



# Flipping an EFL classroom with the LINE application: students' performance and perceptions

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**Abstract** This study investigated how a flipped English as a Foreign Language (EFL) classroom incorporating the mobile app LINE impacted college students' English performance and their perceptions of this app. The study was conducted in a one-semester Freshman English Speaking course for non-English majors. An experimental research method was employed, utilizing student data from an English Speaking pretest and posttest, a questionnaire, and group interviews. Based on a comparative analysis of the participants' English-speaking performance between the pre- and posttests, the intervention was found to be beneficial. The findings also revealed that the English-speaking performance of students who were more involved in out-of-class LINE-based activities improved more than the performance of those who were less involved. The quantitative and qualitative data both highlight that the observed improvements in the students' English-speaking performance can be explained by the sociable and ubiquitous nature of the LINE app. Pedagogical recommendations to fuse LINE-integrated flipped-classroom instruction into their EFL curricula more effectively are also provided.

**Keywords** Flipped classroom approach · LINE mobile app · Mobile-assisted language learning (MALL) · English as a foreign language (EFL)

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## Introduction

The effectiveness of the flipped classroom approach has been well documented across disciplines in both K-12 and higher education (Alvarez 2012; Love et al. 2014; Missildine et al. 2013). This approach inverts the usual instructional sequence: with students viewing instructional materials online before coming to class, where they are guided in the application of their newly learned knowledge with support from their instructors and peers (Bergmann and Sams 2012). Having reported increased student engagement, higher levels of student achievement, and stronger learning outcomes, this body of research implies that the benefits of flipped classrooms may be greater than those of traditional lecture-based ones (Nouri 2016; O’Flaherty and Phillips 2015; Qiang 2018). Inspired by these positive findings, some EFL researchers have looked at the potential of the flipped classroom to transform EFL instruction in a learner-centered and communicative direction (Ekmekci 2017; Hung 2017a; Lee and Wallace 2017; Mehring 2016; Sung 2015).

Most EFL classrooms across the globe are still dominated by lectures and text-based learning, which have been argued to overemphasize the transmission of superficial knowledge (Brown 2007; Lee and Wallace 2017; Li and Jones 2019). Likewise, the instructional design of EFL classes has long focused on theoretical knowledge of the English language, as opposed to the actual use of English for communication (Chang and Goswami 2011; Chung and Huang 2010). Immersed in traditional EFL classroom environments dominated by teachers’ lectures, grammar translation, and testing, non-native English-language learners tend to be passive and silent. Recognizing the need for a more learner-centered, communicative-based pedagogy, EFL researchers and educators have been exploring new instructional resources and approaches (Chi 2012).

Amid an increasing emphasis on innovative EFL instructional design, a growing body of literature has highlighted flipped classrooms’ potential benefits to students’ English-language learning (Hao 2016; Huang and Hong 2016; Hung 2015). However, while various technological tools have been deployed in flipped EFL classrooms, only a few pioneering studies have utilized mobile apps to construct such classrooms (Chen Hsieh et al. 2017a; Hung 2017b); and little research in any country has explored if, how, or to what extent such app use can support EFL teaching and learning. Importantly, most of the EFL classroom teachers felt comfortable using computer technologies for teaching (e.g., PowerPoint slides and content-relevant video and audio), but less so about incorporating mobile apps into their classroom practices (So 2016).

Recognizing the specific challenges encountered by EFL students in traditional immersive EFL oral-training classrooms, teachers and educators in the twenty-first century are constantly adopting new pedagogies and technologies. The flipped classroom has been found to be one of the most promising approaches to transforming learning experiences via the integration of technology. The flipped classroom and educational use of social network services like LINE have been drawing much attention from researchers, but only a few studies of non-English

majors' perceptions of LINE-integrated flipped-classroom instruction have been conducted in EFL oral-training courses in Taiwan. To bridge the aforementioned gaps, the present study investigated how a flipped EFL oral-training course integrated with the popular freeware instant-communications app LINE affected EFL college students' spoken-English performance and collaborative engagement. The participants' perceptions of this application were also examined.

