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Flipping the flipped class: using online collaboration to enhance EFL students' oral learning skills

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Abstract

Extensive research on the in-class synchronous learning aspect of the flipped classroom approach (FCA) has rendered favorable results the past decade. However, less attention has been placed on the out-of-class component of the FCA, specifically the drawbacks that may occur, such as low student accountability while watching the pre-assigned video lessons, thus coming to class unprepared, and not using the latest online technological to its full potential. This study addresses these issues by examining the impact of creating a more synchronous/collaborative online out-of-class flipped-class component. Using the latest online technology, a newly proposed flipped group (PFG) was created and then compared to a regular flipped group (RFG), and a traditional class (TC) over 14 weeks. Fifty-four undergraduate business students from a university in Taiwan participated in the study. Mock International English Language Testing System (IELTS) oral pre/post-tests were given to all participants to investigate which teaching approach is more effective. The results showed the PFG significantly improved overall on average, out-performing the RFG. Surprisingly, the TC significantly performed better than the RFG. In addition, significant differences and correlations also occurred between the PFG and RFG students' online learning behaviors and objective performances, such as the time spent online viewing the assigned video lessons and the effects on their quiz and final grade scores. This study's findings support creating a more synchronous/collaborative online learning environment can enhance the out-of-class component of a FCA, and therefore help improve student's overall oral/aural EFL learning.

Keywords: EFL learning, Flipped classroom approach, Online technology, Oral skills, Synchronous/collaborative learning

Introduction

Considerable scrutiny has been placed on higher educational institutes globally to improve the quality of education due to growing demand from parents and students for more productive programs and effective teaching methods to attain better student outcomes (O'Flaherty & Phillips, 2015). For instance, traditional lecturing models cramming hundreds of students into one class despite of economic benefits is no longer adequate and acceptable for the average digital-aged millennial and post-millennial student

(Pikhart & Klímová, 2020; Sixto-García & Duarte-Melo, 2020). In terms of language learning and most traditional language classrooms, specifically English as a foreign language (EFL) classrooms in Asia, the teacher-centered approach and rote learning has been the norm, and less emphasis has been placed on interactive student-centered learning in the language-learning process (McLean, 2012; Yeşilçınar, 2019). To enhance traditional educational models, the move towards the utilization of digital technology and newer pedagogical approaches in higher education encompassing new-aged technology involving online, blended and flipped learning paradigms have become increasingly popular globally (Chen Hsieh et al., 2017; Roehl et al., 2013; Yeşilçınar, 2019). Today's students are tech-savvy, multi-taskers, and digitally literate, thus favor and feel more comfortable towards innovated and stimulating teaching styles encompassing the latest technology in the classroom (Webb & Doman, 2020). As a result, this places pressure on higher academic institutes to rethink traditional approaches to education due to a higher preference for experimental and active learning environments involving the latest technology (Loucky & Ware, 2017; Sankey & Hunt, 2017; Sixto-García & Duarte-Melo, 2020). In response, the flipped model has proven to be a more flexible learning environment allowing English language educators and learners to fully grasp technology, thus encompassing a more student-centered approach, coupled with online learning (Chen Hsieh et al., 2017; Pikhart & Klímová, 2020; von Lindeiner-Stráský et al., 2020).

Consequently, the flipped classroom approach (FCA) has received heightened attention and increased satisfaction over the past decade (Loucky & Ware, 2017; Schultz et al., 2014), along with increased usage in higher education and language learning, specifically in Asia (Turan & Akdag-Cimen, 2020). Simultaneously, much emphasis and research has been focused on the “in-class” synchronous/collaborative learning aspect of the FCA, thus yielding overall positive results and favorable advantages among educators and students. However, according to Jiang et al.'s (2020) scoping review on the FCA, not only has there been lack of studies done on the FCA and EFL learning education, but even less focus has been placed on the out-of-class asynchronous learning component of the FCA and the problems that occur. For instance, Lai and Hwang (2016) found that students involved in the FCA needed more guidance and assistance with the pre-class self-learning due to poor management skills while watching the video lessons, and one of the greatest challenge for instructors is to ensure that the students assiduously learn the assigned pre-class materials (Wang & Qi, 2018). In other words, some students have low self-regulated behaviors (Rahman et al., 2015; Sletten, 2017), some students have difficulties watching all the videos (Chuang et al., 2018; He et al., 2016; Kim et al., 2014; Taylor, 2015), and the most common problem and major concern reported by educators is students coming to class unprepared (Bristol, 2014; Chen et al., 2014; Chuang et al., 2018), which diminishes the advantages that the FCA in-class synchronous learning activities provide (Akçayır & Akçayır, 2018; Sayeski et al., 2015).

In addition, although most educators integrate technology into the flipped classroom out-of-class learning aspect, mostly for course content delivery (i.e., video lessons) and progress assessment (i.e., content quizzes), most educators have yet to harness the full advantages current technology offers to increase students' preparedness for the FCA in-class learning activities (Wang & Qi, 2018). Furthermore, Jiang et al. (2020) claims technology is not fully being used to enhance pre-class peer to peer, student–teacher

interaction/content-interaction. Specifically, for EFL learning, rooted and firmly supported by socio-cultural constructivism, interaction is an essential feature for enhancing language learning (Powell & Kalina, 2009). In turn, educators using the FCA have taken full advantage of this by incorporating synchronous/collaborative learning activities in-class; however, for the out-of-class facet of the flipped classroom very few educators have yet to fully utilize technology to create more online interactive commutative-learning environments (Akçayır & Akçayır, 2018; Jiang et al., 2020). In response, some educators/researchers such as Yang et al. (2016) and Loucky and Ware (2017) have identified some of these drawbacks—that students lacked strong teacher and social-collaborative presences while watching the videos alone at home—and therefore proposed more online collaborative learning methods to enhance a greater social-collaborative presence during the out-of-class sessions of a flipped classroom. In addition, because today's students are digital natives, fully immersed in the latest technology, they are more motivated and inclined to socially engage online via social networking platforms and learning management systems (LMSs) (Zainuddin et al., 2019), which more attention should be placed on fostering a more synchronous/collaborative learning framework enabling students to master the preassigned content outside the classroom (Wang & Qi, 2018).

To address these issues, the purpose of this study is to improve the out-of-class component of the FCA, this empirical study proposes flipping the current out-of-class asynchronous session and implement a more synchronous/collaborative learning model by creating small online groups allowing for real-time interaction between participants while watching the pre-assigned flipped-video lessons. In addition, we also examined the relationship between the students' learning performances and their online learning behaviors in the out-of-class component. To therefore gain a better understanding if this newly proposed flipped group (PFG) can yield positive results thus lead to better academic oral English learning performances, online learning behaviors, and objective performances than a regular flipped group (RFG) and traditional class (TC), a comparison of three different types of teaching methods was conducted to investigate the following research questions:

1. Which teaching method—(1) the PFG, (2) the RFG, or (3) the TC—yields the most significant results in terms of the students' oral English learning performance?
2. Are there any significant differences between the PFG and RFG students' online learning behaviors (total online log-on times) and objective performances (online quiz and final grade scores)?
3. Are there any significant relationships that occur with both PFG and RFG students' online learning behaviors (amount of time spent online viewing the assigned weekly video lessons, PFG group video-watching time, and PFG total online log-on times) and their objective performances (online quiz, post-test, and final grade scores)?

Literature review

In order to address and further explore the aforementioned research gaps and issues regarding the FCA the following review will focus first on a brief overview of the FCA and studies related to a theoretical framework of online collaborative learning; followed

by research regarding the FCA and EFL learning; and finally, studies related to video collaboration and online synchronicity.

