errors and give feedback more effectively.

Therefore, the following research questions are proposed.

- (1) Is there any significant differences in students' pre- and post-listening comprehension before and after the action research?
- (2) Is there any significant differences in students' pre- and post-oral fluency before and after the action research?
- (3) Does this course design enhance students' attitude in autonomous learning at a significance level before- and after- the action research project?
- (4) What are students' perceptions of this course in terms of instructional design, AI-based speaking assessments, and extensive listening?

肆、計畫特色及具體內容

Three major features of this innovative teaching project are as follows.

- (1) The overall content of the Listening and Speaking course is based on effective and systematic listening comprehension and speaking strategies, including syllable stress, consonant clusters, intonation in statements and so on.
- (2) Extensive Listening: An orientation workshop will be conducted at the beginning of the semester to help students register on Voicetube. A wide array of extensive listening multimedia videos of various English proficiencies would be provided for students to engage in extensive listening experience.
- (3) AI-based Reading Progress: Teacher will set up reading practices on Reading Progress platform for students to take part in English oral fluency practices on regular basis.

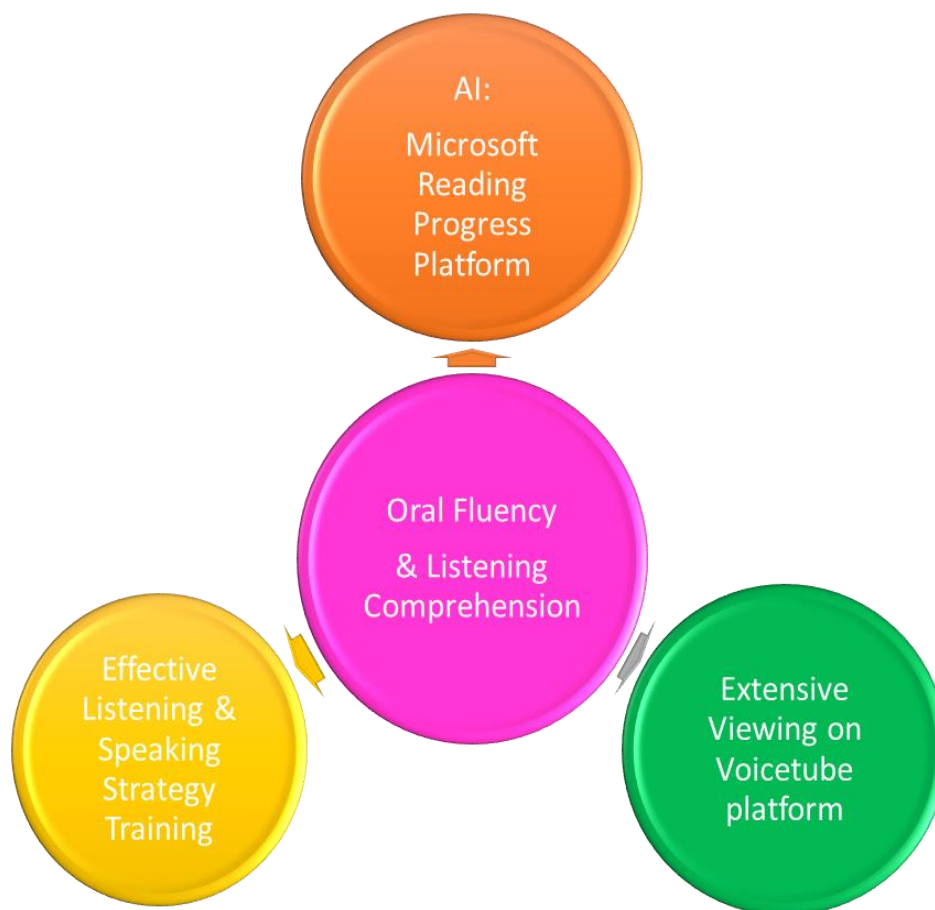


Figure 1: Features of the innovative teaching project

Teaching Instruction:

The following three phases illustrates the general teaching procedures. First, the lesson begins with guided listening strategy instruction, followed by extensive listening on Voicetube. Therefore, students would implement listening strategy in a meaningful context as well as through discussion with group members. During phase two, guided speaking instruction will be followed by pair speaking practice based on the speaking activity. Then, class would conclude with recorded oral fluency practice on Reading Progress platform independently. As for the third phase, AI-based and teacher feedback will be given to individual student along with overall class oral fluency assessment result. Students are encouraged to keep their personal learning reflection on regular basis based on their learning experience from Voicetube and Reading Progress.

