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Flipping EFL Reading Comprehension Classes: Students' Learning Achievement and Perceptions

ABSTRACT

Recent English as a foreign language (EFL) research has focused on flipped learning as one of the innovative teaching methods for enhancing language learning quality. Given this recent attention, this study examines the impact of the flipped classroom method on EFL students' reading comprehension. With the use of quasi-experimental mixed method design, a total of 211 EFL students from a Vietnamese university were randomly divided into groups engaged in flipped learning (n = 111) and traditional learning (n = 100). A variety of data sources were used to triangulate the findings. These included a reading comprehension diagnostic test, pre- and post-reading comprehension tests, EFL flipped questionnaire, an institutional feedback survey, and focus group discussions. The post-reading comprehension test results showed that students learning with the flipped classroom method significantly outperformed their counterparts in the traditional group. The students also had positive perceptions of the flipped classroom, increasing their learning motivation, learning autonomy, learning engagement, satisfaction, and effectiveness.

KEYWORDS

flipped classroom, reading comprehension, impact, perceptions, EFL, higher education

INTRODUCTION

For English as a foreign language (EFL) students, reading is one of the most critical macro skills (i.e., listening, speaking, reading, and writing), since it improves their language competence (Carrell and Grabe 2002; Krashen and Brown 2007). This is true especially for university students, as most academic resources are written in English and most foreign language learners are required to comprehend many English texts (Carrell and Grabe 2002; Mohammadpur and Ghafournia 2015). Therefore, students who lack the ability to read in English not only suffer from poor academic performance, but also face a variety of challenges outside the classroom (Mundhe 2015).

In the context of Vietnam, English is used widely for communication, education, trade, science, and technology (Tran, Thanh Phan, and Marginson 2018). To integrate into the regional and global economy, Nguyen and Hamid (2020) highlight the need for English skills and proficiency in the workplace. To enhance the effectiveness of English teaching and learning, the Prime Minister of Vietnam (2008) launched a national project which has reformed English teaching and learning at all educational levels. Among the reforms, the government has decided to transform the education system so that it aligns with a twenty-first century learning approach through the implementation of blended learning techniques (Nguyen et al. 2021).

As a form of blended learning, the flipped classroom inverts the usual instruction pattern and transfers passive learning to out-of-class homework (Bergmann and Sams 2012). With this method,

students learn the course content via instructional videos and preparatory activities prior to the class, leaving more in-class time to practice and engage with peers (Chen Hsieh et al. 2017). Research has demonstrated the benefits of the flipped classroom for English language teaching. These benefits include improved EFL student's writing (Su Ping et al. 2020), speaking (Chen and Hwang 2020), reading and listening skills (Torres and Pérez 2019), grammar (Al-Naabi 2020), and vocabulary (Chen Hsieh et al. 2017). Recent studies have been conducted on reading skills (Admed et al. 2022; Mohammaddokht and Fathi 2022; Samiei and Ebadi 2021; Wang 2023), showing significant improvements in reading comprehension compared to a control group.

Despite promising outcomes, the above studies have some shortcomings. Ahmed et al. (2022) highlighted the short duration of their study and the limited scope of data collection, relying solely on quantitative measures. Mohammaddokht and Fathi (2022) emphasized similar issues with sample homogeneity (i.e., only male students) and the need for qualitative data to capture a fuller picture of students' experiences. Only Samiei and Ebadi (2021) employed qualitative interviews; however, they investigated the impact of a WebQuest-based flipped classroom on the inferential reading comprehension skills rather than flipped classrooms as a whole. Therefore, with a quasi-experimental mixed-method design, our study sheds new light on the effect of the flipped classroom on EFL students' reading comprehension, integrating qualitative data in order to provide a more comprehensive understanding of how flipped learning impacts students' reading comprehension, their perceptions of and experiences with this innovative method. The research questions guiding this study are as follows:

1. Does the flipped classroom method impact EFL students' reading comprehension?
2. What are EFL students' perceptions of, and experiences with, the flipped classroom method for teaching reading comprehension?

LITERATURE REVIEW
Reading comprehension

Reading comprehension refers to the ability to comprehend and summarize a literary work (Azmuddin et al. 2020). To achieve this, readers must integrate their background knowledge, summarize details, draw conclusions, and ask questions to make sense of a text (Kirmizi 2010). Additionally, students must be able to recognize and process new words, comprehend different structures to build comprehension, engage in various strategic processes and possess certain cognitive abilities (Grabe 2014).

Given the complexity of these skills, it becomes clear that effective reading strategy instruction is essential in order to improve students' reading comprehension. Fayazi-Nasab and Ghafournia (2016) stated that reading instructions, together with continuous practice, play a vital role in EFL classrooms to help students better understand and skilfully apply reading strategies. Research has shown different teaching techniques and methods to improve EFL students' reading comprehension, such as the use of a cognitive academic language learning approach (Albashtawi 2019), scaffolded voluntary reading (Sholeh, Setyosari, and Yudi Cahyono 2019), and jigsaws as a cooperative learning strategy (Abed 2019). Although these studies showed positive effects on EFL students' reading comprehension, they did not integrate technology in teaching, which may be inappropriate nowadays. As twenty-first century students have been raised in the Internet era, providing them with the resources that fit their learning style becomes crucial (Chandrasoma and Chu 2016). Therefore, there is a need for innovative teaching methods to enhance students' reading and learning experience. Shyamlee and Phil (2012) argue that rapid developments in information technology have made it possible to explore the evolving teaching model in a more effective way. Thanks to technology, the flipped classroom method

(also known as "just in time teaching" (Novak 2011) or "inverted learning" (Davies 2013)) has increasingly attracted EFL researchers and practitioners (Wang, An, and Wright 2018).

Flipped classroom and related theories

Flipped classrooms provide students with more opportunity for learning before, during, and after class since they take advantage of the inverted learning process (Bergmann and Sams 2012). Students receive materials (e.g., lectures recorded by the teacher or downloaded from the website) before class, while class time is used for collaborative activities, projects, and discussions (Bergmann and Sams 2012). The flipped classroom emphasizes students' preparation before class so that during class, instructors' scaffold and guide learning and provide feedback to students (Qiu and Luo 2022). When using a flipped classroom model, students have more time in class to participate actively and receive support from their peers and teachers (Guo 2019).

Constructivism theory considers learning as a process achieved via self-construction of knowledge and socialization (Challob 2021). In this view, students are expected to not only make meaning and learn independently, but also to take an active role in interacting and collaborating with peers in order to acquire new knowledge; thus, learning occurs through experience, interaction, and reflection (Bereiter 1994). Complying with constructivism theory, the flipped classroom for teaching reading comprehension in this study was based on the four pillars of flipped learning (Flipped Learning Network 2014): a flexible environment, learning culture, intentional content, and professional educators.

With a flexible environment, students are entirely free to watch instructional videos and complete pre-class assignments at any time and place and at their own pace (Hill 2006). The learning culture pillar focuses on a student-centered approach, requiring students to arrive at the class with a basic understanding of the course materials (Bergmann and Sams 2012) and to participate in interactive activities (Swart and Wuensch 2016). This aligns with Doyle and Zakrajsek 's (2011) learner-centered teaching, emphasizing active student engagement and responsibility in the learning process. The intentional content pillar accounts for teachers' decisions on what and how to teach so students can discover learning on their own, with consideration of subject matter and grade level (Rahman, Yunus, and Hashim 2019). The last pillar, professional educators, emphasizes the importance of teachers who observe students, evaluate their work and give them relevant feedback (Flipped Learning Network 2014).

According to self-determination theory (SDT) three basic needs of autonomy, competence and relatedness are necessary conditions for effective learning to occur (Ryan and Deci 2000). Abeysekera and Dawson (2015) indicated that students in flipped classrooms experienced higher levels of relatedness due to increased peer interaction and support. Flipped learning offers students opportunities to prepare for the subject at home independently, making them autonomous and ready for in-class activities and enhancing their feeling of competence during the learning process (Abeysekera and Dawson 2015). Thus, learning in a flipped classroom can potentially increase students' relatedness, competence, and autonomy or intrinsic motivation, which potentially helps improve students' academic performance.

The flipped classroom design for teaching reading comprehension in this study is also aligned with cognitive load theory (CLT) (Sweller 1988) which emphasizes the capacity of an individual's working memory to store information, expressed as schemata, at a particular time. According to Sweller (2005), there are three types of cognitive load generated in the learning process: germane, intrinsic, and extraneous loads. Intrinsic load refers to the inherent nature of the learning material, learners' background knowledge and the interaction between them, which impacts learners' effort to understand the content (Sweller and Chandler 1994). To avoid exceeding intrinsic load, learning

materials should be adjusted to match learners' expertise (Shadiev et al. 2015). Extraneous load relates to elements that make learning more challenging (Schmeck et al. 2015); germane load refers to the number of mental resources dedicated to the acquisition and automaticity of schemata in long-term memory (Sweller, Van Merrienboer, and Paas 1998). Sweller (2007) suggests that effective learning can be achieved by reducing extraneous load and enhancing working memory or germane load. Based on four pillars of flipped learning, the flipped classroom in this study was designed to minimize students' extraneous load, balance intrinsic load, and enhance germane load, leading to improving EFL students' reading comprehension.

METHOD

Participants

The study involved 211 first-year students in an English preparatory program in semester one of the 2022–2023 academic year at a large university in Vietnam. They were selected out of 254 students based on the results of a reading diagnostic test (Appendix A), with scores ranging from 0 to 40. With the mean score of 12.57, participants whose mean scores (rounded up) were between 5 and 19 (i.e., the mean plus and minus 7) were selected to participate. This benchmark represented the general reading ability of the sample. By this measure, participants with very high or low reading comprehension scores on the screening test were excluded from the study.

This study employed a quasi-experimental design, participants were assigned randomly to either the experimental (n = 111) or the control group (n = 100). The experimental group was taught by the researcher whereas the control group was led by a different teacher. The students were primarily between 18 and 19 years of age and had previously studied English for three to 13 years. Their English language proficiency levels were elementary and low-intermediate. While all students were in a four-year undergraduate program, they studied different majors, such as information technology, software engineering, electrical engineering, chemical engineering, tourism and hospitality management, biotechnology, food technology, finance and banking, business administration, international business, and construction technology. The majority of the students (50%, n = 211) studied international business or finance and banking.