The FCA and online collaborative learning

The traditional flipped classroom paradigm basically consists of two components: in-class synchronous learning activities and out-of-class asynchronous assigned learning tasks, such as videos presenting the weekly preassigned course content/class lessons in which the students would view at home on their own time; and, then while attending the regular classes at school, the students would spend more time actively engaged in various collaborative learning activities (Bergmann & Sams, 2012). In this aspect, the class becomes more student-centered transforming it into highly active synchronous learning environment (Loucky & Ware, 2017; O'Flaherty & Phillips, 2015). Student-centered learning or peer-assisted learning and social interaction reinforce the theories of Piaget's extensive work on cognitive development, and the social cooperative learning from Vygotsky's zone of proximal development (Li et al., 2014). Through the process of peer-to-peer/face-to-face group collaboration, students accelerate to the level of the teacher/tutor assisting in the learning of their peers. Furthermore, both students and teachers show a higher preference and deeper satisfaction towards this social interactive learning environment (Loucky & Ware, 2017; Schultz et al., 2014). Not only does flipped classroom model support and foster the theoretical collaborative constructivism framework thus creating a positive and dynamic active learning environment inside the classroom, but due to recent advances in technology the past several years, this has emerged to outside of the classroom as well. The process of learning via social collaboration has been proven to have a positive influence on the students' academic learning outcomes, and constructing and facilitating online collaborative learning communities is generating further attention and favorability amongst educators (Garrison, 2007, 2016; Stephens & Roberts, 2017).

To gain a better insight into the intricate nature of how the FCA fosters collaborative learning in-side and out-side the classroom, a brief understanding of the online Community of Inquiry (CoI) framework developed by Garrison et al. (1999) is necessary. The CoI concept constitutes three elements essential to an educational transaction—cognitive presence, social presence, and teaching presence. Cognitive presence encompasses the learning and inquiry process the student engages in while learning; social presence involves either face-to-face or online peer-to-peer communication and social interaction; and teaching presence relies on the teacher design and control of the curriculum/course content and management, learning activities (in and out-of-class), timelines and evaluation (Garrison, 2016; Garrison et al., 2010). The social presence factor provides an effective mediating variable/connection between teaching presence and cognitive presence; and the presence of all three outside the classroom are instrumental to the success of the flipped model and students' learning, and effective online learning requires the development of a more collaborative learning community (Garrison, 2016; Garrison et al., 2010). Some studies have found that social presence positively correlates with and impacts cognitive presence, and students who tend to have both higher social and cognitive presence achieve higher grades (Rockinson-Szapkiw et al., 2016; Le Roux & Nagel, 2018; Zhang & Lin, 2021).

Although less teaching presence may occur outside of the flipped classroom as compared to in-class, a similar and just effective form of presence can occur in the form of peer-interaction and peer-instruction. It has been shown in various studies that peer-interaction/peer-instruction during in-class group activities and tasks enhances deeper critical thinking performance among students, as well as creates peer-pressure and motivation to complete tasks and perform better (Bishop, 2013; Le Roux & Nagel, 2018; Singh & Harun, 2021). Outside of the flipped classroom, various experimental designs involving peer-interaction/peer-instruction (combined with increased social and cognitive presences) during the out-of-class course material previewing and practice also produced positive effects in regards to enhancing motivation, student preparedness, learning performance, and so forth (Chen Hsieh et al., 2017; Singh & Harun, 2021; Zou & Xie, 2019).

Furthermore, given that the educational model of the flipped learning focusses on student-centered approach, social presence is therefore essential to the student's overall learning process and learning outcomes. Specifically, the online learning environment aspect of a flipped classroom—where the student often views video lessons alone—may cause students to feel isolated and become more passive in their learning. Social presence can significantly reduce students' feeling of isolation by creating a more positive interactive learning environment online (Doo & Bonk, 2020; Stöhr et al., 2020). Nowadays, with the advent of advance online technology, educators are beginning to incorporate newer technological tools to enhance more effective—peer-to-peer/teacher-to-student—online synchronous/collaborative learning activities to ensure that students assiduously acquire the pre-assigned materials and come to class well prepared (Akçayır & Akçayır, 2018; Jiang et al., 2020; Wang & Qi, 2018).

The FCA, online technology and EFL learning

The prime objectives of the asynchronous out-of-class sessions for a flipped classroom is for students to preview the class lessons content (to free up significant class time) and to come prepared to engage in collaborative synchronous learning activities (Chen et al., 2014; O'Flaherty & Phillips, 2015), thus providing numerous benefits which are inaccessible in conventional classrooms (Shi et al., 2020). Students may watch the video lectures asynchronously outside the class at their own pace and preferred time. Students can also pause and stop video lectures if they need a break or rewind if they miss something (Ishak et al., 2020; von Lindeiner-Stráský et al., 2020; Zainuddin et al., 2019), and repeated exposure to course content reinforces the deeper understanding of the materials (Chen Hsieh et al., 2017; Shi et al., 2020). With the rapid growth of computer and online technology the past decade, the plethora of multimedia and educational app choices—videos, audios, online streaming and websites, educational tools, social media-sites, and PPTs—are now available for language teachers allowing them to easily design, choose and prepare the flipped classroom out-of-class pre-assign language content lessons from multiple sources, such as: YouTube, Khan Academy, TED-Ed, and BBC News for attractable and polished video content lessons; Edpuzzle, PlayPosit, and Quizlet for video educational language input tools/apps; WhatsApp, WeChat, LINE, and Facebook for online social networking communities (Ishak et al., 2020; Lin & Hwang, 2018).

Today, state-of-the-art technology more readily available for educators globally has led to more diverse and dynamic adaptations to the FCA inside and outside of the classroom, thus enhancing EFL learning (Chen et al., 2019; Zhang & Zou, 2020). More specifically, initially the out-of-class learning activities of a flipped classroom that were more asynchronous, in which students often viewed the pre-assigned video lesson/class materials alone at home before coming to class. In response to this perceived limitation of a more asynchronous aspect of the out-of-class component of a FCA, educators began experimenting with implementing more online collaborative learning methods and out-of-class tasks using the latest educational technological innovations (Ishak et al., 2020; Zhang & Zou, 2020). In Wu et al. (2017) study, English language learners collaborated on course content with their peers and tutors online via LINE and mobile devices (i.e., smartphones). Loucky and Ware's (2017) study involved EFL learners engaging in online discussions and collaboration via pallet.com. Chen Hsieh et al. (2017) highlighting the seven pillars FLIPPED schema implemented online interactive LINE social networking groups to enhance out-of-class EFL learning activities and motivation, resulting in improving students' English idiomatic knowledge and oral abilities. Lin and Hwang (2018) used Facebook to create an online community-based flipped learning environment to enhance students' English oral performance. Furthermore, because most students today are digital-natives, fully immersed and motivated by technology, Zainuddin et al. (2019) experimented using the LMS to create online interactive/collaborative groups while watching preassigned video lessons to motivate the students and enhance their EFL skills. Wu et al.'s (2020) study regarding flipped classroom technology incorporated the online interactive-communitive platform Sakai that allowed students from Taiwan and America to collaborate together on EFL writing assignments, resulting in not only increasing the Taiwanese students' motivation to improve their writing skills, but significantly enhanced the Taiwanese students' overall EFL writing proficiency through international online peer-to-peer interaction. In a more recent study, Zarrinfard et al. (2021) examined the effects implementing of two types of flipped instruction—using low-tech (audio/video recorded lectures), mid-tech (instructional materials delivered via an educational website)—in comparison to more traditional groups using blended instruction and traditional instruction (chalk-and-talk) for EFL students. The findings revealed the mid-tech group for out-of-class learning had the most significant impact than the other three groups, in-which the results indicated that the study's participants in the mid-tech group came to class more prepared, thus achieving better learning objectives, specifically improving their overall English reading proficiency skills.