Experimental Procedures

Both qualitative and quantitative data were collected throughout the experiment. Figure 2 indicates the types of data collected in time order. Before the experiment, pre-reading high-intermediate GEPT listening test, and pre-survey regarding prior listening experience were administered. During the experiment, teacher field observation notes, students' listening comprehension test, oral fluency scores, mid-term and final exam were also collected and analyzed to adjust teaching instruction based on students' needs. After the experiment, post-listening test, post-survey, final exam, and

volunteer students' interviews were also analyzed with other qualitative (in Nvivo software) and quantitative (in SPSS) data accordingly.

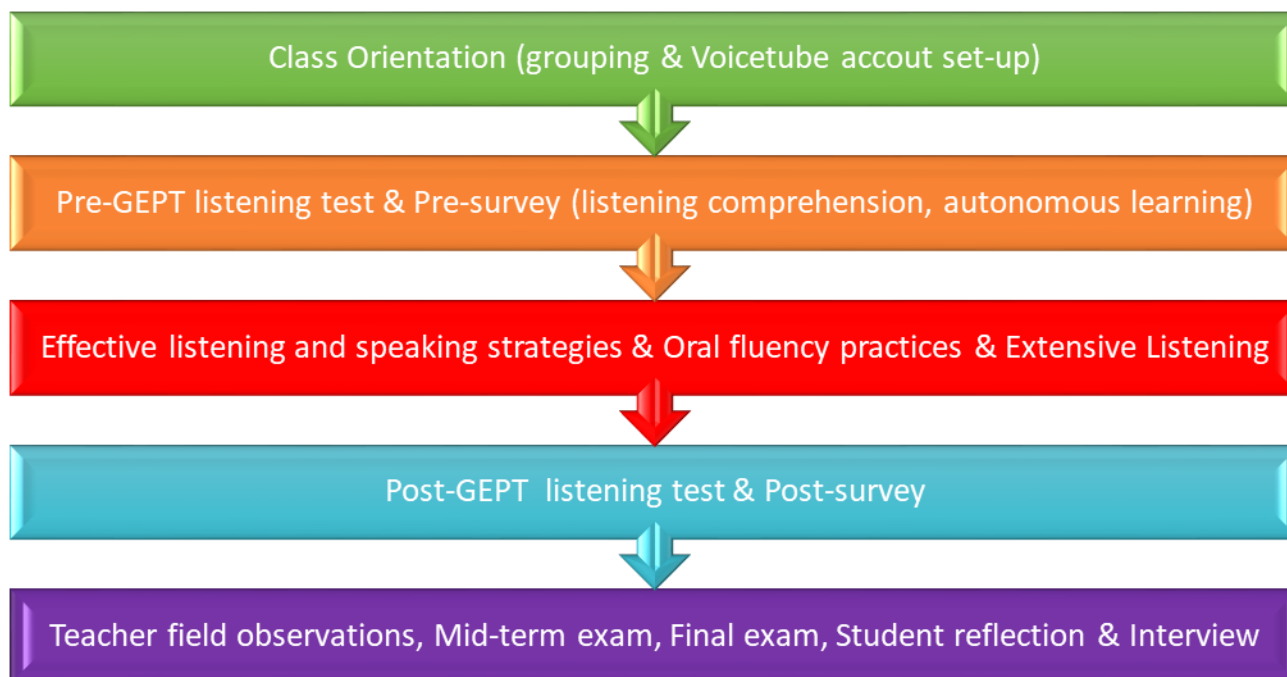


Figure 2: Experimental Procedures

Below is the course schedule for the fall semester of English Listening & speaking class.