The flipped classroom method

The flipped classroom method for the Reading 1 course (FL003H) was designed using the four pillars of flipped learning (Flipped Learning Network 2014) and asked students to access video lessons in order to learn reading comprehension question types, access reading strategies and tips, and do vocabulary tasks prior to attending classes.

During in-class time, the teacher reviewed the vocabulary, and students discussed the content learned outside of class in pairs or groups. The teacher scaffolded key reading strategies and tips for the lesson and organized further reading comprehension practice and other post-reading activities, like analyzing reading texts, grammar, synonyms, antonyms, and discussion.

The traditional teaching method

There were no preparatory tasks in the traditional teaching method class, and all reading instructions were delivered in class. The teacher performed warm-up activities, taught new vocabulary, reading strategies, and guided the students through reading comprehension exercises from the textbook. If time allowed, the teacher would provide students with further reading comprehension practices.

Although the teaching methods were different, the students in both groups studied the same textbook content and shared the same number of learning hours (see Table 1).

Table 1. Flipped classroom and traditional teaching methods

Stage	Flipped classroom method		Traditional teaching method	
	Activities	Duration	Activities	Duration
Preparatory tasks	- Vocabulary task - Video lecture about reading strategies - Video about the lesson in the book - Exercises related to the videos	50 minutes	Nil	0 minutes
	- Warm-up	10 minutes	- Warm-up	10 minutes
	- Students' sharing of their preparatory task answers in groups or pairs - Teacher's feedback	30 minutes	- Reading exercises in the book	70 minutes
In-class session	- Discussion about the content of the reading	10 minutes	- Discussion about the content of the reading	10 minutes
	- Exam skills in the book	20 minutes	- Exam skills in the book	25 minutes
	- Answer sharing and analysis	10 minutes	- Answer sharing and analysis in pairs and whole class - Text analysis	15 minutes
	- Further reading practice	20 minutes	- Further reading practice	20 minutes
Total time		150 minutes		150 minutes

Study procedures

In the pre-test phase, students completed consent forms, diagnostic reading comprehension test and a pre-reading comprehension test. The students learned the reading course for seven weeks. The post-test phase involved the post-reading comprehension test, an EFL flipped questionnaire, focus group discussions, and the university feedback survey.

Data collection and analysis

Overall, five different types of instruments were used in this study: pre- and post-reading comprehension tests, EFL flipped classroom questionnaire, a university feedback survey, and focus group discussions.

Pre- and post-reading comprehension tests

As the Reading 1 course (FL003H) covered the first four units of the textbook that followed the International English Language Testing System (IELTS) format. The pre- and post-reading comprehension tests were modified from the Cambridge for IELTS 17 book, which is the official Cambridge exam preparation materials produced by Cambridge Exams Publishing in order to ensure tests' validity and reliability. The test included IELTS question types such as matching, multiple choices, and fill-in-the-blanks (see Appendix B).

The EFL flipped classroom questionnaire

This questionnaire has 22 items and is divided into five constructs: learning motivation (four items), learning autonomy (seven items), learning engagement (six items), learning effectiveness (four

items), and satisfaction (one item) (see Appendix C). They were adapted from various resources including Haghighi et al. (2019)'s and Diaz-Carrion and Franco-Leal (2022)'s flipped learning experience questionnaires, Tsai (2019)'s learning autonomy questionnaire, and an engagement questionnaire from Fredricks, Blumenfeld, and Paris (2004). Our study's questionnaire was designed as a 7-point Likert scale and was reviewed by two experts in EFL to improve its validity.

Cronbach's alpha values were reliable at 0.64, 0.68, 0.75, and 0.76 for learning motivation, learning autonomy, learning engagement, and effectiveness, respectively. Though the Cronbach coefficients for learning motivation and learning autonomy were .64 and .68, they were acceptable for exploratory studies, according to Taber (2018) and Cortina (1993).

The university student feedback survey

This institutional satisfaction survey designed on a 5 point-Likert scale. This survey covers areas such as the teacher's teaching method, learning resources, the teacher's guidance, and checks on students' self-study, assessment and overall satisfaction with the course. This survey provided further insights into students' experiences of the flipped classroom method. Combined with the EFL flipped classroom questionnaire, it serves as a way of triangulating data.

Focus group discussions

Insights from students regarding the impact of the flipped classroom method on reading anxiety were examined through 60-minute Zoom discussions (see Appendix D). Focus group sessions were utilized to study perceptions of the flipped classroom method (Wilson, Lizzio, and Ramsden 1997) as an innovative teaching approach and to probe participants' understanding and experience (Kitzinger 1995). These discussions, conducted in Vietnamese, aimed to foster idea exchange, facilitating comprehensive insights. Recordings were created to ensure accuracy of responses from individual students. There were two focus groups conducted, named FG1 and FG2. To safeguard anonymity, student identifiers were substituted for codes (e.g., ST1, ST2).

Data analysis

IBM SPSS Statistics 26 was used for quantitative data processing and analysis. The data met normality parameters allowing the use of independent sample t-tests and mixed-ANOVA. Meanwhile, qualitative data were analyzed using a five-step thematic analysis (Braun and Clarke 2012).

RESULTS
The effects of the flipped classroom method on EFL students' reading comprehension

The independent sample t-test was first conducted to determine whether the students in both groups were of similar reading comprehension ability before the training began. As demonstrated by Levene's test, the variances were equal, $p = 0.08$, indicating that the pre-reading comprehension mean score met the homogeneity assumption. The results showed no significant difference in the pre-reading comprehension mean scores between the experimental group (M = 6.87, SD = 3.87) and the control group (M = 6.78, SD = 3.34), $t(209) = -0.17$, $p = 0.87$. These results suggest that the students in the experimental and control groups had similar reading comprehension ability prior to training.

Mixed ANOVA was then used to examine the impact of the flipped classroom method on students' reading comprehension after the training. The results of the mixed ANOVA test with Greenhouse–Geisser correction revealed that both time (pre- and post-reading comprehension) and group (experimental vs control) had significant effects, $F(1.00, 209) = 251.89$, $p < 0.01$, partial $eta2 = 0.55$ and $F(1.00, 209) = 4.57$, $p = 0.03$, partial $eta2 = 0.02$, respectively (see tables 2 and 3). These

findings suggest that students in both groups improved their reading comprehension over time, and that the students in the experimental group improved their reading comprehension scores more than their counterparts in the control group.

Table 2. Tests of within-subjects effects

Source	Sum of squares	Df	Mean square	F	Sig.	Partial Eta squared
Time	4600.31	1.00	4600.31	251.89	0.00**	0.55
Time*Group	142.16	1.00	142.16	7.78	0.01	0.04
Error (Time)	3817.06	209	18.26	_	_	_

Table 3. Tests of between-subjects effects

Source	Sum of squares	Df	Mean square	F	Sig.	Partial Eta squared
Intercept	43174.93	1.00	43174.93	1205.33	0.000	0.85
Groups	163.67	1.00	163.67	4.57	0.03*	0.02
Error	7486.37	209	35.82	_	_	_

As shown in Figure 1, reading comprehension scores increased from an average of 6.78 at the pre-test to 12.23 at the post-test for students in the control group, showing an improvement of 5.45 points. In comparison, the flipped classroom method showed a more substantial increase in reading comprehension scores, rising from an average of 6.87 at the pre-test to 14.64 at the post-test, with an improvement of 7.77 points. While both groups helped improve students' reading comprehension over time, the flipped classroom method had a more positive impact on improving students' reading comprehension abilities than the traditional method. This comparison suggests that the flipped classroom method was more effective than the traditional method in boosting students' reading comprehension abilities.

Figure 1. Improvement in student reading comprehension in both groups
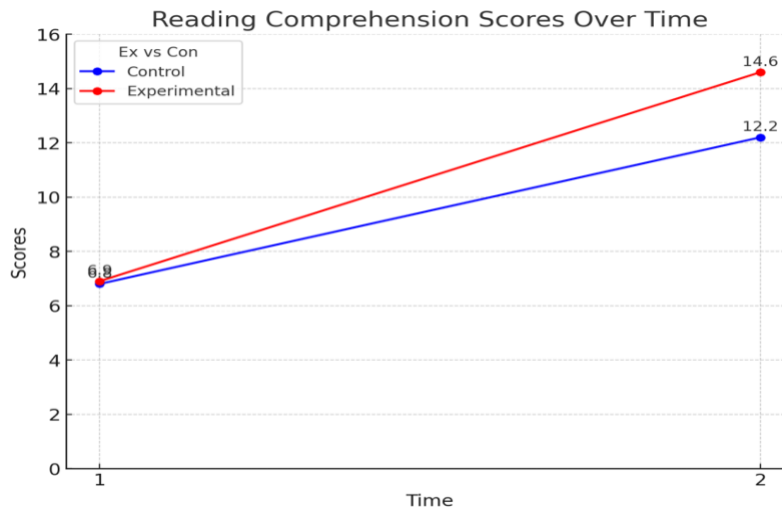
EFL students' perceptions of the flipped classroom method for teaching reading comprehension

EFL students' perceptions of the flipped classroom method were examined in relation to five constructs of the flipped classroom questionnaire: learning motivation, learning autonomy, learning engagement, satisfaction, and effectiveness. Table 4 presents descriptive statistics for each construct.

Table 4. EFL students' perceptions of the flipped classroom method

	Min	Max	Mean	SD	Median	No. of items
Satisfaction	2.00	7.00	4.87	1.19	5.0	1
Learning motivation	2.00	6.50	4.81	.82	4.75	4
Learning autonomy	3.14	6.57	4.93	.70	4.86	7
Learning engagement	2.33	6.33	4.81	.76	4.83	6
Effectiveness	1.00	6.75	5.04	.91	5.0	4

Note. n=111.

The results revealed that students generally held positive perceptions across the five constructs: learning motivation, learning autonomy, learning engagement, perceived effectiveness, and satisfaction, with overall mean scores ranging from 4.81 to 5.04. Median scores for these categories hovered around the midpoints, from 4.75 to 5.0. These results suggested consistent responses and a generally favourable view of the flipped classroom approach among the students. Further details are provided in the following subsections.

Learning motivation

Students perceived the flipped classroom method as a positive enhancement for their learning motivation. They were eager to engage in pre-class activities in order to prepare for class (60.3%, n =

111), were motivated to devote more time to learning English reading skills (62.1%, n = 111), and were more motivated to learn English reading skills (59.4%, n = 111). Furthermore, qualitative results showed that students in the flipped classroom group were motivated to learn reading comprehension skills as they had a sense of competence and guidance for self-study at home.