Synchronous online video collaboration

Due to the limitations of online technology prior to the past recent years, much of the synchronous learning that occurred for the out-of-class proportion of the blended, flipped classroom approach such as collaborative video watching for assigned video lessons either involved small synchronous collaborative groups face-to-face, or collaborative video conferencing via remote (on-campus) digital networking systems; and, after watching the video lessons individually, students would have collaborative asynchronous discussions online via real-time chat groups/forums (Li et al., 2014). Eventually, online video conferencing tools (e.g. Skype) allowed students in small groups to have more

synchronous real-time discussions (Bower et al., 2012), yet students would generally still have to watch the assigned video lesson alone or in small face-to-face groups, and technological challenges would often occur depending on the student's computer-technological equipment and broadband connection speeds. Web conferencing systems and tools soon developed allowing small groups of students to connect online involving more synchronous real-time collaboration, chatting, and sharing of files and screens (Almpanis et al., 2011). Recently, after the advent of quicker internet broadband speeds, 4G and 5G, state-of-the-art internet social networking web conferencing sites/apps such as Google Hangouts and Meets, Skype, Zoom, FaceTime, LINE, along with various other online streaming web conferencing collaboration tools/technology that has recently emerged (Zhang & Zou, 2020), however very few current academic studies have been conducted on the use of online synchronous-collaborative learning; and, a considerable gap exists in the area that warrants further investigation.

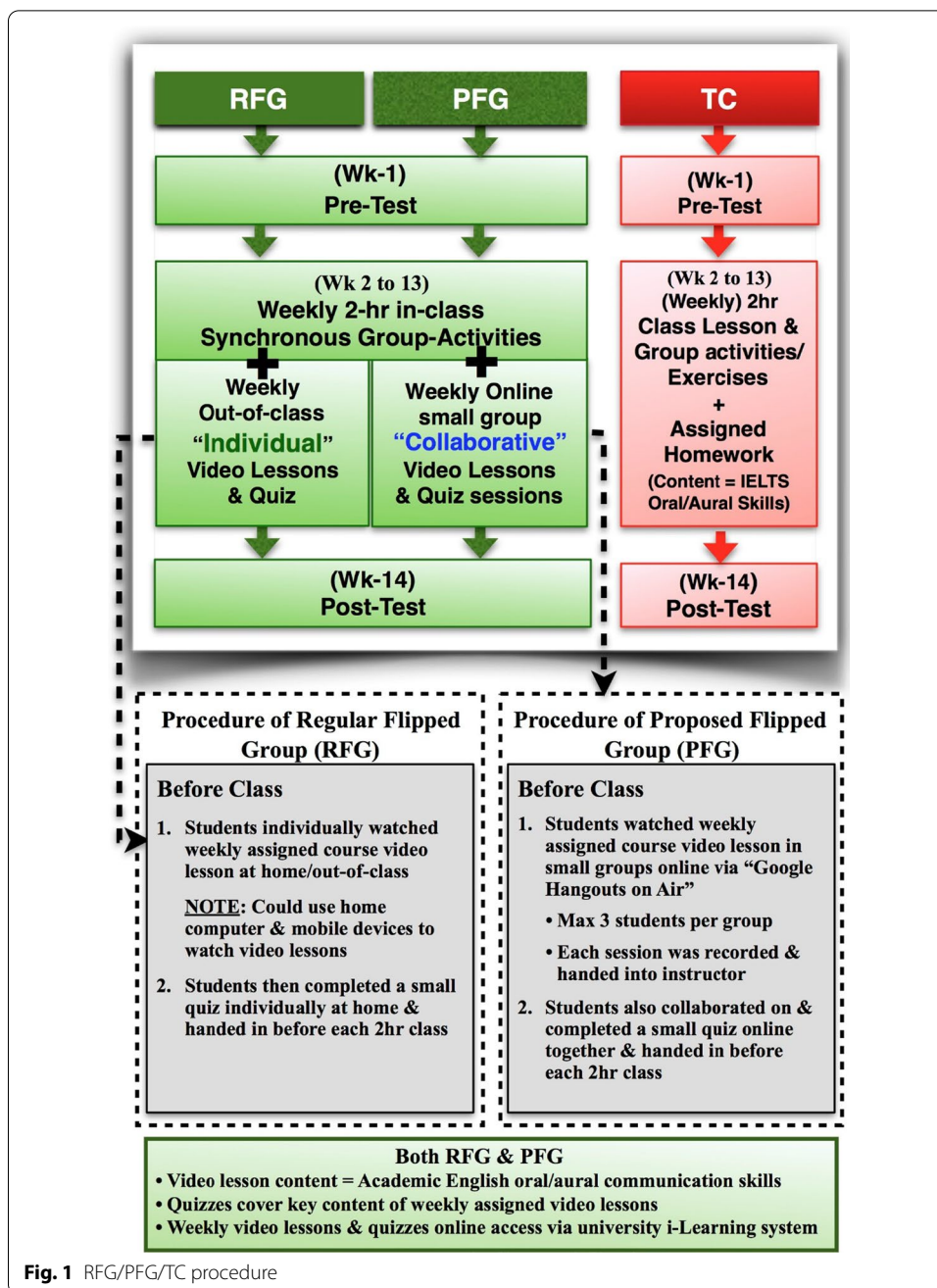
Methodology

Participants

The participants for this study involved 54 students from a private university in northern Taiwan comprising of two classes/three groups—one larger experimental class of approximately 36 students and the experimental class was then divided into two smaller groups (PFG and RFG) with 18 students in each, and one traditional class (TC—control group) of 18 students. In total, there were 43 female and 11 male participants—PFG = 17 females and one male, RFG = 13 females and five males, and TC = 13 females and five males—and most students were between the ages of 18 and 23. The majority of the participants in all three groups were 3rd and 4-year undergraduate university students from the Business Management College. The native language of all participants is Chinese. The majority of the participants' English proficiency levels ranged from lower to mid-intermediate range—400 to 780 for the Test of English for International Communication (TOEIC) or A2 to B1 for the Common European Framework of Reference for Languages (CEFR).

Teaching method and materials

All three groups—TC/RFG/PFG—were taught by the same instructor, who was professionally trained in International English Language Testing System (IELTS) instruction, and relatively used the same course materials that focused on IELTS academic listening and speaking English with a heavy emphasis on academic English speaking skills. All three groups received 2 h in-class instruction approximately for 14 weeks—pre-tests and post-tests were given during the first and last week (Fig. 1). The instructor's role in the TC involved: The traditional 'sage on the stage' method delivering and discussing the course materials approximately during the first hour; then coordinated and facilitated group exercises and activities the second hour. As for the RFG and PFG, the instructor engaged in various roles: In-class—the instructor designed the curriculum, coordinated and facilitated group activities/tasks; answered student's questions and provided feedback; and implemented student assessments (e.g., pre- and post-tests) and evaluations.



Out-of-class—the instructor selected and implemented the pre-assigned course video lessons and online quizzes, as well as design—created the content, recorded and edited—some of the specialized video lessons; setup and managed the course materials in the university’s LMS, and Google’s Hangout on Air video meeting web-app; and occasionally monitored and provided feedback during PFG online group sessions.