Table 1. Course schedule for English Listening & Speaking Course

Week	Topic	Assignment
1	Orientation: Grouping & Pre-GEPT Listening Test	Pre-Survey
2	Getting to Know You	Voicetube Listening
3	Getting to Know You	#1: Reading Progress
4	Events and Places	Voicetube Listening
5	Events and Places	#2: Reading Progress
6	How We Feel	
7	How We Feel	

8	Mid-term exam	
9	Mid-term exam discussion	Voicetube Listening
10	Talking about People	#3: Reading Progress
11	Talking about People	Voicetube Listening
12	Eating in Restaurants	#4: Reading Progress
13	Eating in Restaurants	
14	Eating in Restaurants	
15	Review & Post-Listening GEPT Test	Post-Survey
16	Final Exam	Student Interviews

伍、實施成效及影響（量化及質化，且說明是否達到申請時所期之學習目標與預期成效）

Research Question #1: Pre-Post listening comprehension

Based on the paired t-test, no significant difference was found, [t (52) = .43, p = .669], between the pre- (M = 36.58, SD = 10.43) and post- (M = 37.23, SD = 12.84) listening comprehension section of General English Proficiency Test.

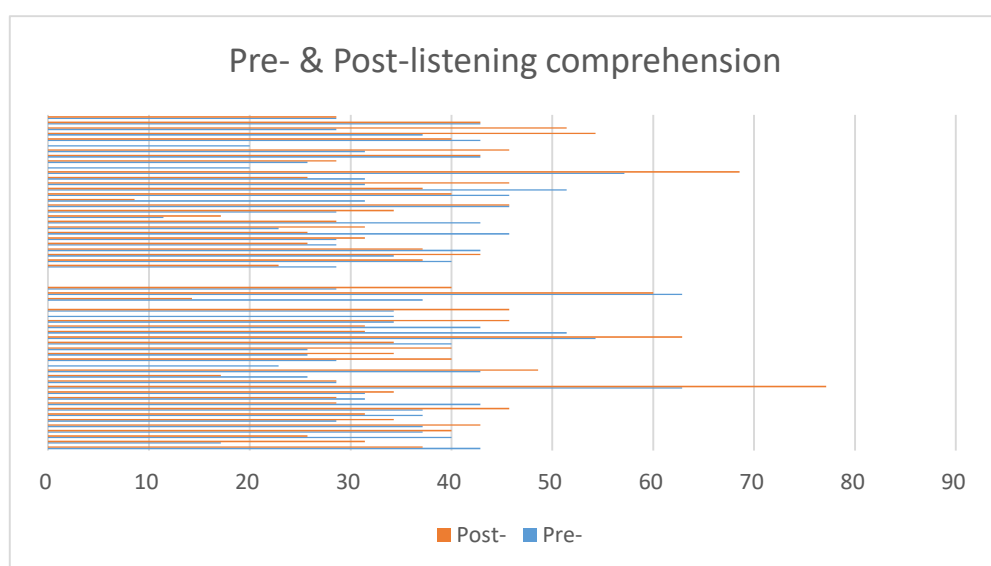


Figure 3: Pre-Post listening comprehension

Research Question #2: Pre- and Post- oral fluency performance

Because of the students’ low English proficiency, reading fluency performance is evaluated mainly by reading accuracy and reading rate. Based on students’ oral fluency performance before- and after-the mid-term exam, significant differences in student’s reading accuracy [$t(35) = 4.73, p < .001$] and rate [$t(35) = 3.12, p < .01$] were observed in the results of paired t-tests. In other words, students did make improvements in reading accuracy and reading speed at the end of the semester.