> ST2: I have increased my motivation to learn reading comprehension skills because I can determine how to do different IELTS reading question types. (FG1)

> ST6: With this method, the teacher delivered preparatory tasks to do at home, guidance for self-study. However, for other subjects there was no guidance to prepare so I felt bored. (FG1)

Learning autonomy
The students perceived that the flipped classroom method improved their learning autonomy. 69.3% (n = 111) of students agreed that they had developed self-study skills as a result of the flipped classroom activities, and 66.6% felt that their learning style was more self-directed and independent. There were many comments from students regarding the development of their learning autonomy in this reading course.

> ST1: With this method . . . I could search for more knowledge. (FG1)

> ST11: The flipped classroom method helped improve my self-study. . . . I have found many useful external learning resources. So, I've self-studied more. (FG2)

According to students, the preparatory activities provided guidance for self-study, which helped save time in class and improve vocabulary learning.

> ST3: This method helped me have more time to learn on my own. Self-studying at home saved time in class. (FG1)

> ST4: Preparing in advance helped me to do more self-study. By self-studying, I was able to remember new words better than by waiting for a teacher to teach them . . . As I read the passages, I often encountered new words and I noted them in my notebook for self-study.
> (FG1)

Learning engagement
Students were positive about the impact of the flipped classroom method on their learning engagement. The majority of students (65.7%, n = 111) reported spending more time and effort in class, participating actively, and interacting more with their classmates (57.6%, n = 111). Qualitative results showed that the students had made considerable effort in this reading course.

> ST1: When I watched the videos, I watched them many times to understand and take notes.

> ST3: When I was unable to understand the content in the videos, I had to concentrate more and use a dictionary. (FG1)

ST4: The flipped classroom method had preparatory tasks at home, so I spent a lot of time and effort to complete the tasks. (FG1)

Students reported two key aspects of the flipped classroom that contributed to their commitment and engagement in the reading course: improved comprehension and clear guidance during preparation.

ST3: I spent more time reading. In the past I had read the reading passage exactly once and then quit as I did not comprehend anything. This flipped learning method helped me improve a lot. (FG1)

ST6: Reading was the subject I invested the most in thanks to preparatory tasks at home with self-study guidance. (FG1)

Furthermore, students reported that with proper preparation at home, they participated more actively in class, shared lessons with classmates, and discussed them in group-sharing activities, demonstrating strong engagement with the flipped learning approach employed in this reading course.

ST3: In class, I participated more actively thanks to home preparation. (FG1)

ST1: By sharing exercises and answers in groups . . . I participated in in-class activities, so I saw that I kept up with my friends. (FG1)

ST7: With good preparation in advance at home, I was able to help my friends around in class, sharing with them with confidence. (FG1)

Effectiveness

Students perceived the flipped classroom method to be effective for teaching reading comprehension (i.e., an improved level of comprehension (71.1%, n = 111), a better use of reading strategies (72%, n = 111), and improved vocabulary learning (81%, n = 111). Qualitatively, students believed that the flipped classroom method was successful at teaching reading comprehension skills. Some of their comments included "effective," "quite effective," "very effective," "more correctly," "save more time," "quicker," "more progress" and "a lot of progress," showing the strong impact of the flipped classroom method on students' reading comprehension.

ST14: It was quicker to do reading exercises in class when preparation was done at home, increasing the effectiveness of lessons in class. (FG1)

ST6: My reading comprehension improved. For example, in the final test the results showed more progress than at the beginning of the term. (FG1)

Furthermore, the flipped classroom method had a positive impact on the students' vocabulary learning. Their vocabulary resources increased, and they were able to comprehend different meanings of new vocabulary words and remember them better.

ST9: I found that learning new words on the Google Classroom site in advance at home could help students understand different meanings of words. (FG2)

> ST4: When I was at home, I studied vocabulary once on Google Classroom. I learned it again in class. This helped me remember new vocabulary better. (FG1)

Furthermore, the students indicated that the combination of pre- and in-class activities in the flipped classroom contributed to their mastery of IELTS question types, and reading strategies and skills (skimming, scanning, identifying key words, etc.) which improved their reading comprehension skills.

> ST1: I understood how to do reading comprehension exercises more correctly and saved more time . . . When I learned skimming and scanning, it helped me save a lot of time translating unnecessary information. (FG1)

> ST9: I found the flipped learning method effective for me. I prepared vocabulary and reading passages at home, so I could easily catch up with what the teacher taught in class on Google Classroom, I watched and learned reading strategies and tips that helped improve my reading comprehension skills. (FG2)

Satisfaction

Overall, students were satisfied with the flipped classroom experience, with 57.6% (n = 111) in agreement and one third neutral. The results of the university student feedback survey indicate that students were very satisfied with the flipped classroom method used in this reading course (see Table 5).

Table 5. EFL student level of satisfaction

Statements	Strongly dissatisfied	Dissatisfied	Neutral	Satisfied	Strongly satisfied
1. Teachers have teaching methods to help you learn actively.		3%	**28%**	44%	22%
				66%	
2. The resources provided by the teacher help clarify the course content and meet your learning needs.			**25%**	59%	16%
				75%	
3. Your level of satisfaction with the content and assessment method of the course.		3%	**25%**	47%	25%
				72%	
4. Teachers guided and checked your self-study hours according to regulations.			**25%**	50%	22%
				72%	
5. Teachers completed the number of hours according to the published schedule.			**16%**	44%	38%
				82%	
6. You are satisfied with the teaching and learning in this class.			**25%**	50%	25%
				75%	

Note. n = 32.

In general, students rated this reading comprehension course "satisfied" or "strongly satisfied" across all aspects examined. Specifically, students rated active learning (66%, n = 32), instructional resources and overall satisfaction, each with 75%, n = 32, content and assessment method and teacher guidance and check of student self-study, each with 72%, n = 32, the number of teaching hours completed (82%, n = 32). Qualitatively, the students expressed satisfaction with the flipped classroom method used in this reading course, as it allowed them to improve their reading comprehension skills and have more interactions with peers.

> ST3: I was quite satisfied with this reading course this semester. (FG1)

> ST1: I felt satisfied. After this course, my reading comprehension ability had improved. (FG1)

> ST8: I was satisfied because this course had more teamwork, which is better for future courses. (FG2)

Challenges

The students reported some challenges with the flipped classroom method, including unfamiliarity at first, students' vocabulary limitations, overuse of Google Translate to do preparatory tasks, and students' failure to complete preparatory tasks. However, the students found no problems with the technology.

> ST1: The videos were all in English, so at first, I found it difficult to understand. However, under the guidance of the teacher and native-speaker teachers, I could understand how to do reading comprehension exercises more easily and get more correct answers. (FG1)

> ST8: During the sharing-answers activity in class, students who had not completed the preparatory tasks copied each other's answers. There were not many cases, but this still occurred. (FG2)

> ST12: A downside is that when students did preparatory tasks at home, they used Google Translate, which made it difficult for them to take reading comprehension tests. (FG2)

> ST13: Most of my classmates didn't have difficulty with the technology. (FG2)

Suggestions

The students provided suggestions on how to improve the flipped classroom method's effectiveness for reading comprehension teaching. To ensure that students are able to remember new words better, they proposed that the teacher provide between five and seven new words per unit, and that teachers should consider assigning group work rather than individual work for the preparatory tasks so that stronger students could help their peers.

> ST6: I think the teacher should provide five to seven words per unit because if there were too many, the students wouldn't remember. (FG2)

ST8: The teacher should provide a moderate volume of vocabulary for each unit. (FG2)

ST12: The teacher should give more group work like watching videos and doing preparatory tasks in groups so that less competent students can learn from good students. Good students can also consolidate their knowledge while helping their peers. (FG2)

DISCUSSIONS

The present study showed the positive impact of the flipped classroom method on EFL students' reading comprehension. There was a statistically significant difference in EFL students' reading comprehension abilities between the two groups after training. This difference favored the students who learned with the flipped classroom method, suggesting the effectiveness of the flipped classroom method in improving EFL students' reading comprehension skills. Our results are consistent with Admed et al. (2022), Mohammaddokht and Fathi (2022), and Wang (2023). We also found that students perceived the flipped reading classroom method positively with respect to their learning motivation, autonomy, engagement, effectiveness, and satisfaction. In particular, our study explains how the flipped classroom method contributed to such benefits from a qualitative approach, which has not been examined before.

Consistent with cognitive load theory (CLT) (Sweller 1988), we found that pre-training preparatory tasks in advance helped them build schemata, that is, reading strategies and tips and vocabulary, which were then transferred to their long-term memory for later use in reading classes. Samiei and Ebadi (2021) also stated that students improved their critical thinking and inferential reading skills by using schemas before class discussions. By mastering reading strategies such as skimming, scanning, and identifying key words, the students avoided unnecessary cognitive processes, like translating or reading the entire passage. This contributed to the reduction of student extraneous load. Additionally, the knowledge-segmentation process delivered through pre- and in-class trainings helped students absorb knowledge gradually, rather than overwhelming them. This contributed to easing students' cognitive load in reading classes, leading to an improvement in their reading comprehension.

Further, it was also found that two phases of vocabulary learning, through preparatory tasks on Google Classroom at home and in-class activities together with synonyms provided by the teacher attributed to the increase in students' vocabulary resources, facilitating students' reading comprehension. Indeed, vocabulary is very important in reading comprehension (Jun Zhang and Bin Anual 2008). Li and Kirby (2015), write "both breadth and depth of vocabulary are required for adequate L2 word reading and reading comprehension" (631).

Consistent with self-determination theory (SDT) (Ryan and Deci 2000), we concluded that the design of the preparatory tasks offered clear guidance for self-study, and that the video lessons allowed students to acquire reading strategies and tips at their own pace. This supported self-paced learning and met differentiated learning needs. Previous research also suggests that the flipped classroom helps students gain learning outcomes through self-paced learning which allows them to pause, rewind and re-watch as desired (Chen Hsieh et al. 2017; Webb and Doman 2016). In other words, students can take control of their learning and improve independent learning in a flipped classroom. This leads to increased students' learning autonomy, supported by Aghaei et al. (2020) stating that EFL students appreciated the self-paced and autonomous learning of flipped classrooms.