Instructional materials

The course materials for all three groups covered four major academic English skills areas related to ILETs: (1) coherence and cohesion, (2) lexical, (3) grammar and

Table 1 TC/RFG/PFG instructional course materials

Academic skills area	Skills and strategies	Weeks/videos lessons
1. Coherence and cohesion	Signposting Discourse—structuring patterns Discourse pattern recognition	Wk1-Vid1 ^a , Wk7-Vid7; Wk8-Vid8, Wk9/10-Vid9/10(2 vids), Wk11/12-Vid11/12 (2 vids)
2. Lexical	Vocabulary building (content and functional words, collocations) Signpost words and phrases Summarization and note-taking skills	Wk3-Vid3, Wk8-Vid8, Wk9/10-Vid9/10 (2 vids), Wk11/12-Vid11/12 (2 vids)
3. Grammar and accuracy	Extended speech—sentence structuring Verb tense recognition and construction	Wk2-Vid2, Wk9/10-Vid9/10 (2 vids)
4. Pronunciation	Intonation and word/sentence stressing Fluency—chunking, linking and reduction	Wk4-Vid4, Wk5/6-Vid5/6 (2 vids), Wk7-Vid7

TC Textbook: Each academic skills areas and associated English skill and strategies were covered in the text's leading instructional chapters

^a Wk1-Vid1 = Week 1 and video 1 lesson was pre-assigned for the 2nd week of the course—the 1st and last weeks (1st and last classes) involved the course introduction, pre-tests and post-tests

accuracy, and (4) pronunciation. Each academic English skills areas were then divided up into 12 weekly module-lessons that focused on IELTS related speaking and listening skills/strategies. Twelve video lessons that encapsulated the main content/concepts of each the weekly instructional modules were then pre-assigned to the RFG and PFG students, in which they watched before coming to class (Table 1). For the TC students, the text book Cambridge English IETLS Trainer (Hashemi & Thomas, 2011) was used for weekly (in-class) instructional lessons that covered the individual skills and strategies (highlighted in Table 1) associated to all four major IELTS academic English skills areas, extracted from different sections and units in the textbook. In addition, selected video lessons (assigned to RFG/PFG) were shown and discussed in some TC classes, along with handouts, covering and practicing the similar materials and exercises given to the RFG and PFG students.

In-class/out-of-class instructional design

During the weekly in-class periods, the instructor provided short announcements, instructions and answered students' questions at the beginning of class; and then for remaining class time, in-class group activities/tasks practicing the weekly pre-assigned video lessons/content were conducted. All PFG and RFG students received the same in-class treatment. The students were divided into groups and engaged in various exercises and tasks, discussing and practicing the weekly lesson content (listening and speaking skill and strategies).

Out-of-class, the RFG students watched the weekly assigned course video lessons individually at home along with completing a small quiz associated to each video lessons. In comparison, the PFG students were divided to small groups (maximum three students) and watched each prescribed weekly video lesson online in their groups, along with collaborating on the video content and completing the attached video quizzes together. The small PFG groups used Google Hangouts on Air for their online video sessions, which were recorded and handed into the instructor to review and provide feedback (Table 2). For instance, each individual small PFG group weekly online sessions would involve: (1)

Table 2 TC/RFG/PFG in-class and out-of-class activities/tasks samples

In-class	Activities	Teacher role	Mode
RFG/PFG	Signposting listening exercises Discourse pattern recognition exercises Extended speech—oral features and sentence structuring exercises Vocabulary building (content and functional words, collocations) exercises Synonyms and paraphrasing exercises Summarization and note-taking skills practice Pronunciation features exercises and practice	Instruction Coordinator Facilitator Assessment and feedback	Synchronous (Group discussion) ^a
TC	Course content and skills instruction Short video watching and review Textbook exercises and related tasks ^b	Lecturer Facilitator Assessment	Synchronous (Group discussion)
Out-of-class			
RFG	Self-watch pre-assigned video lessons Video quiz completion	Curriculum and video designer LMS manager Assessment and feedback	Asynchronous (online)
PFG	Small group video watching sessions Video quiz completion (group) Addition self-watch video review ^c		Synchronous (Group discussion) Asynchronous (online)
TC	Pre/post-assigned course homework		Asynchronous

^a All RFG/PFG in-class activities were group exercises discussion and practice

^b Class exercises and related tasks corresponded to the text's unit lessons and were short versions of RFG/PFG activities

^c Some students would watch pre-assigned video lessons before and after scheduled group video watching sessions

Each group leader would schedule and set up and host a weekly online meeting time for each member via Google Hangouts on Air. (2) Then the leader would access the pre-assigned video lesson and the corresponding video quiz for each week on the university's LMS system. (3) The group members would then watch the video lesson and then collaborate on the content and discuss and answer the assigned quiz questions. (4) Then the group leaders would upload each recorded online video session to the instructor before the proceeding class (Fig. 2). In addition, it was announced to the PFG students that their weekly online video sessions would be monitored-reviewed in order for any feedback response to be given during the weekly in-class sections.

The TC students' 2-h weekly lessons incorporated both instruction on the course materials and in-class activities together. The instructor would primarily spend the first hour each week covering the class lessons and the second hour involved various group activities/tasks (corresponding to the lessons and skills from the text) thus practicing the materials similar to those conducted in the RFG/PFG weekly in-classes.