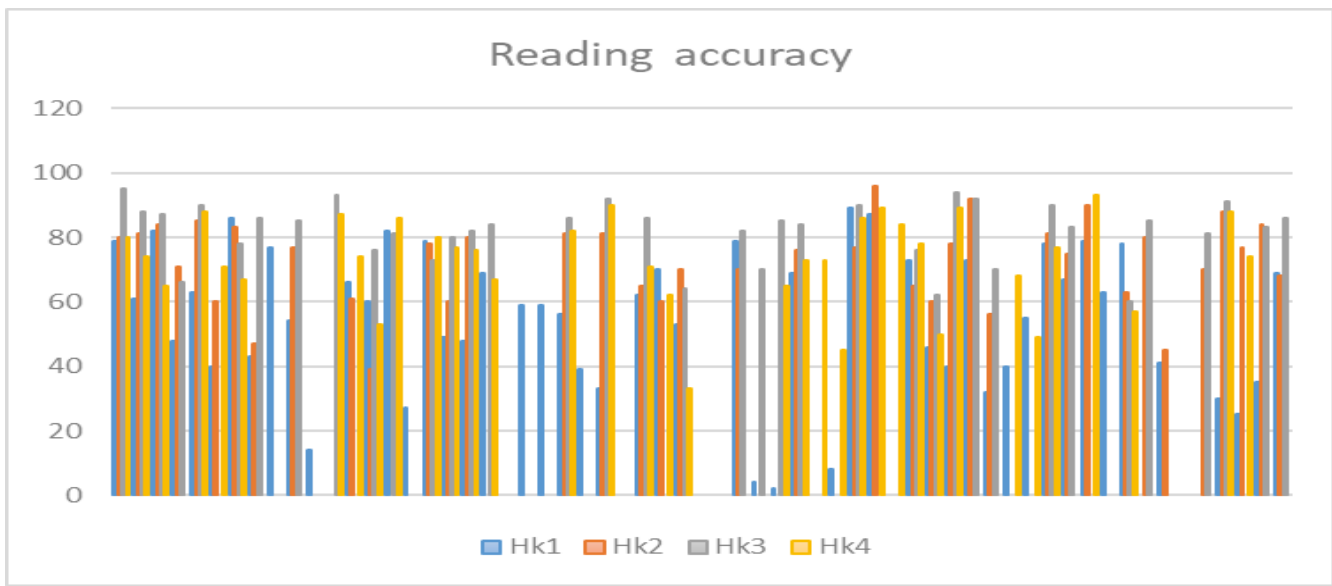


Figure 4: Students’ reading accuracy across assignments

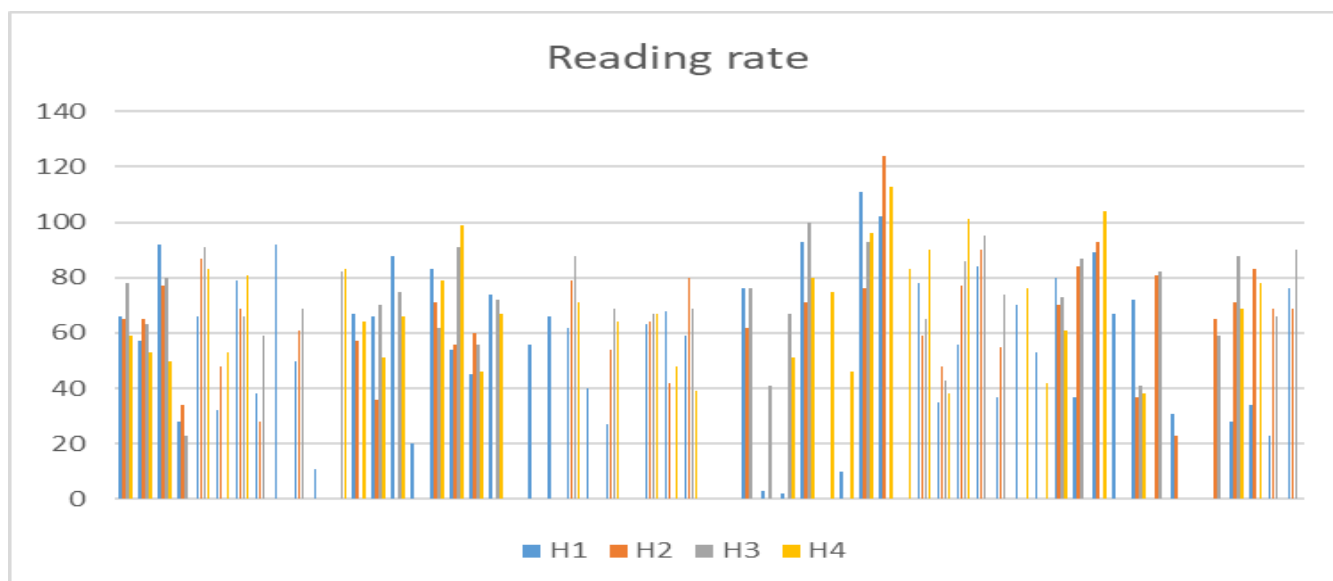


Figure 5: Students' reading rate across assignments

Research Question #3: self-efficacy and regulation of learning

Self-regulated learning, also known as autonomous learning, is examined through self-efficacy and regulation of learning in this study. The survey was modified from studies in Duncan & McKeachi (2005) and Pintrich, et al. (1993). There was a significant difference in student's pre- ($M = 3.22$, $SD = 0.84$) and post- ($M = 3.50$, $SD = 0.71$) self-efficacy [$t(38) = 2.43$, $p < .05$]. However, no significant difference was found in students' pre- ($M = 3.21$, $SD = 0.78$) and post- ($M = 3.46$, $SD = 0.68$) regulation of learning [$t(38) = 1.93$, $p = 0.06$].

Research Question #4: Students' perceptions

In general, students still prefer teacher's one-on-one individual ($M = 3.63$) feedback than overall class feedback ($M = 3.57$). Nevertheless, students also consider the use of AI-based speaking assessment beneficial in giving individual oral feedback ($M = 3.61$). The following are students' excerpts from students' reflections.