The flipped classroom environment with a variety of group-sharing activities during in-class sessions offered active student participation. The combination of preparatory tasks at home and group sharing activities in class was crucial in the flipped classroom method. With proper preparation

in advance, the students were ready and willing to share, discuss, and help each other in discussions, enhancing their sense of relatedness. Alongside an increased amount of time for in-class discussion that contributed to improving students' competence (Thaman et al. 2013), our study found that the combination of both preparatory tasks done at home helped students effectively learn reading strategies and tips for in-class activities, potentially contributing to students' reading competence. Thus, the enhancement in students' learning autonomy, relatedness and competence attributed to improved intrinsic motivation from self-determination theory (Ryan and Deci 2000).

Research has shown that increasing students' engagement is one of the benefits of the flipped classroom method (Bauer-Ramazani et al. 2016; Fisher et al. 2024; Lin and Chen 2016). Our study further explored features of the flipped classroom method that enhanced students' learning engagement. The sense of improving comprehension and the preparatory tasks with clear guidance contributed to triggering students' learning efforts and commitment. Students could watch video lessons as many times as needed, took notes, and remained focused doing reading comprehension tasks. This is in line with Hung's (2015) study that students in the flipped classroom spent 80% more time and energy receiving, comprehending, and applying new information than students in traditional classrooms. Combined with proper preparation at home, the students became class-ready, participated in class more actively, shared lessons, and discussed course materials with classmates in group-sharing activities. It is apparent that flipping classrooms enabled students to engage more deeply with course contents and activities (Bergmann and Sams 2012).

CONCLUSION

The present study supports the positive impacts of the flipped classroom method on EFL students' reading comprehension, learning motivation activated by enhanced competence, autonomy and relatedness, learning engagement, and overall satisfaction. Based on our findings, we recommend increased training for EFL instructors on how to implement the flipped classroom method for teaching reading skills. Considering the flipped classroom method is relatively new in Vietnam and similar Asian contexts, students should know why it is used. They also need time to gradually adapt and participate effectively in classes. The flipped classroom method allows instructors to not only prepare materials for the class, but to scaffold students' learning throughout.

The study also discovered challenges in implementing the flipped classroom. For example, some students did not complete the preparatory tasks at home and took advantage of their peers' work in group sharing activities. In addition, the students might overuse Google Translate for preparatory tasks. EFL teachers and practitioners should consider ways to overcome such pitfalls in their teaching practices.

This study does have some limitations. Firstly, this study's participants were first-year students from a single local university; future research is encouraged to investigate the impact of the flipped classroom method across cohorts and cultural contexts. Additionally, future studies could include questionnaires and focus-group discussions not only within the experimental group but also within the control group. This balanced approach would yield deeper insights into the student perceptions. Further, there should be the same teacher in both control and experimental groups in order to avoid the threat of different teaching styles across different teachers. Finally, incorporating additional tools such as classroom observation and notes are recommended to provide more comprehensive conclusions.

Overall, this study contributes to resolving problems in English language teaching in Vietnamese HE, providing (1) an innovative flipped classroom method for improving students' reading comprehension, learning motivation, engagement, and satisfaction, and (2) valuable references for future research using the flipped classroom method in the EFL context.

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DISCLOSURE

Generative AI is used to generate Figure 1 at the peer-reviewed stage.

ETHICS

This study was approved through the Swinburne University of Technology ethical review.

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APPENDIX A
Diagnostic Reading Comprehension Test

READING PASSAGE 1

You should spend about **20 minutes** on **Questions 1-13** which are based on Reading Passage 1 below.

Alexander Henderson (1831-1913)

Born in Scotland, Henderson emigrated to Canada in 1855 and become a well-known landscape photographer

Alexander Henderson was born in Scotland in 1831 and was the son of a successful merchant. His grandfather, also called Alexander, had founded the family business, and later became the first chairman of the National Bank of Scotland. The family had extensive landholding in Scotland. Besides its residence in Edinburgh, it owned Press Estate, 650 acres of farmland about 35 miles southeast of the city. The family often stayed at Press Castle, the large mansion on the northern edge of the property, and Alexander spent much of his childhood in the area, playing on the beach near Eyemouth or fishing in the streams nearby.

Even after he went to school at Murcheston Academy on the outskirts of Edinburgh, Henderson returned to Press at weekends. In 1849 he began a three-year apprenticeship to become an accountant. Although he never liked the prospect of a business career, he stayed with it to please his family. In October 1855, however, he emigrated to Canada with his wife Agnes Elder Robertson and they settled in Montreal.

Henderson learned photography in Montreal around the year 1857 and quickly took it up as a serious amateur. He became a personal friend and colleague of the Scottish – Canadian photographer William Notman. The two men made a photographic excursion to Niagara Falls in 1860 and they cooperated on experiments with magnesium flares as a source of artificial light in 1865. They belonged to the same societies and were among the founding members of the Art Association of Montreal. Henderson acted as chairman of the association's first meeting, which was held in Notman's studio on 11 January 1860.

In spite of their friendship, their styles of photography were quite different. While Notman's landscapes were noted for their bold realism, Henderson for the first 20 years of his career produced romantic images, showing the strong influence of the British landscape tradition. His artistic and technical progress was rapid and in 1865 he published his first major collection of landscape photographs. The publication had limited circulation (only seven copies have ever been found) and was called Canadian Views and Studies. The contents of each copy vary significantly and have proved a useful source for evaluating Henderson's early work.

In 1866, he gave up his business to open a photographic studio, advertising himself as a portrait and landscape photographer. From about 1870 he dropped portraiture to specialize in landscape photography and other views. His numerous photographs of city life revealed in street scenes, houses, and markets are alive with human activity, and although his favourite subject was landscape, he usually composed his scenes around such human pursuits as farming the land, cutting ice on a river, or sailing down a woodland stream.

There was sufficient demand for these types of scenes and others he took depicting the lumber trade, steamboats, and waterfalls to enable him to make a living. There was little competing hobby or amateur photography before the late 1880s because of the time-consuming techniques involved and the weight of equipment. People wanted to buy photographs as souvenirs of a trip or as gifts, and catering to this market, Henderson had stock photographs on display at his studio for mounting, framing, or inclusion in albums.

Henderson frequently exhibited his photographs in Montreal and abroad, in London, Edinburgh, Dublin, Paris, New York, and Philadelphia. He met with greater success in 1877 and 1878 in New York when he won first prizes in the exhibition held by E and H T Anthony and Company for landscapes using the Lambertype process. In 1878 his work won second prize at the world exhibition in Paris.

In the 1870s and 1880s Henderson travelled widely throughout Quebec and Ontario, in Canada, documenting the major cities of the two provinces and many of the villages in Quebec. He was especially fond of the wilderness and often travelled by canoe on the Blanche, du Lièvre, and other noted eastern rivers. He went on several occasions to the Maritimes and in 1872 he sailed by yacht along the lower north shore of the St Lawrence River. That same year, while in the lower St Lawrence River region, he took some photographs of the construction of the Intercolonial Railway. This undertaking led in 1875 to a commission from the railway to record the principal structures along the almost-completed line connecting Montreal to Halifax. Commissions from other railways followed. In 1876 he photographed bridges on the Quebec, Montreal, Ottawa and Occidental Railway between Montreal and Ottawa. In 1885 he went west along the Canadian Pacific Railway (CPR) as far as Rogers Pass in British Columbia, where he took photographs of the mountains and the progress of construction.

In 1892 Henderson accepted a full-time position with the CPR as manager of a photographic department which he was to set up and administer. His duties included spending four months in the field each year. That summer he made his second trip west, photographing extensively along the railway line as far as Victoria. He continued in this post until 1897, when he retired completely from photography.

When Henderson died in 1913, his huge collection of glass negatives was stored in the basement of his house. Today collections of his work are held at the National Archives of Canada, Ottawa, and the McCord Museum of Canadian History, Montreal.

Questions 1–8
Do the following statements agree with the information given in Reading Passage 1? In boxes **1–8** on your answer sheet, write
TRUE if the statement agrees with the information
FALSE if the statement contradicts the information
NOT GIVEN if there is no information on this

1. Henderson rarely visited the area around Press estate when he was younger.
2. Henderson pursued a business career because it was what his family wanted.
3. Henderson and Notman were surprised by the results of their 1865 experiment.
4. There were many similarities between Henderson's early landscapes and those of Notman.
5. The studio that Henderson opened in 1866 was close to his home.
6. Henderson gave up portraiture so that he could focus on taking photographs of scenery.
7. When Henderson began work for the Intercolonial Railway, the Montreal to Halifax line had been finished.
8. Henderson's last work as a photographer was with the Canadian Pacific Railway.

Questions 9–13
Complete the notes below.

Choose **ONE WORD ONLY** from the passage for each answer.
Write your answers in boxes **9-13** *on your answer sheet.*
Alexander Henderson
Early life

- was born in Scotland in 1831 – father was a **(9)** …………………….…
- trained as an accountant, emigrated to Canada in 1855

Start of a photographic career

- opened up a photographic studio in 1866
- took photos of city life, but preferred landscape photography
- people bought Henderson's photos because photography took up considerable time and the **(10)** ……………….…… was heavy
- the photographs Henderson sold were **(11)** ………….………… or souvenirs

Travelling as a professional photographer

- travelled widely in Quebec and Ontario in 1870s and 1880s
- took many trips along eastern rivers in a **(12)** ………….………..
- worked for Canadian railways between 1875 and 1897
- worked for CPR in 1885 and photographed the **(13)** ………….………… and the railway at Rogers Pass.

READING PASSAGE 2
You should spend about 20 minutes on **Questions 14–26** which are based on Reading Passage 2 below.

Back to the future of skyscraper design

Answers to the problem of excessive electricity use by skyscrapers and large public buildings can be found in ingenious but forgotten architectural designs of the 19th and early-20th centuries

A. *The Recovery of Natural Environments in Architecture* by Professor Alan Short is the culmination of 30 years of research and award-winning green building design by Short and colleagues in Architecture, Engineering, Applied Maths and Earth Sciences at the University of Cambridge. 'The crisis in building design is already here,' said Short. 'Policy makers think you can solve energy and building problems with gadgets. You can't. As global temperatures continue to rise, we are going to continue to squander more and more energy on keeping our buildings mechanically cool until we have run out of capacity.'