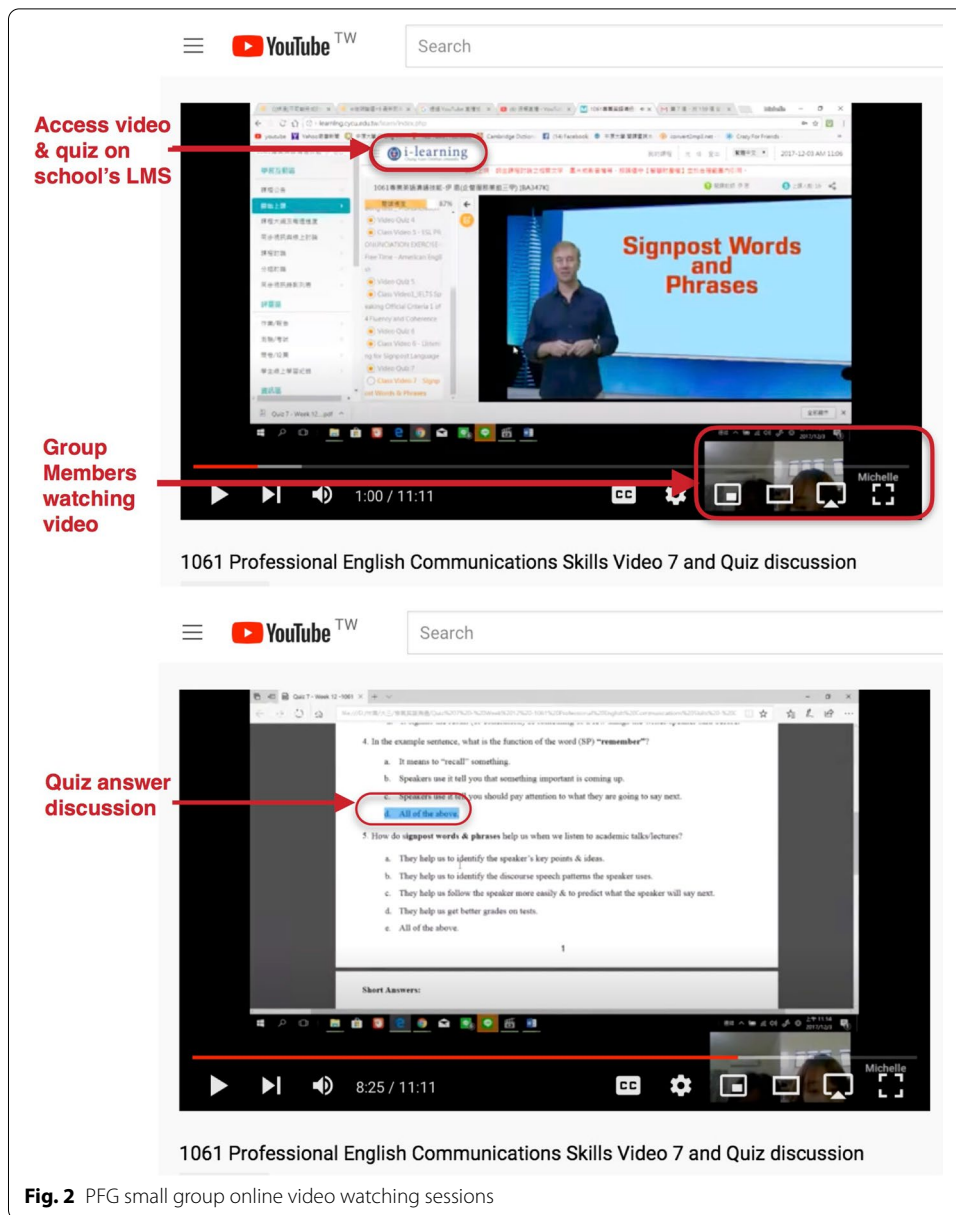


Fig. 2 PFG small group online video watching sessions

Instruments

Objective performance

Four types of objective performances were measured in this study: (1) pre- and (2) post-oral tests scores; (3) online quiz scores, and (4) final course grades.

First of all, mock IELTS pre- and post-oral tests were used to determine the participants' oral English learning performance for all three groups (PFG, RFG and TC), and both tests were consistent in content and structure. The mock IELTS pre- and post-tests were administered to all participants during the first and last weeks for both experimental and controlled classes. In this study, both pre and post tests were approximately 6–8 min in length, and equivalent to a full IELTS speaking test both consisted of three parts: (1) the participants were first asked several general interview

questions for 2 to 3 min; (2) and then given a topic question and piece of paper and a pencil to make notes on the topic for approximately 45 s, and then given approximately 1 min to speak on the topic; and (3) finally two to three follow-up questions—covering more abstract ideas and issues related to topic given in part 2—are asked, which is approximately 2 to 3 min long. Six sets of different topics-questions were used, and all participants received different randomly chosen topic sets for both pre and post-tests. All tests were administered by the same professionally trained examiner, and recorded for final grading (each recorded test) by three professionally trained IELTS examiners. The participant’s responses to the pre- and post-tests were graded according to four key speaking skills areas (band-descriptors) measuring: (1) fluency and coherence, (2) lexical resource, (3) grammatical range and accuracy, and (4) pronunciation. The participants receive a band score from 0 to 9 for each band descriptor category, and then averaged out to one complete final score between 0 and 9 (Seedhouse et al., 2014; Roehl et al., 2013) (Table 3). To determine if the pre- and post-oral test scores given by the three raters were consistently reliable, an inter-rater reliability analysis was conducted for both pre- and post-test scores resulting in a very significant measure of Cronbach’s alpha 0.87 and 0.88.

Online quizzes were used to test the participants’ comprehension of the weekly assigned videos lessons for both experimental groups, as well as help prepare them for the weekly in-class activities. Following each weekly video lessons, the students had to complete a short online quiz and hand in before each class. A total of 10 quizzes were administered with approximately eight to 10 multiple choice and short-answer questions for each quiz, which covered the main topics in the video lesson (sample shown in Fig. 2). The average for all 10 quizzes for each participant was calculated and used as the third type of objective performance, as well as a percentage calculated in their final grades. Finally, the fourth type of objective performance measured was PFG and RFG student’s final grades, which consisted of the student’s (1) overall participation score (60%)—class attendance (30%), quiz scores (27%) and assignments (3%); (2) midterm test score (20%) and final test (post-test) score (20%).

Online learning behavior

Three types of online learning behavior analytics were also measured, which included: (1) Regular online log-on time involved the time both PFG and RFG participants spent

Table 3 Pre and post-tests grading

IELTS speaking test band descriptors (oral skills areas)			
1) Fluency and coherence	2) Lexical resource	3) Grammatical range and accuracy	4) Pronunciation
Measures: 1. Speaking fluency and length 2. How words, phrases, ideas are organized and linked together	Measures: 1. Vocabulary + range 2. Idiomatic/less common language 3. Collocations and paraphrasing	Measures: 1. Sentence structures, variation and range 2. Grammatical errors	Measures: 1. Clarity of words 2. Pronunciation features: • Intonation and stress • Speed and rhythm • Chunking, etc
(Band Score) 0–9	(Band Score) 0–9	(Band Score) 0–9	(Band Score) 0–9
Total average score = 0–9			

online viewing the weekly assigned video lessons; (2) Group video-watching time consisted of the time the PFG participants spent watching the video lessons in their small online collaborative groups, whereas the RFG participants did not watch the video lessons in small groups; (3) Total online log-on times consisted of the PFG participants' small groups video-watching times added to their individual regular online log-on times. Both second and third online learning behavior analytics only apply to the PFG participants because the RFG students watched the video lessons individually on their own time, therefore the RFG students' regular online log-on time and total online log-on times are the same in this study.

To analyze the PFG and RFG participants' online learning behavior—specifically the approximate time the participants spent online viewing the assigned course video lessons—all video lessons and attached quizzes were uploaded weekly onto the university's LMS, in which both PFG and RFG participants were instructed to watch the weekly pre-assigned videos on a specific LMS online classroom, and complete the attached quiz (and download) prior to coming to class. The LMS records the amount of time measured in seconds each student logs on (weekly) to watch the videos online. Each participant's weekly log-on times was then calculated together to create one overall regular online log-on time for each individual spent on the LMS for the duration of the course. Additionally, the PFG students' online video-watching and quiz completion/collaborative weekly sessions were also recorded, and the approximate time spent for each online group session was then calculated together (i.e., group video-watching time) thus providing an overall amount of additional (observable) time the PFG students specifically spent online watching the assigned video lessons and collaborating together. This second type of online learning behavior analytics is significant because it allows to virtually observe the PFG students and amount of time they spent watching and learning the course materials/video lessons.

Data analysis

SPSS statistical software was used for all the data analysis conducted in this study. To explore the first research question, a paired-sample *t*-test analysis was first used to determine if there were any significant differences in the means of the pre-and post-tests for the three groups (PFG, RFG and TC), followed by a one-way analysis of variance (ANOVA) and post-hoc Fisher's least significant difference (LSD) analysis to determine if any significant differences occurred in the post-test scores among each group. Investigating the second research question regarding both experimental flipped groups, an independent *t*-test was used to determine if there were any significant differences in the PFG and RFG students online learning behaviors and their objective performances, specifically the average online quiz scores and final course grades. Then the third research question to explore if any correlation occurred between the students' online learning behaviors and objective performances for both PFG and RFG, two separate statistical measures were used. First, to determine if the total online log-on times the students spent watching the weekly assigned videos had an overall effect on their online quiz and final grade scores, a cross-tabulation statistical measurement was conducted on both groups (PFG and RFG). Second, a Pearson correlation analysis was conducted to

Table 4 Results of the paired-sample *t*-test

Group	Pre-test		Post-test		<i>t</i>	<i>p</i>
	M	SD	M	SD		
RFG	4.91	0.62	5.00	0.20	0.68	.507
PFG	5.08	0.57	5.53	0.13	5.57***	.000
TC	5.08	0.57	5.44	0.10	4.07**	.001

p* < .01, *p* < .001

determine if any relationship occurs between the students’ online learning behaviors and objective performances in both experimental groups (PFG and RFG).