In what follows, we will first present the recent research on the flipped classroom approach to English-language teaching and learning. In another subsection of the literature review, we will focus on the studies of the integration of mobile technologies into English language-learning contexts, with special attention to flipped EFL classrooms. Then, we will present the research methodology covering (1) research context and participants, (2) instructional design, (3) instruments, (4) procedure, and (5) data analysis. Next, we will present the results, including students' English-speaking performance, as demonstrated by comparison of the participants' pre- and post-intervention test results, and their perceptions of the LINE-integrated flipped classroom intervention based on a questionnaire and group interviews. Finally, we will discuss the results and the pedagogical implications of how to fuse LINE-integrated flipped-classroom instruction into the existing EFL curricula more effectively. Conclusions and suggestions for future research will be provided at the end.

## Literature review

The present study contributes to two distinct bodies of literature, covering (1) the flipped classroom approach to English teaching and learning, and (2) the integration of mobile technologies into language-learning contexts, with special attention to flipped EFL classrooms. The prior research in each of these areas will be reviewed in turn below.

### The flipped classroom approach to English teaching and learning

Flipped classrooms' advantages over traditional lecture-based ones in K-12 and higher-education first-language (L1) settings have been well documented (Alvarez 2012; Bergmann and Sams 2012; Love et al. 2014; Missildine et al. 2013). The recognized pioneers of the flipped classroom approach, Bergmann and Sams (2012), implemented it in their high-school chemistry classes in response to high rates of student absenteeism and concluded that it enabled more efficient use of classroom time by allowing teachers to provide students with more in-class help in understanding lesson content. In addition, students gained more ownership of their learning, increase their collaborative engagement, and enhance their mastery of course content.

Through their Flipped Learning Network (2014), Bergmann and Sams established the four pillars of F-L-I-P implementation: *flexible* environments, changing *learning* culture, use of *intentional* content, and fostering *professional* educators (see also Hamdan et al. 2013). Following the incorporation of these four pillars into

their classroom practices, researchers across various disciplines in higher education have offered further evidence of the educational benefits of the flipped classroom approach in L1 contexts (Love et al. 2014; McLaughlin et al. 2014). A growing body of literature suggests that the implementation of flipped classrooms in various disciplines can improve college students' learning and higher-order thinking (Nouri 2016; O'Flaherty and Phillips 2015; Qiang 2018). Recognizing the potential of this approach, some EFL researchers and educators have drawn on it to reform EFL instruction in a more learner-centered and communicative direction (Ekmekci 2017; Lee and Wallace 2017; Mehring 2016; Sung 2015).

Amid strong recent scholarly emphasis on the need for innovative EFL instructional design (Chang and Goswami 2011; Chi 2012; Chung and Huang 2010), the flipped classroom approach has received considerable attention. Huang and Hong (2016) investigated the effects of a flipped English classroom intervention on Taiwanese high-school students' information and communication technology (ICT) and English reading comprehension skills and found that the experimental group's scores improved significantly more than the control group's in both these areas. Similarly, Hung (2015) investigated the impacts of three different flipped-teaching formats on English-language learners' academic performance, participation levels, and learning attitudes, and found that structured and semi-structured flipped lessons were associated with better learner outcomes, attitudes, and effort.

Nevertheless, translating these positive research findings into effective classroom practices still presents challenges for students and teachers, especially in EFL contexts: with some scholars claiming that doing so relies disproportionately – and perhaps unrealistically – on students' willingness to participate in extensive out-of-class previewing and reviewing of EFL course content (Hung 2015; Roehl et al. 2013; Shih and Tsai 2017). Accordingly, researchers have employed various technological tools to facilitate EFL students' participation in such activities (Chen Hsieh et al. 2017a; Huang and Hong 2016; Hung 2017b; Lee and Wallace 2017; Mehring 2016). Although this area of research is still in its early stages, most of the results so far suggest that technology can add value to the flipped classroom approach.