B. Short is calling for a sweeping reinvention of how skyscrapers and major public buildings are designed – to end the reliance on sealed buildings which exist solely via the 'life support' system of vast air conditioning units. Instead, he shows it is entirely possible to accommodate natural ventilation and cooling in large buildings by looking into the past, before the widespread introduction of air conditioning systems, which were 'relentlessly and aggressively marketed' by their inventors.

C. Short points out that to make most contemporary buildings habitable, they have to be sealed and air conditioned. The energy use and carbon emissions this generates is spectacular and largely unnecessary. Buildings in the West account for 40-50% of electricity usage, generating substantial carbon emissions, and the rest of the world is catching up at a frightening rate. Short regards glass, steel and air-conditioned skyscrapers as symbols of status, rather than practical ways of meeting our requirements.

D. Short's book highlights a developing and sophisticated art and science of ventilating buildings through the 19th and earlier-20th centuries, including the design of ingeniously ventilated hospitals. Of particular interest were those built to the designs of John Shaw Billings, including the first Johns

Hopkins Hospital in the US city of Baltimore (1873-1889). 'We spent three years digitally modelling Billings' final designs,' says Short. 'We put pathogens* in the airstreams, modelled for someone with tuberculosis (TB) coughing in the wards and we found the ventilation systems in the room would have kept other patients safe from harm.

* pathogens: microorganisms that can cause disease

E. 'We discovered that 19th-century hospital wards could generate up to 24 air changes an hour – that's similar to the performance of a modern-day, computer-controlled operating theatre. We believe you could build wards based on these principles now. Single rooms are not appropriate for all patients. Communal wards appropriate for certain patients – older people with dementia, for example – would work just as well in today's hospitals, at a fraction of the energy cost.' Professor Short contends the mindset and skill-sets behind these designs have been completely lost, lamenting the disappearance of expertly designed theatres, opera houses, and other buildings where up to half the volume of the building was given over to ensuring everyone got fresh air.

F. Much of the ingenuity present in 19th-century hospital and building design was driven by a panicked public clamouring for buildings that could protect against what was thought to be the lethal threat of miasmas – toxic air that spread disease. Miasmas were feared as the principal agents of disease and epidemics for centuries and were used to explain the spread of infection from the Middle Ages right through to the cholera outbreaks in London and Paris during the 1850s. Foul air, rather than germs, was believed to be the main driver of 'hospital fever', leading to disease and frequent death. The prosperous steered clear of hospitals.

While miasma theory has been long since disproved, Short has for the last 30 years advocated a return to some of the building design principles produced in its wake.

G. Today, huge amounts of a building's space and construction cost are given over to air conditioning. 'But I have designed and built a series of buildings over the past three decades which have tried to reinvent some of these ideas and then measure what happens. 'To go forward into our new low-energy, low-carbon future, we would be well advised to look back at design before our high-energy, high-carbon present appeared. What is surprising is what a rich legacy we have abandoned.'

H. Successful examples of Short's approach include the Queen's Building at De Montfort University in Leicester. Containing as many as 2,000 staff and students, the entire building is naturally ventilated, passively cooled and naturally lit, including the two largest auditoria, each seating more than 150 people. The award-winning building uses a fraction of the electricity of comparable buildings in the UK. Short contends that glass skyscrapers in London and around the world will become a liability over the next 20 or 30 years if climate modelling predictions and energy price rises come to pass as expected.

I. He is convinced that sufficiently cooled skyscrapers using the natural environment can be produced in almost any climate. He and his team have worked on hybrid buildings in the harsh climates of Beijing and Chicago – built with natural ventilation assisted by back-up air conditioning – which, surprisingly perhaps, can be switched off more than half the time on milder days and during the spring and autumn. Short looks at how we might reimagine the cities, offices and homes of the future. Maybe it's time we changed our outlook.

Questions 14–18

Reading Passage 2 has nine sections, **A-I**

Which section contains the following information?

Write the correct letter, **A–I***, in boxes* **14–18** *on your answer sheet.*

14 why some people avoided hospitals in the 19th century

15 a suggestion that the popularity of tall buildings is linked to prestige

16 a comparison between the circulation of air in a 19th-century building and modern standards

17 how Short tested the circulation of air in a 19th-century building

18 an implication that advertising led to the large increase in the use of air conditioning

Questions 19–26

Complete the summary below.

Choose **ONE WORD ONLY** from the passage for each answer.

Write your answers in boxes **19–26** *on your answer sheet.*

Ventilation in 19th-century hospital wards

Professor Alan Short examined the work of John Shaw Billings, who influenced the architectural **19**……………………… of hospitals to ensure they had good ventilation. He calculated that **20** ……………………… in the air coming from patients suffering from **21**……………………… would not have harmed other patients. He also found that the air in **22**………………………In hospitals could change as often as in a modern operating theatre. He suggests that energy use could be reduced by locating more patients in **23**……………………… areas. A major reason for improving ventilation in 19th-century hospitals was the demand from the **24**………………………for protection against bad air, known as **25** ……………………………… These were blamed for the spread of disease for hundreds of years, including epidemics of **26** ………………………in London and Paris in the middle of the 19th century.

READING PASSAGE 3

You should spend about 20 minutes on **Questions 27–40** which are based on Reading Passage 3 below.

Why companies should welcome disorder

A. Organisation is big business. Whether it is of our lives – all those inboxes and calendars – or how companies are structured, a multi-billion-dollar industry helps to meet this need. We have more strategies for time management, project management and self-organisation than at any other time in human history. We are told that we ought to organize our company, our home life, our week, our day and seven our sleep, all as a means to becoming more productive. Every week, countless seminars and workshops take place around the world to tell a paying public that they ought to structure their lives in order to achieve this. This rhetoric has also crept into the thinking of business leaders and entrepreneurs, much to the delight of self-proclaimed perfectionists with the need to get everything right. The number of business schools and graduates has massively increased over the past 50 years, essentially teaching people how to organise well.

B. Ironically, however, the number of businesses that fail has also steadily increased. Work-related stress has increased. A large proportion of workers from all demographics claim to be dissatisfied with the way their work is structured and the way they are managed. This begs the question: what has gone wrong? Why is it that on paper the drive for organisation seems a sure shot for increasing productivity, but in reality, falls well short of what is expected?

C. This has been a problem for a while now. Frederick Taylor was one of the forefathers of scientific management. Writing in the first half of the 20th century, he designed a number of principles to improve the efficiency of the work process, which have since become widespread in modern companies. So, the approach has been around for a while.

D. New research suggests that this obsession with efficiency is misguided. The problem is not necessarily the management theories or strategies we use to organise our work; it's the basic assumptions we hold in approaching how we work. Here it's the assumption that order is a necessary condition for productivity. This assumption has also fostered the idea that disorder must be detrimental to organizational productivity. The result is that businesses and people spend time and money organising themselves for the sake of organising, rather than actually looking at the end goal and usefulness of such an effort.

E. What's more, recent studies show that order actually has diminishing returns. Order does increase productivity to a certain extent, but eventually the usefulness of the process of organisation, and the benefit it yields, reduce until the point where any further increase in order reduces productivity. Some argue that in a business, if the cost of formally structuring something outweighs the benefit of doing it, then that thing ought not to be formally structured. Instead, the resources involved can be better used elsewhere.

F. In fact, research shows that, when innovating, the best approach is to create an environment devoid of structure and hierarchy and enable everyone involved to engage as one organic group. These environments can lead to new solutions that, under conventionally structured environments (filled with bottlenecks in term of information flow, power structures, rules, and routines) would never be reached.

G. In recent times companies have slowly started to embrace this disorganisation. Many of them embrace it in terms of perception (embracing the idea of disorder, as opposed to fearing it) and in terms of process (putting mechanisms in place to reduce structure).

For example, Oticon, a large Danish manufacturer of hearing aids, used what it called a 'spaghetti' structure in order to reduce the organisation's rigid hierarchies. This involved scrapping formal job titles and giving staff huge amounts of ownership over their own time and projects. This approach proved to be highly successful initially, with clear improvements in worker productivity in all facets of the business. In similar fashion, the former chairman of General Electric embraced disorganisation, putting forward the idea of the 'boundaryless' organisation. Again, it involves breaking down the barriers between different parts of a company and encouraging virtual collaboration and flexible working. Google and a number of other tech companies have embraced (at least in part) these kinds of flexible structures, facilitated by technology and strong company values which glue people together.

H. A word of warning to others thinking of jumping on this bandwagon: the evidence so far suggests disorder, much like order, also seems to have diminishing utility, and can also have detrimental effects on performance if overused. Like order, disorder should be embraced only so far as it is useful. But we should not fear it – nor venerate one over the other. This research also shows that we should continually question whether or not our existing assumptions work.

Questions 27–34
Reading Passage 3 has eight sections, **A–H.**
Choose the correct heading for each section from the list of headings below. Write the correct number, **i–ix**, in boxes **27–34** on your answer sheet.
List of Headings

i	Complaints about the impact of a certain approach
ii	Fundamental beliefs that are in fact incorrect
iii	Early recommendations concerning business activities
iv	Organisations that put a new approach into practice
v	Companies that have suffered from changing their approach

vi   What people are increasingly expected to do?
vii   How to achieve outcomes that are currently impossible
viii Neither approach guarantees continuous improvement
ix   Evidence that a certain approach can have more disadvantages that advantages

27 Section **A**
28 Section **B**
29 Section **C**
30 Section **D**
31 Section **E**
32 Section **F**
33 Section **G**
34 Section **H**

Questions 35–37
Complete the sentences below.
Choose **ONE WORD ONLY** from the passage for each answer.
*Write your answers in boxes **35–37** on your answer sheet.*
35 Numerous training sessions are aimed at people who feel they are not ………………….. enough.
36 Being organised appeals to people who regard themselves as ……………………………
37 Many people feel……………………………with aspects of their work.

Questions 38–40
Do the following statements agree with the information given in Reading Passage 3?
In boxes **38–40** on your answer sheet, write
TRUE if the statement agrees with the information **FALSE** if
the statement contradicts the information
NOT GIVEN if there is no information on this

38 Both businesses and people aim at order without really considering its value.
39 Innovation is most successful if the people involved have distinct roles.
40 Google was inspired to adopt flexibility by the success of General Electric.