Results

Oral English learning performance

A paired-sample *t*-test was applied to compare the differences between the pre- and post-tests of students’ oral English learning performance for the three groups. As shown in Table 4, significant differences were found between the pre- and post-tests for the PFG (*t* = 5.57, *p* < .001) and TC (*t* = 4.07, *p* = .001). More specifically, both PFG and TC showed significant higher post-test scores than their pre-test scores. However, no significant difference was found between the pre- and post-tests for the RFG (*t* = 0.68, *p* > .05). These results suggested that students in both PFG and TC significantly improved their oral English learning performance, whereas such improvement was not found for students in the RFG.

An ANOVA was employed to further examine the differences among the three groups in their oral English learning performance. As shown in Table 5, a significant difference was found among the three groups (*F* = 3.49, *p* = .038). A post-hoc LSD analysis showed the significant differences occurred between the PFG and the RFG (*p* = .017) and between the TC and the RFG (*p* = .044), but no significant difference was found between the PFG and the TC (Table 6). These results suggested that students in the PFG and the TC performed better than those in the RFG.

Table 5 Results of the ANOVA

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between groups	2.89	2	1.45	3.49*	.038
Within groups	21.18	51	0.41		
Total	24.07	53			

**p* < .05

Table 6 Results of the post hoc LSD

(I)	(J)	<i>MD</i>	<i>SE</i>	<i>p</i>	<i>95% Conf</i>	
Ind-G	Ind-G	(I-J)			<i>LB</i>	<i>UB</i>
PFG	RFG	.528	.215	.017	.097	.959
PFG	TC	.083	.215	.700	-.348	.515
TC	RFG	.444	.215	.044	.013	.876

Table 7 Results of the independent-samples *t*-test

Activity	Group	M	SD	df	t	p
Total online log-on time ^a (hours)	RFG	2.00	1.83	34	− 4.99***	.000
	PFG	8.01	4.77			
Online quiz (score)	RFG	75	16.2	34	− 4.97***	.000
	PFG	95	6.29			
Final grade (score)	RFG	77	8.3	34	− 2.83**	.009
	PFG	83	4.3			

^a RFG total online log-on time = Reg. online log-on time

** $p < .01$, *** $p < .001$

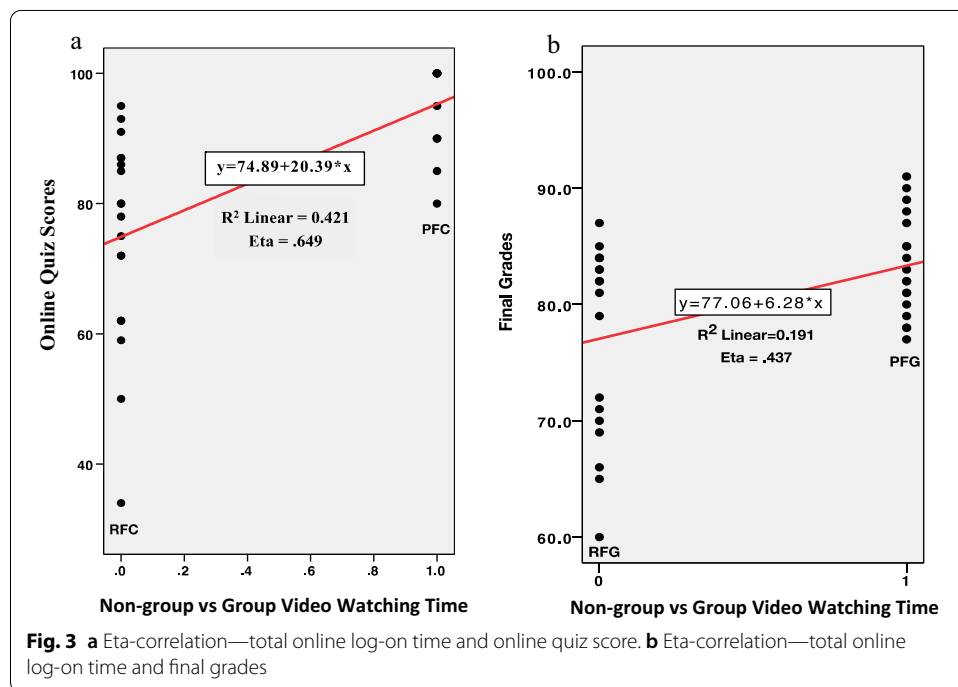


Fig. 3 a Eta-correlation—total online log-on time and online quiz score. b Eta-correlation—total online log-on time and final grades

PFG and RFG online learning behaviors and objective performances

An independent-samples *t*-test was conducted to determine if any differences occurred between the PFG and RFG students’ online behaviors and objective performances (Table 7). First of all, there was a significant difference in the total online log-on time students spent online viewing the weekly video lessons between both groups ($t = -4.99$, $p < .001$). In fact, on average, students in the PFG spent four-times the amount of time online ($M = 8.01$) than the RFG students ($M = 2.00$). Furthermore, the PFG students significantly out-performed the RFG students ($t = -4.97$, $p < .001$) on the overall average online quiz scores (95 compared to 75). In addition, the PFG students significantly performed better ($t = -2.83$, $p = .009$) in contrast to the RFG students on their final course grades. These results suggest that the PFG students on average not only spent more time online viewing the assigned video lessons, they also out-performed the RFG students on the online quiz scores and final grades.

Table 8 Correlation—online learning behavior and objective performance

RFG		M	SD	1	2	3	4			
1	Total online log-on time	2.0 h	1.82	–						
2	Online quiz score	74%	16.20	.588*	–					
				.010						
3	Post test score	5.0	0.85	–.002	.066	–				
				.994	.796					
4	Final grade score	77%	8.33	.611**	.918***	.317	–			
				.007	.000	.200				
PFG				5	6	7	8	9	10	
5	Reg. online log-on time	5.4 h	4.54	–						
6	Group video-watching time	2.3 h	1.12	.079	–					
				.754						
7	Total online log-on time ^a	8.0 h	4.76	.967	.328	–				
				.000	.184					
8	Online quiz score	95%	6.29	.300	–.025	.275	–			
				.227	.921	.270				
9	Post test score	5.5	0.55	–.192	–.357	–.271	.082	–		
				.445	.146	.276	.747			
10	Final grade score	83%	4.32	.239	–.253	.156	.256	.731**	–	
				.339	.313	.536	.306	.001		

* $p < .05$, ** $p < .01$, *** $p < .001$ (2-tailed)

^a Small group video-watching time combined with regular online log-on time

Correlations between online learning behaviors and objective performances

A cross-tabulation measurement was used to ascertain if any correlation occurred between the PFG and RFG online learning behaviors (total online log-on times) and two of their objective performances—online quiz and final grade scores. As shown in Fig. 3a, there was a significant Eta-correlation between both PFG and RFG students’ online video-watching time and their total online quiz scores (Eta = 0.649, R sq. = 0.421). This indicates the time the students in the small PFG groups spent watching the video lessons and collaborating online together (weekly) resulted in overall higher online quiz scores compared to the RFG students who did not watch the video lessons in small groups, but independently. In Fig. 3b, a cross-tabulation between PFG and RFG students’ online video-watching time and their final grade scores also shows a slight significant Eta-correlation (Eta = 0.437, R sq. = 0.191), which indicates that the weekly small PFG groups’ online video-watching and collaboration sessions also resulted in higher final grade scores in comparison to the RFG students.