## **Mobile technologies in flipped EFL teaching and learning**

### *Mobile technologies in language learning*

Over the past two decades, mobile technologies such as laptops, personal digital assistants, and mobile phones have gradually insinuated themselves into education (Sung et al. 2016). Students frequently come to class with their mobile devices, which as well as being personal and portable are socially interactive and context sensitive. The ubiquitous use of mobile technologies enables students to access learning materials and interact with teachers and peers anytime and anywhere (Hwang and Tsai 2011). Researchers and educators in disparate disciplines have identified various advantages of integrating mobile technologies into their classroom practices, including increased accessibility of the target content, and enhanced opportunities for students to learn and practice in their own way and at their own pace

(Avraamidou 2008; Chen et al. 2003; Roschelle et al. 2005). Indeed, some researchers have argued that these advantages make mobile technologies ideal for language teaching and learning (Burstun 2013).

Much of the early research on mobile-assisted language learning (MALL) focused on the exchange of text messages as a means of learning English vocabulary, and concluded that mobile technologies could be effective tools for delivering language-learning materials such as vocabulary quizzes (Cavus and Ibrahim 2009; Chen and Chung 2008; Lu 2008; Thornton and Houser 2005). In addition to content delivery, some MALL studies have utilized mobile technologies to promote communication and collaboration among learners, or between teachers and students (Frohberg et al. 2009; Kukulka-Hulme and Traxler 2005; Lin and Yu 2017), and explored the language teaching and learning potential of various new and existing mobile apps (So 2016; Yen et al. 2015), with generally positive results. For example, Hung (2017a) used the mobile app Kahoot! as a type of student response system to motivate members of a university-level flipped EFL course to complete their non-classroom-based activities. Hung argued that, as well as motivating the students to complete their assigned tasks, the app served as a formative assessment, allowing them to receive formative feedback from the teacher and their peers. Similarly, Chen Hsieh et al. (2017a) used LINE to motivate students to collaboratively complete their English-speaking activities, and claimed that the motivational enhancement they reported was in part due to the additional time and space the app provided for collaborative engagement outside the classroom. Taken together, these findings suggest that using mobile apps in a flipped classroom can be an effective approach to EFL teaching and learning.

### **Studies of the mobile app LINE in the context of EFL speaking**

Initially released in 2011, LINE has experienced phenomenal growth. It enables users of smartphones, tablets, and personal computers (among other devices) to exchange texts, photos, music, video, and audio with other LINE users (Wikipedia 2017). Its strongest user base is in Asia, notably Japan, Taiwan, Thailand, and Indonesia (Smith 2017). One emerging line of research investigates how LINE can be used for language teaching and learning, especially in Asian EFL oral-training courses (Chen Hsieh et al. 2017a; Chen Hsieh et al. 2017b; Liu 2016; Liu and Wu 2016; Wu and Marek 2016). Liu and Wu (2016) used LINE to design post-class tasks for a group of Taiwanese English majors, including English-conversation role-play that required them to speak, write, and interact with each other in contextualized, content-related scenarios. These activities helped their participants work together more effectively on collaborative tasks. Wu and Marek (2016) successfully incorporated LINE into their design for cross-cultural collaboration in language learning; Liu (2016) used it as a conversational tool to enhance Taiwanese English majors' English-speaking skills; and Chen Hsieh et al. (2017a; 2017b) reported that integrating LINE into a flipped EFL oral-training course led to improved learning outcomes. These positive findings represent solid evidence that LINE can create alternative dialogic spaces for EFL learners'

English-language speaking practice, a feature likely to prove especially useful in countries where natural out-of-class English practice is limited. Various studies have also pointed out that non-English majors' learning of English speaking beyond their local EFL classrooms normally suffers due to large class sizes and limited classroom hours (Chen 2015; Lin 2007; Sun and Yang 2013). Additional LINE research using samples of non-English majors is therefore needed.