「那個口語練習可以看出自己正確或錯誤的地方，平常的口語練習可能唸過而已，無法使自己更加進步」

「能不斷練習，還會有系統回饋，能發現自己哪裡有問題」

However, the teacher as well as the students did notice some technical errors in AI-based speaking assessment tool. The following technical challenges were reported by the students.

「需要相當安靜的環境及足夠大聲的聲音，不然他會無法辨識」

「上傳的時候需要等太久，不小心滑掉的話，就需要再重新錄製一次」

Extensive viewing on Voicetube

Students in general held positive attitude toward the content on VoiceTube (M = 4.0). In addition, students consider extensive listening beneficial to learning vocabulary in context (M = 3.8). Although students were only required to view 4 video clips (M = 4.1), 22 (36.1%) students watched more than the required number of videos as indicated in Figure 6. The following were comments related to the students' VoiceTube viewing experiences. However, 19 (31.1%) students

「可訓練自己的聽力和增加單字量，不用侷限在課本內容的枷鎖中」

「因為上面的影片都有分級以及翻譯，讓我在看這些影片的時候可以了解到他在表達什麼」

「改善了我念句子的卡頓，因為VoiceTube 讓我知道句子哪裡該重音強調」

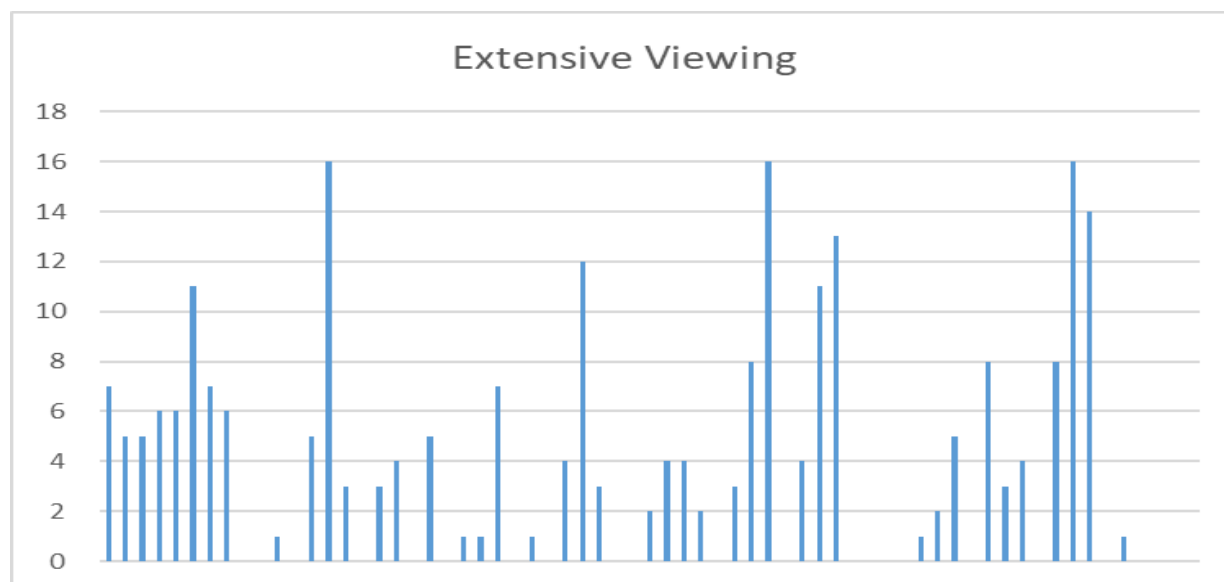


Figure 6: The total number of video clips watched by students

陸、結論

Learning outcomes:

1. Based on this study, students of low English proficiency did benefit from AI-based speaking assessment and extensive listening. Although no difference was found in pre- and post- GEPT listening comprehension test, students did make significant improvements in reading fluency both in reading accuracy and reading rate;

2. Students were able to practice oral fluency with partners collectively and individually with AI-assisted learning mechanism;
3. Students were acquire effective listening and speaking strategies in assessing their listening comprehension and English speaking fluency;
4. Students became familiar and motivated to engage in collaborative and autonomous learning through Voicetube and Reading Progress (for oral fluency);
5. Students showed improvements in their performances including listening comprehension, speaking fluency, and willingness to engage in after-class autonomous learning on Voicetube and Reading Progress.

It should be noted that the teacher had to manually double-check the accuracy of AI-assisted speaking assessment due to some constraints of the AI mechanism such as students' accents and volume in speaking. With a large class size like this one, tasks such as keeping track of grading and giving individual feedback could be challenging at times.

柒、執行計畫活動照片

Photo 1: Reading Progress in fall semester

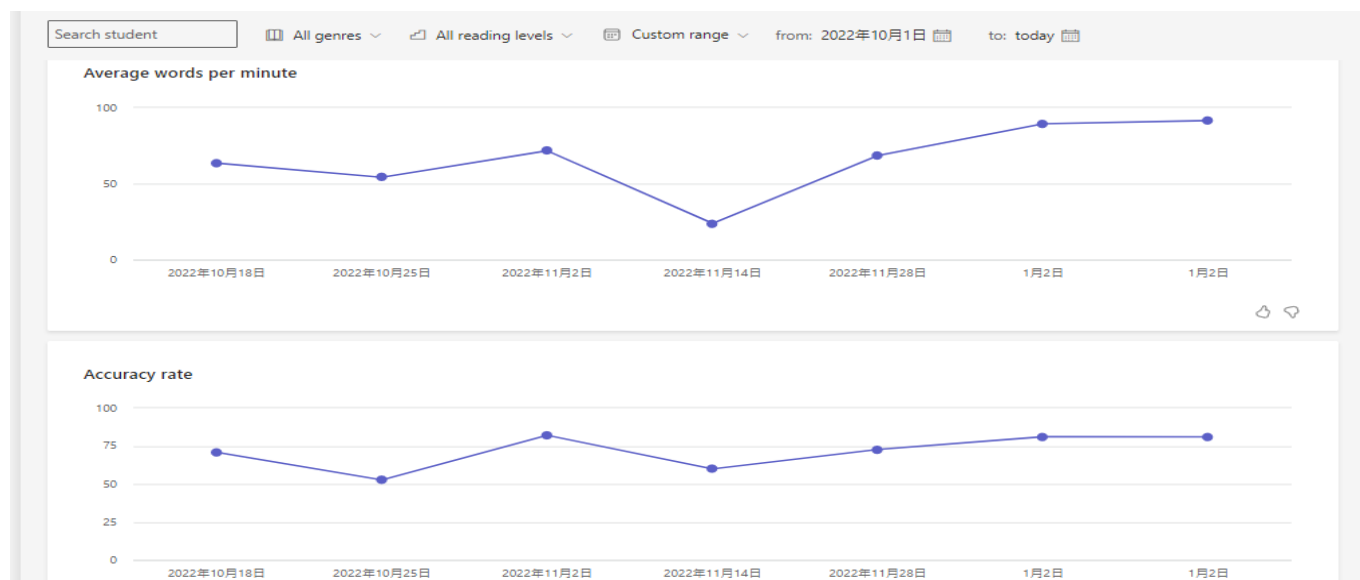


Photo 2: Students' Reading Progress report

Photo 3: Challenging words from the assigned reading

捌、附件

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備註：

本報告書大綱得視需要自行增列項目。