A Pearson correlation analysis was also administered to determine if any correlation occurred between online learning behaviors and objective performances for the students in both experimental groups. Table 8 indicates that there are significant correlations between the RFG students’ total online log-on time variable and their average online quiz scores ($r = 0.588$, $p = .010$), and their final grade scores ($r = 0.611$, $p = .007$), which suggests the time RFG students log online has a positive correlation with their objective performances—quiz and final grade scores. However, as for the PFG, the Pearson correlation analysis indicates no significance correlation occurred between all three PFG online learning behaviors and all three objective performance variables.

Furthermore, as shown in Table 8, a significant correlation occurs between the RFG students' average online quiz scores and their final grade scores ($r = 0.918$, $p < .001$), thus indicating that the RFG students' total online quiz scores effected their final grades in a positive way. Interestingly, a significant correlation occurs between the PFG students' post test scores and their final grade scores ($r = 0.731$, $p = .001$). This positive correlation suggests that the PFG students' post test scores undoubtedly influences their final grades. On the other hand, no significant correlations occurred between the RFG students' post test scores and their online quiz scores and final grade scores for certain plausible reasons further explained in "Discussion" section below.

Discussion

Oral English learning performance

The results in "Oral English learning performance" section not only indicate that the PFG on average significantly outperformed the RFG, but surprisingly the TC has also statistically exceeded the RFG in oral English learning performance despite the overwhelming favorability that the FCA has been receiving over the last decade plus. Similar results from previous studies parallel the findings shown above in which RFG students underperformed TC students in regards to assessments and post-grading (He et al., 2016, 2019). Furthermore, in concordance to evidence from past research highlighting students' lower accountability watching the video lessons individually at home due to poor self-managements and self-regulating skills (He et al., 2016, 2019; Rahman et al., 2015; Sletten, 2017), and being ill-prepared prior to class-time (Chuang et al., 2018; Taylor, 2015) are plausible speculative explanations why the students in the PFG, and the TC significantly outperformed those in the RFG.

The above findings may be due to the fact that both PFG and TC incorporated a greater involvement of social and cognitive presences during the instructional aspect of the course materials. In order to create more effective learning motivation and learning outcomes amongst students, and elevate their objective performances, the presence of both elements (social and cognitive presences) are necessary (Fiock, 2020; Garrison, 2007; Wang & Qi, 2018). For instance, a higher percentage of social presence and cognitive presence occurred in both PFG when the weekly course materials were presented to the students through the involvement of peer-to-peer pair and small group interactions—discussion and collaboration—which has been proven to have positive effects on students' learning (Yang et al., 2016; DeNoyelles et al., 2014; Fiock, 2020). As for the TC, specifically a high degree of social interaction (as well as teaching presence) occurred between the students and the instructor during the 1st-hour of class instruction because of open questioning and discussion on the material presented and various video lessons viewed. In comparison, the RFG students watched the weekly lesson content present on the pre-assigned videos at home individually, thus resulting no social interaction with co-students. Although the students in the small online PFG group video sessions were not physically interacting face-to-face (as in an actual class setting), they collaboration visually and audibly through use of real-time synchronous online video chatting during their weekly small group online sessions. The primary purpose of these online synchronous/collaborative groups was to establish greater online social and cognitive presences

during the out-of-class video-watching sessions, whereas the traditional flipped classroom out-of-class segment (in-which each student watched assigned video-lessons alone) most often lacks or incurs a relatively low percentage of online social and cognitive presences (Garrison, 2016). For example, slight or no noticeable social interaction, and cognitive strategies—regarding content review, discussions and collaboration with peers—occurred between students in the RFG during the out-of-class individual video watching sessions.

In addition, adding to this greater influence of social and cognitive presences both TC and PFG received during exposure to the course content, not only a significant amount of teacher supervision occurred during the TC, but a high percentage of peer-interaction and peer-instruction occurred among the PFG students during their small online group sessions. Peer-interaction and peer-instruction like teaching presence instills pressure on the students to perform better, as well as creates an environment that enhances critical thinking performance (Le Roux & Nagel, 2018; Singh & Harun, 2021; Zou & Xie, 2019). Furthermore, the PFG students were also informed by the instructor that their weekly recorded online video sessions would be observed and evaluated, resulting in short (approx. 5–10 min) occasional, random feedback sessions prior, during and after each week's in-class hours. Consequently, exposure to face-to-face instructor feedback, and the awareness of the online sessions being monitored, directly and indirectly heightened the sense of teaching presence for the PFG students throughout the course. As a result, higher student accountability transpired, thus elevating motivation to watch, pay attention and learn the course content presented. In contrast, the RFG out-of-class video-lessons watching sessions, very little or no social, cognitive and teaching presence occurred during the out-of-class sessions; therefore, it is questionable as to what extent the RFG students completely watched and learned the content presented on the video-lessons. According to the RFG students' average online log-on time, which was the only analytic indicator used to record how much time each RFG student spent viewing the assigned video lessons, the RFG students spent less than four-times the amount of time online than the PFG students. In short, the lack of social, cognitive and teaching presences, can significantly impede students' out-of-class motivation to adequately preview the assigned course materials, thus resulting in lower objective performances. This has also proven to be the case in similar studies, such as He et al.'s (2019) study where approximately 16.3% of students in the flipped classroom did not watch all the assigned video lessons, and 2.5% did not watch any of the video lessons, resulting in experimental flipped students' underperformance on the post-exam and final grades in comparison to the controlled students in a traditional class. One of the common causes of low student motivation to preview and/or complete the out-of-class flipped classroom activities based on students' feedback is the added time burden—having to spend more time review the pre-class learning materials, whereas most traditional classes requires less time and work (Akçayır & Akçayır, 2018).

PFG and RFG online learning behaviors and objective performances

According to the independent *t*-test results in “[PFGandRFG online learning behavior-sandobjective performances](#)” section, the tenable factors that influenced the significant differences between the PFG and RFG students' total online times, overall online quiz

scores, and final grades means were (1) the amount of time both groups spent online, and (2) the PFG's small groups video-watching sessions. First of all, the students in the PFG spent four-times the amount of time online than the RFG students. Specifically, the overall average time all RFG students spent online was approximately 2 h, whereas total average time all PFG students spent online was approximately 8 h. In addition, the PFG students watched and discussed the weekly video lessons together in their small online video-watching collaborative groups. These weekly online small groups discussions and collaboration on the video lesson content and quizzes had a positive impact on PFG students' understanding of the course materials, which also resulted in them achieving an overall higher percentage of correct answers on the quizzes. More specifically, the PFG total quiz score average is 95% with a lower standard deviation (SD) of 6.29 compared to the RFG total quiz score average of 75% with a higher SD of 16.20, which indicates that there was a wider range of total online quiz scores amongst the RFG students. Consequently, the PFG students' higher average quiz scores also contributed to achieving higher average final grades of 83% with a lower SD of 4.3 compared to the RFG students who on average received a score of 77% with a higher SD of 8.3. This indicates that the consistent weekly collaboration the PFG students engaged in not only allowed them to sustain a closer range of quiz scores (as supported by lower SD) and a higher average over the length of the course, but also lead to a closer final grade scores range and higher average because their quiz scores were directly calculated into their accumulated final grades. Overall, both increased out-of-class preparation and higher quiz scores have been shown to have a positive impact on students' overall grade point averages (GPAs) (Bassett et al., 2020; Heiner et al., 2014; Hsiao et al., 2019).