ANSWER SHEET FOR THE DIAGNOSTIC READING COMPREHENSION TEST

Please put a tick in this box if you consented to participate in the research. What is your cohort (i.e., M01?)? _____

Your Name: _____ Your student ID: _____

CODE: *[insert 001-320]*

_____ [*tear off here*]_____

CODE: *[insert 001-320]*   *R5-EX*

1.	11.	21.	31.
2.	12.	22.	32.
3.	13.	23.	33.
4.	14.	24.	34.
5.	15.	25.	35.
6.	16.	26.	36.
7.	17.	27.	37.
8.	18.	28.	38.
9.	19.	29.	39.
10.	20.	30.	40.

Total: _____

APPENDIX B
Reading Comprehension Test

PRE-READING COMPREHENSION TEST BOOKLET

Reading Passage 1

You should spend about 20 minutes on Questions 1-13 which are based on Reading Passage 1 below.
Stadiums: past, present and future

A. Stadiums are among the oldest forms of urban architecture: vast stadiums where the public could watch sporting events were at the centre of western city life as far back as the ancient Greek and Roman Empires, well before the construction of the great medieval cathedrals and the grand 19th- and 20th-century railway stations which dominated urban skylines in later eras. Today, however, stadiums are regarded with growing scepticism. Construction costs can soar above £1 billion, and stadiums finished for major events such as the Olympic Games or the FIFA World Cup have notably fallen into disuse and disrepair. But this need not be the case. History shows that stadiums can drive urban development and adapt to the culture of every age. Even today, architects and planners are finding new ways to adapt the mono-functional sports arenas which became emblematic of modernisation during the 20th century.

B. The amphitheatre of Arles in southwest France, with a capacity of 25,000 spectators, is perhaps the best example of just how versatile stadiums can be. Built by the Romans in 90 ADS, it became a fortress with four towers after the fifth century and was then transformed into a village containing more than 200 houses. With the growing interest in conservation during the 19th century, it was converted back into an arena for the staging of bullfights, thereby returning the structure to its original use as a venue for public spectacles. Another example is the imposing arena of Verona in northern Italy, with space for 30,000 spectators, which was built 60 years before the Arles amphitheatre and 40 years before Rome's famous Colosseum. It has endured the centuries and is currently considered one of the world's prime sites for opera, thanks to its outstanding acoustics.

C. The area in the centre of the Italian town of Lucca, known as the Piazza dell'Anfiteatro, is yet another impressive example of an amphitheatre becoming absorbed into the fabric of the city. The site evolved in a similar way to Arles and was progressively filled with buildings from the Middle Ages until the 19th century, variously used as houses, a salt depot, and a prison. But rather than reverting to an arena, it became a market square, designed by Romanticist architect Lorenzo Nottolini. Today, the ruins of the amphitheatre remain embedded in the various shops and residences surrounding the public square.

D. There are many similarities between modern stadiums and the ancient amphitheatres intended for games. But some of the flexibility was lost at the beginning of the 20th century, as stadiums were developed using new products such as steel and reinforced concrete and made use of bright lights for night-time matches. Many such stadiums are situated in suburban areas, designed for sporting use only and surrounded by parking lots. These factors mean that they may not be as accessible to the general public, require more energy to run and contribute to urban heat.

E. But many of today's most innovative architects see scope for the stadium to help improve the city. Among the current strategies, two seem to be having particular success: the stadium as an urban hub, and as a power plant. There's a growing trend for stadiums to be equipped with public spaces and services that serve a function beyond sport, such as hotels, retail outlets, conference centres, restaurants and bars, children's playgrounds, and green space. Creating mixed-use developments such as this reinforces compactness and multi-functionality, making more efficient use of land and helping to regenerate urban spaces. This opens the space up to families and a wider cross-section of society, instead of catering only to sportspeople and supporters. There have been many examples of this in the

UK: the mixed-use facilities at Wembley and Old Trafford have become a blueprint for many other stadiums in the world.

F. The phenomenon of stadiums as power stations has arisen from the idea that energy problems can be overcome by integrating interconnected buildings by means of a smart grid, which is an electricity supply network that uses digital communications technology to detect and react to local changes in usage, without significant energy losses. Stadiums are ideal for these purposes, because their canopies have a large surface area for fitting photovoltaic panels and rise high enough (more than 40 metres) to make use of micro wind turbines. Freiburg Mage Solar Stadium in Germany is the first of a new wave of stadiums as power plants, which also includes the Amsterdam Arena and the Kaohsiung Stadium. The latter, inaugurated in 2009, has 8,844 photovoltaic panels producing up to 1.14 GWh of electricity annually. This reduces the annual output of carbon dioxide by 660 tons and supplies up to 80 percent of the surrounding area when the stadium is not in use. This is proof that a stadium can serve its city and have a decidedly positive impact in terms of reduction of CO2 emissions.

G. Sporting arenas have always been central to the life and culture of cities. In every era, the stadium has acquired new value and uses from military fortress to residential village, public space to theatre and most recently a field for experimentation in advanced engineering. The stadium of today now brings together multiple functions, thus helping cities to create a sustainable future.

Questions 1–4

The reading passage has seven sections, **A–G.**
Which section contains the following information?
Write the correct letter, **A–G**, in boxes on your answer sheet.

1. _____ a mention of negative attitudes towards stadium building projects.
2. _____ figures demonstrating the environmental benefits of a certain stadium.
3. _____ examples of the wide range of facilities available at some new stadiums
4. _____ reference to the disadvantages of the stadium built during a certain era.

Questions 5–9

Complete the summary below.

Roman amphitheatres

The Roman stadiums of Europe have proved very versatile. The amphitheatre of Arles, for example, was converted first into a (5) _____, then into a residential area and finally into an arena where spectators could watch (6) _____ Meanwhile, the arena in Verona, one of the oldest Roman amphitheatres, is famous today as a venue where (7) _____ is performed. The site of Lucca's amphitheatre has also been used for many purposes over the centuries, including the storage of (8) _____. It is now a market square with (9) _____ and homes incorporated into the remains of the Roman amphitheatre.

Questions 10 and 11

Choose **TWO** letters, **A-E.**
Write the correct letters in boxes 10 and 11 on your answer sheet.

When comparing twentieth-century stadiums to ancient amphitheatres in Section **D**, which **TWO** negative features does the writer mention?
    A. They are less imaginatively designed.
    B. They are less spacious.

C. They are in less convenient locations.
D. They are less versatile.
E. They are made of less durable materials.

Questions 12 and 13
Choose *TWO* letters, **A-E.**
Write the correct letters in boxes 12 and 13 on your answer sheet.

Which *TWO* advantages of modern stadium design does the writer mention?
    A. Offering improved amenities for the enjoyment of sports events
    B. Bringing community life back into the city environment
    C. Facilitating research into solar and wind energy solutions
    D. Enabling local residents to reduce their consumption of electricity
    E. Providing a suitable site for the installation of renewable power generators

Reading Passage 2
You should spend about 20 minutes on Questions 14–26 which are based on Reading Passage 2 below.

Does education fuel economic growth?
A. Over the last decade, a huge database about the lives of southwest German villagers between 1600 and 1900 has been compiled by a team led by Professor Sheilagh Ogilvie at Cambridge University's Faculty of Economics. It includes court records, guild ledgers, parish registers, <u>village</u> censuses, tax lists and – the most recent addition – 9,000 handwritten inventories listing over a million personal possessions belonging to ordinary women and men across three centuries. Ogilvie, who discovered the inventories in the archives of two German communities 30 years ago, believes they may hold the answer to a conundrum that has long puzzled economists: the lack of evidence for a causal link between education and a country's economic growth.
B. As Ogilvie explains, 'Education helps us to work more productively, invent better technology, and earn more … surely it must be critical for economic growth? But, if you look back through history, there's no evidence that having a high literacy rate made a country industrialise earlier.' Between 1600 and 1900, England had only mediocre literacy rates by European standards, yet its economy grew fast, and it was the first country to industrialise. During this period, Germany and Scandinavia had excellent literacy rates, but their economies grew slowly, and they industrialised late. 'Modern cross-country analyses have also struggled to find evidence that education causes economic growth, even though there is plenty of evidence that growth increases education,' she adds.
C. In the handwritten inventories that Ogilvie is analysing are the belongings of women and men at marriage, remarriage and death. From badger skins to Bibles, sewing machines to scarlet bodices – the villagers' entire worldly goods are included. Inventories of agricultural equipment and craft tools reveal economic activities; ownership of books and education related objects like pens and slates suggests how people learned. In addition, the tax lists included in the database record the value of farms, workshops, assets and debts; signatures and people's estimates of their age indicate literacy and numeracy levels; and court records reveal obstacles (such as the activities of the guilds*) that stifled industry. Previous studies usually had just one way of linking education with economic growth – the presence of schools and printing presses, perhaps, or school enrolment, or the ability to sign names. According to Ogilvie, the database provides multiple indicators for the same individuals, making it possible to analyse links between literacy, numeracy, wealth, and industriousness, for individual women and men over the long term.

D. Ogilvie and her team have been building the vast database of material possessions on top of their full demographic reconstruction of the people who lived in these two German communities. 'We can follow the same people – and their descendants – across 300 years of educational and economic change,' she says. Individual lives have unfolded before their eyes. Stories like that of the 24-year-olds Ana Regina and Magdalena Riethmiillerin, who were chastised in 1707 for reading books in church instead of listening to the sermon. 'This tells us they were continuing to develop their reading skills at least a decade after leaving school,' explains Ogilvie. The database also reveals the case of Juliana Schweickherdt, a 50-year-old spinster living in the small Black Forest community of Wildberg, who was reprimanded in 1752 by the local weavers' guild for 'weaving cloth and combing wool, counter to the guild ordinance'. When Juliana continued taking jobs reserved for male guild members, she was summoned before the guild court and told to pay a fine equivalent to one third of a servant's annual wage. It was a small act of defiance by today's standards, but it reflects a time when laws in Germany and elsewhere regulated people's access to labour markets. The dominance of guilds not only prevented people from using their skills, but also held back even the simplest industrial innovation.

E. The data-gathering phase of the project has been completed and now, according to Ogilvie, it is time 'to ask the big questions. One way to look at whether education causes economic growth is to 'hold wealth constant'. This involves following the lives of different people with the same level of wealth over a period of time. If wealth is constant, it is possible to discover whether education was, for example, linked to the cultivation of new crops, or to the adoption of industrial innovations like sewing machines. The team will also ask what aspect of education helped people engage more with productive and innovative activities. Was it, for instance, literacy, numeracy, book ownership, years of schooling? Was there a threshold level – a tipping point – that needed to be reached to affect economic performance?