Correlations between online learning behaviors and objective performances

The cross-tabulation analysis in “[Correlations between online learning behaviors and objective performances](#)” section highlighting the correlation between the involvement of having weekly online small groups session (discussing the video lesson content and attached quizzes) and average quiz scores and final grade scores further supports the PFG students (who participated in these online groups sessions) achieving higher overall averages on the online quizzes and final grades compared to the RFG students who did not participate in online collaborative sessions. These online sessions alone resulted in the PFG students spending an average of 2.3 additional hours covering and discussing the course materials together, whereas the RFG students spent no additional observable time discussing the video lessons content with other students online throughout the course. The fact that the PFG students were socially interacting together during these online collaborative sessions heightens the amount of social and cognitive presences the students are exposed to, and as indicated above, this plays role in helping the students achieve better objective performances (Fiock, 2020; Garrison, 2007). For instance, the PFG students on average spent 8 h logged online in total thus receiving average quiz and final grade scores of 95% and 83% in comparison to their RFG counterparts' average total log-on time of 2 h resulting in average quiz and final grade scores of 75% and 77%.

The Person correlation analysis conducted between both RFG online log-on behavior and online quiz and final grade objective performances further supports the fact that

the more time students spent online viewing the weekly video course lessons the more positive effect this had on their quiz scores and final grades; contrastively, those students who spent significantly less time logged online attained poor objective performances—notably lower average total quiz and final grade scores. These findings are supported by Hsiao et al.'s (2019) study on the effects of students' online learning behaviors (online learning analytics such as video viewing frequency and video viewing completion) in flipped classrooms and their GPAs, in which students who engaged in higher online learning behaviors received higher GPAs. In short, the more engagement the students have outside of class with the assigned course materials, the more positive effect this had on their objective performances such as quiz scores, final exam scores, and GPAs (Bassett et al., 2020; Hsiao et al., 2019).

Furthermore, as shown in Table 8, the significant correlation that occurred between the RFG participants' average online quiz scores and their final grade scores unequivocally make sense and is consistent with the correlated results highlighted in Fig. 3a and b, in which the more time the RFG students spent on the online course materials the more positive effect this had on their quiz scores, thus consequently effecting their final grades. In other words, this positive correlation between completing online quizzes was found in previous studies to not only to generate better exam preparation, but benefits overall exam and grade scores (Heiner et al., 2014; Narloch et al., 2006). In addition, a significant correlation occurred between the PFG post test scores and their final grade scores because the PFG students by large had better overall online performances, as well as a higher presence of the three CoI elements that occurred throughout the course due to their weekly online small group collaboration sessions; coincidentally, the overall improvement in PFG student's oral post-test scores therefore undoubtedly resulted in an increase in their final grades. On the other hand, as indicated in Table 4, there was no overall significant increase in the RFG student's pre and post-test scores indicating that they did not possibly improve throughout the course, therefore resulting in lower average final grades. Furthermore, because the RFG students did not collaborate together online in small groups, this ensued in possible lower presences of all three CoI elements—especially social presence and cognitive presence (in the form of the students not collaborating together)—which further supports the positive impact the CoI elements have on students' objective performances (Hsiao et al., 2019).

Conclusion

In this study, we developed an alternative PFG by strategically incorporating the latest online video-chatting technology to make the traditional asynchronous out-of-class course video previewing assignments more synchronous by creating small weekly online video-lesson viewing discussion groups. In order to determine whether this new PFG would yield positive outcomes, we compared it with a corresponding RFG and TC. In regards to our first research question—which teaching method (1) the PFG, (2) the RFG, or (3) the TC yields the most significant results in terms of the students' oral EFL performance? The oral post test results indicated that the PFG significantly outperformed the RFG; and interestingly, the RFG also significantly underperformed the TC according to the oral post-test scores. As indicated by previous studies (Fiock, 2020; Garrison, 2007), online social, cognitive and teaching presences have significant impacts on students

learning behaviors and overall objective performances, and it is evident in this study that both PFG and TC incorporated all three CoI elements resulting in better oral English learning performances in contrast to the RFG. Our second research question determining—are there any significant differences between the PFG and RFG students' online learning behaviors (total online log-on times) and objective performances (online quiz and final grade scores)? The findings demonstrate that the PFG students significantly out-performed the RFG students on the total online log-on times, overall average online quiz scores and final course grades. Regarding our third research question determining—are there any significant relationships that occur with both PFG and RFG students' online learning behaviors (amount of time spent online viewing the assigned weekly video lessons, PFG group video-watching time, and PFG total online log-on times) and their objective performances (online quiz, post-test, and final grade scores)? It was discovered that the students who on average spent considerably more time logged online obtained higher overall online quiz scores and final grade scores. Although no significant correlation between the PFG student's overall online log on times and their overall objective performances was shown by the Person correlation analysis, their weekly online small group video-watching collaboration sessions, which increased their total online log on times, strongly supports the notion that higher overall engagement in the class materials throughout the course will have a positive impact on students' objective performances as shown in other studies such Bassett et al. (2020).

The contributions of this study include two significant aspects in regards to applications and educational theories. With respect to the former, implementing a more synchronous out-of-class component to the FCA was investigated. The purpose of creating small online group interactive/collaborative sessions (previewing the pre-assigned class materials) was to further boost student's online learning behavior and motivation to therefore come to class better prepared and more knowledgeable about the course content. Regarding the latter, this study focused on empirical measures to gain a deeper understanding of how increasing online social, cognitive and teaching presences during the FCA out-of-class video watching sessions with the assistance of the latest online technology can have a positive effect on students' overall objective performances, specifically enhancing English academic oral and aural skills. In addition, examining the relationship between the students' objective performances and their online learning behaviors in the out-of-class component of both flipped models (RFG and PFG), provides a more extensive understanding of the type learning behaviors that the students engage in, such as online log on time, online collaboration, and so forth, have an impact on their objective performances. As a result, EFL educators can use the implications and findings from this study to further investigate how innovations in online technology can increase student interaction and collaboration outside of the flipped classroom, as well as further enhance students' learning behaviors and motivation in and outside of the class by designing more synchronous out-of-class components of a FCA.

One limitation of this study would be the small sample size of the all three groups. Although the results obtained for each group prove to be interesting—especially that this study's TC students on average slightly out-performed the RFG students given the overwhelming positive results and favorability associated to the FCA—larger sample sizes (for each group) could possibly provide more inclusive data to confirm if and how

TC students while in-class and students subjected to a more synchronous out-of-class flipped model (as proposed in this study) incur a higher percentage of social, cognitive, teaching presence during course content exposure. Furthermore, a larger sample size focusing on specific academic English oral/aural proficiency levels (e.g., high, mid, low levels), as well as gender would also provide the researcher more accurate and comprehensive data regarding the differences and improvements each group/level may incur while exposed to similar learning conditions and teaching methods examined in this study. Another limitation not explored more in depth in this study is a more comprehensive and accurate account of students' online behavior while using the latest online technological outside of class to view the pre-assigned video lessons whether alone or during small online group session using more synchronous video chat apps/conferencing software. Recent innovations in online technology can further assist in attaining a wider range of and more accurate data of subjects' behaviorisms and motivation while engaged in online activities, thus allowing for a more extensive assessment of students' out-of-class behavioral analytics. As a result, this will allow educators to plan more effective and meaningful out-of-class activities to better prepare the students, as well as enhance their learning abilities and outcomes.

Overall, these factors (highlight above) not examined in this study, such as student's individual levels, gender, online learning behavior and motivation that may have affected RFG/PFG students' out-of-class video-watching sessions will be considered for future studies. Current innovations to online social-networking and computer technology will further enhance the out-of-class portion of the FCA to become more synchronous, thus providing more opportunities for increased teacher–student and peer-to-peer interaction outside of the language classroom.

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Authors' contributions

IDF designed the study, acquired and analyzed the data, and wrote the initial draft. JCY conceptualized the work, interpreted the data, provided critical feedback and edited the manuscript. Both authors read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Competing interests

The authors declare that they have no competing interests.

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