F. Ogilvie hopes to start finding answers to these questions over the next few years. One thing is already clear, she says: the relationship between education and economic growth is far from straightforward. 'German-speaking central Europe is an excellent laboratory for testing theories of economic growth,' she explains. Between 1600 and 1900, literacy rates and book ownership were high and yet the region remained poor. It was also the case that local guilds and merchant associations were extremely powerful and legislated against anything that undermined their monopolies. In villages throughout the region, guilds blocked labour migration and resisted changes that might reduce their influence. 'Early findings suggest that the potential benefits of education for the economy can be held back by other barriers, and this has implications for today,' says Ogilvie. 'Huge amounts are spent improving education in developing countries, but this spending can fail to deliver economic growth if restrictions block people – especially women and the poor – from using their education in economically productive ways. If economic institutions are poorly set up, for instance, education can't lead to growth.'

Questions 14–18
Does education fuel economic growth? Reading Passage has six sections, A–F.
Which section contains the following information?
*Write the correct letter, **A-F**, in boxes 14–18 on your answer sheet.*

14. an explanation of the need for research to focus on individuals with a fairly consistent income
15. examples of the sources the database has been compiled from
16. an account of one individual's refusal to obey an order
17. a reference to a region being particularly suited to research into the link between education and economic growth
18. examples of the items included in a list of personal possessions

Questions 19–22

Complete the summary below. Choose ONE WORD from the passage for each answer.
Write your answers in boxes 19-22 on your answer sheet

Demographic reconstruction of two German communities

The database that Ogilvie and her team has compiled sheds light on the lives of a range of individuals, as well as those of their 19. ……………………………….…., over a 300-year period. For example, Ana Regina and Magdalena Riethmullerin were reprimanded for reading while they should have been paying attention to a 20.………….…….……….……… There was also Juliana Schweickherdt, who came to the notice of the weavers' guild in the year 1752 for breaking guild rules. As a punishment, she was later given   a 21. ………….……….……….……… Cases like this illustrate how the guilds could prevent 22. …….….…….………….. and stop skilled people from working.

Questions 23 and 24

Choose TWO letters, A–E.
Write the correct letters in boxes 23 and 24 on your answer sheet.

Which **TWO** of the following statements does the writer make about literacy rates in Section B?
A. Very little research has been done into the link between high literacy rates and improved earnings.
B. Literacy rates in Germany between 1600 and 1900 were very good.
C. There is strong evidence that high literacy rates in the modern world result in economic growth.
D. England is a good example of how high literacy rates helped a country industrialise.
E. Economic growth can help to improve literacy rates.

Questions 25 and 26

Choose TWO letters, A-E.
Write the correct letters in boxes 25 and 26 on your answer sheet.

Which TWO of the following statements does the writer make in Section F about guilds in German-speaking Central Europe between 1600 and 1900?
A. They helped young people to learn a skill.
B. They were opposed to people moving to an area for work.
C. They kept better records than guilds in other parts of the world.
D. They opposed practices that threatened their control over a trade.
E. They predominantly consisted of wealthy merchant

ANSWER SHEET FOR THE PRE - READING COMPREHENSION TEST

Please put a tick in this box if you consented to participate in the research.

What is your cohort (i.e., M01?)? _____

Your Name: _____*Your student ID:* _____

CODE: *[insert 001-320]*

--[*tear off here*] -----------

 CODE: *[insert 001-320] R1-EX*

1.	11.	21.	Marks:
2.	12.	22.	
3.	13.	23.	
4.	14.	24.	
5.	15.	25.	
6.	16.	26.	
7.	17.		
8.	18.		
9.	19.		
10.	20.		

THANK YOU!

POST-READING COMPREHENSION TEST BOOKLET

Reading Passage 1

You should spend about 20 minutes on Questions 1–13 which are based on Reading Passage 1 below.

Palm oil

A. Palm oil is an edible oil derived from the fruit of the African oil palm tree and is currently the most consumed vegetable oil in the world. It's almost certainly in the soap we wash with in the morning, the sandwich we have for lunch, and the biscuits we snack on during the day. Why is palm oil so attractive for manufacturers? Primarily because its unique properties – such as remaining solid at room temperature – make it an ideal ingredient for long-term preservation, allowing many packaged foods on supermarket shelves to have 'best before' dates of months, even years, into the future

B. Many farmers have seized the opportunity to maximise the planting of oil palm trees. Between 1990 and 2012, the global land area devoted to growing oil palm trees grew from 6 to 17 million hectares, now accounting for around ten percent of total cropland in the entire world. From a mere two million tons of palm oil being produced annually globally 50 years ago, there are now around 60 million tons produced every single year, a figure looking likely to double or even triple by the middle of the century.

C. However, there are multiple reasons why conservationists cite the rapid spread of oil palm plantations as a major concern. There are countless news stories of deforestation, habitat destruction and dwindling species populations, all as a direct result of land clearing to establish oil palm tree monoculture on an industrial scale, particularly in Malaysia and Indonesia. Endangered species – most famously the Sumatran orangutan, but also rhinos, elephants, tigers, and numerous other fauna – have suffered from the unstoppable spread of oil palm plantations

D. Palm oil is surely one of the greatest threats to global biodiversity,' declares Dr Farnon Ellwood of the University of the West of England, Bristol. 'Palm oil is replacing rainforest, and rainforest is where all the species are. That's a problem.' This has led to some radical questions among environmentalists, such as whether consumers should try to boycott palm oil entirely. Meanwhile Bhavani Shankar, Professor at London's School of Oriental and African Studies, argues, 'It's easy to say that palm oil is the enemy and we should be against it. It makes for a more dramatic story, and it's very intuitive. But given the complexity of the argument, I think a much more nuanced story is closer to the truth.'

E. One response to the boycott movement has been the argument for the vital role palm oil plays in lifting many millions of people in the developing world out of poverty. Is it desirable to have palm oil boycotted, replaced, eliminated from the global supply chain, given how many low-income people in developing countries depend on it for their livelihoods? How best to strike a utilitarian balance between these competing factors has become a serious bone of contention.

F. Even the deforestation argument isn't as straightforward as it seems. Oil palm plantations produce at least four and potentially up to ten times more oil per hectare than soybean, rapeseed, sunflower, or other competing oils. That immensely high yield- which is predominantly what makes it so profitable – is potentially also an ecological benefit. If ten times more palm oil can be produced from a patch of land than any competing oil, then ten times more land would need to be cleared in order to produce the same volume of oil from that competitor.

As for the question of carbon emissions, the issue really depends on what oil palm trees are replacing. Crops vary in the degree to which they sequester carbon – in other words, the amount of carbon they capture from the atmosphere and store within the plant. The more carbon a plant sequesters, the more it reduces the effect of climate change. As Shankar explains: '[Palm oil production] actually sequesters more carbon in some ways than other alternatives. […] Of course,

if you're cutting down virgin forest it's terrible – that's what's happening in Indonesia and Malaysia, it's been allowed to get out of hand. But if it's replacing rice, for example, it might actually sequester more carbon.'

G. The industry is now regulated by a group called the Roundtable on Sustainable Palm Oil (RSPO), consisting of palm growers, retailers, product manufacturers, and other interested parties. Over the past decade or so, an agreement has gradually been reached regarding standards that producers of palm oil have to meet in order for their product to be regarded as officially 'sustainable'. The RSPO insists upon no virgin forest clearing, transparency, and regular assessment of carbon stocks, among other criteria. Only once these requirements are fully satisfied is the oil allowed to be sold as certified sustainable palm oil (CSPO). Recent figures show that the RSPO now certifies around 12 million tons of palm oil annually, equivalent to roughly 21 percent of the world's total palm oil production.

H. There is even hope that oil palm plantations might not need to be such sterile monocultures, or 'green deserts', as Ellwood describes them. New research at Ellwood's lab hints at one plant which might make all the difference. The bird's nest fern *(Asplenium nidus)* grows on trees in an epiphytic fashion (meaning it's dependent on the tree only for support, not for nutrients), and is native to many tropical regions, where as a keystone species it performs a vital ecological role. Ellwood believes that reintroducing the bird's nest fern into oil palm plantations could potentially allow these areas to recover their biodiversity, providing a home for all manner of species, from fungi and bacteria to invertebrates such as insects, amphibians, reptiles and even mammals.

Questions 1–7
Palm Oil Reading Passage has eight sections, A–H.
Which section contains the following information?
Write the correct letter, **A–H,** in boxes 14–20 on your answer sheet.

1. examples of a range of potential environmental advantages of oil palm tree cultivation
2. description of an organisation which controls the environmental impact of palm oil production
3. examples of the widespread global use of palm oil
4. reference to a particular species which could benefit the ecosystem of oil palm plantations
5. figures illustrating the rapid expansion of the palm oil industry
6. an economic justification for not opposing the palm oil industry
7. examples of creatures badly affected by the establishment of oil palm plantations

Questions 8–9
Choose TWO letters, A–E.
Write the correct letters in boxes 21 and 22 on your answer sheet.

Which **TWO** statements are made about the Roundtable on Sustainable Palm Oil (RSPO)?
A. Its membership has grown steadily over the course of the last decade.
B. It demands that certified producers be open and honest about their practices.
C. It took several years to establish its set of criteria for sustainable palm oil certification.
D. Its regulations regarding sustainability are stricter than those governing other industries.
E. It was formed at the request of environmentalists concerned about the loss of virgin forests.

Questions 10–13
Complete the sentences below.

Choose NO MORE THAN TWO WORDS from the passage for each answer.
Write your answers in boxes 23–26 on your answer sheet.

10. One advantage of palm oil for manufacturers is that it stays ……………………………… even when not refrigerated.
11. The ………………………………………… is the best known of the animals suffering habitat loss as a result of the spread of oil palm plantations.
12. As one of its criteria for the certification of sustainable palm oil, the RSPO insists that growers check ………………………………………… on a routine basis.
13. Ellwood and his researchers are looking into whether the bird's nest fern could restore ………………………………………… in areas where oil palm trees are grown.

Reading Passage 2
You should spend about 20 minutes on Questions 14–26 which are based on Reading Passage 2 below.

Climate change reveals ancient artefacts in Norway's glaciers

A. Well above the tree line in Norway's highest mountains, ancient fields of ice are shrinking as Earth's climate warms. As the ice has vanished, it has been giving up the treasures it has preserved in cold storage for the last 6,000 years- items such as ancient arrows and skis from Viking Age* traders. And those artefacts have provided archaeologists with some surprising insights into how ancient Norwegians made their livings.

B. Organic materials like textiles and hides are relatively rare finds at archaeological sites. This is because unless they're protected from the microorganisms that cause decay, they tend not to last long. Extreme cold is one reliable way to keep artefacts relatively fresh for a few thousand years, but once thawed out, these materials experience degradation relatively swiftly.

With climate change shrinking ice cover around the world, glacial archaeologists need to race the clock to find newly revealed artefacts, preserve them, and study them. If something fragile dries and is windblown it might very soon be lost to science, or an arrow might be exposed and then covered again by the next snow and remain well-preserved. The unpredictability means that glacial archaeologists have to be systematic in their approach to fieldwork.

C. Over a nine-year period, a team of archaeologists, which included Lars Pilo of Oppland County Council, Norway, and James Barrett of the McDonald Institute for Archaeological Research, surveyed patches of ice in Oppland, an area of south-central Norway that is home to some of the country's highest mountains. Reindeer once congregated on these icy patches in the later summer months to escape biting insects, and from the late Stone Age, hunters followed. In addition, trade routes threaded through the mountain passes of Oppland, linking settlements in Norway to the rest of Europe.The slow but steady movement of glaciers tends to destroy anything at their bases, so the team focused on stationary patches of ice, mostly above 1,400 metres. That ice is found amid fields of frost-weathered boulders, fallen rocks, and exposed bedrock that for nine months of the year is buried beneath snow. 'Fieldwork is hard work – hiking with all our equipment, often camping on permafrost – but very rewarding. You're rescuing the archaeology, bringing the melting ice to wider attention, discovering a unique environmental history, and really connecting with the natural environment,' says Barrett.

D. At the edges of the contracting ice patches, archaeologists found more than 2,000 artefacts, which formed a material record that ran from 4,000 BCE to the beginnings of the Renaissance in the 14th century. Many of the artefacts are associated with hunting. Hunters would have easily misplaced arrows and they often discarded broken bows rather than take them all the way home. Other items could have

been used by hunters traversing the high mountain passes of Oppland: all-purpose items like tools, skis, and horse tack.

E. Barrett's team radiocarbon-dated 153 of the artefacts and compared those dates to the timing of major environmental changes in the region- such as periods of cooling or warming-and major social and economic shifts- such as the growth of farming settlements and the spread of international trade networks leading up to the Viking Age. They found that some periods had produced lots of artefacts, which indicates that people had been pretty active in the mountains during those times. But there were few or no signs of activity during other periods.

F. What was surprising, according to Barrett, was the timing of these periods. Oppland's mountains present daunting terrain and in periods of extreme cold, glaciers could block the higher mountain passes and make travel in the upper reaches of the mountains extremely difficult. Archaeologists assumed people would stick to lower elevations during a time like the Late Antique Little Ice Age, a short period of deeper-than-usual cold from about 536-600 CE. But it turned out that hunters kept regularly venturing into the mountains even when the climate turned cold, based on the amount of stuff they had apparently dropped there. 'Remarkably, though, the finds from the ice may have continued through this period, perhaps suggesting that the importance of mountain hunting increased to supplement failing agricultural harvests in times of low temperatures,' says Barrett. A colder turn in the Scandinavian climate would likely have meant widespread crop failures, so more people would have depended on hunting to make up for those losses.

G. Many of the artefacts Barrett's team recovered date from the beginning of the Viking Age, the 700s through to the 900s CE. Trade networks connecting Scandinavia with Europe and the Middle East were expanding around this time. Although we usually think of ships when we think of Scandinavian expansion, these recent discoveries show that plenty of goods travelled on overland routes, like the mountain passes of Oppland. And growing Norwegian towns, along with export markets, would have created a booming demand for hides to fight off the cold, as well as antlers to make useful things like combs. Business must have been good for hunters.

H. Norway's mountains are probably still hiding a lot of history- and prehistory- in remote ice patches. When Barrett's team looked at the dates for their sample of 153 artefacts, they noticed a gap with almost no artefacts from about 3,800 to 2,200 BCE. In fact, archaeological finds from that period are rare all over Norway. The researchers say that could be because many of those artefacts have already disintegrated or are still frozen in the ice. That means archaeologists could be extracting some of those artefacts from retreating ice in years to come.

Questions 14–19
Reading Passage 2 has eight sections, **A–H**.
Which section contains the following information?
Write the correct letter, **A–H**, in boxes **14–19** on your answer sheet.

14. an explanation for weapons being left behind in the mountains
15. a reference to the physical difficulties involved in an archaeological expedition
16. an explanation of why less food may have been available
17. a reference to the possibility of future archaeological discoveries
18. examples of items that would have been traded
19. a reference to the pressure archaeologists is under to work quickly

Questions 20–22
Complete the summary below.

Choose ONE WORD ONLY from the passage for each answer.
Write your answers in boxes 20-22 on your answer sheet.

Interesting finds at an archaeological site

Organic materials such as animal skins and textiles are not discovered very often at archaeological sites. They have little protection against **20.** …………………, which means that they decay relatively quickly. But this is not always the case. If temperatures are low enough, fragile artefacts can be preserved for thousands of years.

A team of archaeologists have been working in the mountains in Oppland in Norway to recover artefacts revealed by shrinking ice cover. In the past, there were trade routes through these mountains and **21.** ……………….. gathered there in the summer months to avoid being attacked by **22.** …………………….. on lower ground. The people who used these mountains left things behind and it is those objects that are of interest to archaeologists.

Questions 23 and 24
Choose **TWO** letters, **A–E.**
Write the correct letters in boxes **23** and **24** on your answer sheet.
Which **TWO** of the following statements does the writer make about the discoveries of Barrett's team?

A. Artefacts found in the higher mountain passes were limited to skiing equipment.
B. Hunters went into the mountains even during periods of extreme cold.
C. The number of artefacts from certain time periods was relatively low.
D. Radiocarbon dating of artefacts produced some unreliable results.
E. More artefacts were found in Oppland than at any other mountain site.

Questions 25 and 26
Choose **TWO** letters, **A–E**.
Write the correct letters in boxes **25** and **26** on your answer sheet.
Which **TWO** of the following statements does the writer make about the Viking Age?

A. Hunters at this time benefited from an increased demand for goods.
B. The beginning of the period saw the greatest growth in the wealth of Vikings.
C. Vikings did not rely on ships alone to transport goods.
D. Norwegian towns at this time attracted traders from around the world.
E. Vikings were primarily interested in their trading links with the Middle East.

ANSWER SHEET FOR THE POST- READING COMPREHENSION TEST

Please put a tick in this box if you consented to participate in the research.

What is your cohort (i.e., M01?)? _____

Your Name: _____ Your student ID: _____
CODE: [insert 001-320]

---[*tear off here*] -----------

CODE: [insert 001-320] R3-EX

1.	11.	21.	Marks:
2.	12.	22.	
3.	13.	23.	
4.	14.	24.	
5.	15.	25.	
6.	16.	26.	
7.	17.		
8.	18.		
9.	19.		
10.	20.		

THANK YOU!

APPENDIX C
EFL Flipped Classroom Questionnaire

Participation in this survey is entirely voluntary and anonymous. If you earlier indicated your consent to participate in this survey. Completion and submission of the survey is taken as evidence of your consent to participate in the survey part of the project.

This section is to investigate your perceptions about the EFL flipped reading classroom. Each statement has a 7-point scale. Please tick the box which represents your genuine response.

Items	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1. I would register into flipped classrooms for other subjects in future.							
2. I was eager to do the pre-class activities to get ready for the class.							
3. The structure of the flipped classroom motivated me to take the subject more seriously and spend time learning English reading skills.							
4. I felt more motivated to learn English reading skills because of the flipped classroom.							

5. I have developed self-study skills thanks to the flipped classroom activities.							
6. The flipped classroom gave me more time to practise English reading skills in class.							
7. Overall, I am satisfied with the flipped classroom experience.							
8. I spent more time and made more effort than usual on my flipped classroom learning activities.							
9. I had the chance to participate in the class activities more in the flipped classroom than the traditional classroom.							
10. The flipped classroom gave me more opportunities to interact with other students.							

11. This flipped reading course was more engaging than traditional classroom instructions.						
12. I could focus well during the flipped classroom.						
13. I participated actively in the flipped classroom.						
14. I learned more and better in the flipped classroom than traditional classes.						
15. The flipped classroom helped me use the reading strategies more effectively.						
16. The flipped classroom helped me learn new vocabulary more effectively.						
17. The flipped classroom helped me improve my reading comprehensio n.						

Because I have participated in the flipped English reading classroom:							
18. I found it convenient and easy to study English at home.							
19. I will set up my own learning goals and I know how to achieve them.							
20. I am confident to ask the instructor whenever I have questions.							
21. When I have problems, I will discuss them with peers and find support from them.							
22. I am a more self-directed and independent learner.							

APPENDIX D
Focus Group Questions

1. Think about your experience of the flipped classroom in comparison with your regular classes:
   - Effectiveness
     - Has the flipped classroom been more effective than regular teaching method for you? How? or why?
   - Cognitive Load
     - Did the learning materials (i.e., videos about reading strategies and tips, vocabulary Quizlet links, teacher-made video lectures, the textbook) make it easier for you to learn in this reading class? Why?
     - Did the preparatory tasks (i.e., preparation in advance at home, Google Classroom platform) make your learning easier? How? and why?
     - Did the in-class activities make your learning easier? How? and why?
     - Did the combination of pre-class work plus in-class activities make it easier for you to learn? Why/why does it not help or make no difference?
     - Was it easier for you to learn new vocabulary in this course? Why?
     - Self-paced learning is a learning method which allows students to accomplish the task at their own speed and take control of their own learning. How did this work for you in this reading course?
   - Learning motivation
     - Has the flipped classroom method contributed to your sense of belonging or relatedness to others in this reading course? How? or why?
     - How has the flipped classroom method helped your learning (e.g., manage your learning, having sense of independence and freedom)?
     - How has the flipped classroom method helped your vocabulary knowledge and reading comprehension?
     - Has the flipped classroom method changed your motivation to learn English reading skills?
   - Learning engagement
     - Has the time and effort you put into learning changed during in this reading course? If so, why?
2. What would you like to see done differently in this reading course?
3. Do you have any other things to share about your experience with flipped classroom learning in this course?