To bridge the aforementioned gaps, the current study examines the impact of a flipped EFL oral-training course incorporating LINE on non-English majors' English-speaking performance and collaborative engagement. Three research questions guided this study: (1) Did the LINE-integrated flipped classroom intervention improve the students' English-speaking performance? (2) What is the relationship between students' frequency of post-class LINE practice and their speaking performance? (3) How did the students perceive their LINE-integrated flipped English classroom experiences?

## Methodology

### Research context and participants

This study was conducted in a Freshman English Speaking class at a university. A total of 38 freshmen enrolled in this course (all aged 19–20) were invited to participate, and all agreed to do so on a voluntary basis. They were informed that their classroom performance, including speaking-test performance, responses to questionnaires, and contributions to student-group interviews would be used for research purposes, and all provided full consent to such use of their data. All 38 participants signed a consent form regarding their participation in the research, which was explained to them as an exploration of their learning experiences in the LINE-integrated flipped EFL instruction. However, the participants were informed about their right to exit the study at any time and to request to have their data deleted. They were also informed how the collected research data would be stored, preserved, and used and how confidentiality could be protected when needed. For example, their group interviews were tape-recorded; however, their names were not recorded on the tapes. Their names and identifying information were not associated with any part of the written report of the research. All of their information, English speaking test scores, questionnaire responses, and group interviews were kept confidential. This study was approved by National Cheng Kung University (NCKU) Research Ethics Committee for Human Behavioral Sciences.

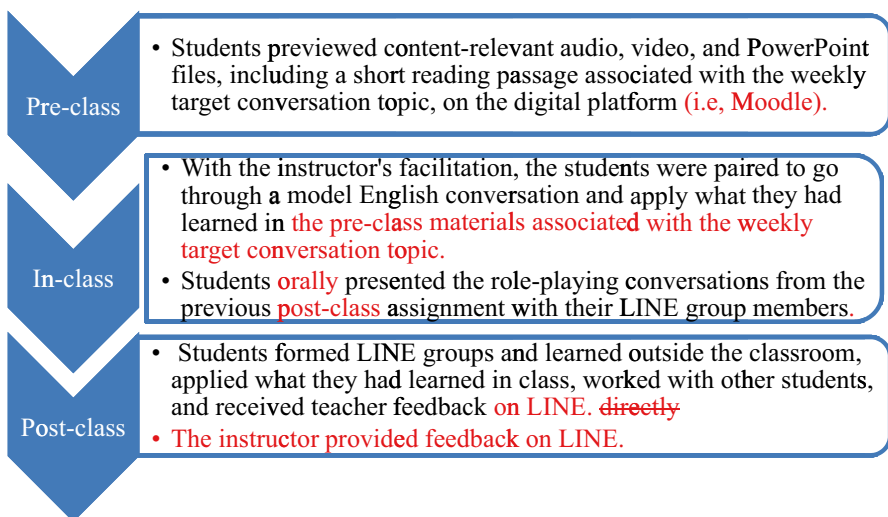
The course met for two hours per week for 18 weeks, of which all but the first and last included LINE-integrated flipped EFL instruction. At the beginning of the course, the instructor explained what the students were expected to do in the LINE-integrated flipped classroom and post-class LINE activities. All the participants already had smartphones with LINE installed.

## Instructional design

To protect the right of the members of the target course to receive an equal quality of classroom instruction, the researchers made the purposeful decision not to divide them into a control group and an experimental group. Accordingly, all students took the English Speaking pretest and posttest before and after the intervention.

As shown in Fig. 1, the flipped classroom work was conducted in a three-stage cycle of learning activities. For the first stage, pre-class learning activities, the instructor uploaded textbook-based instructional audio, video, and PowerPoint presentation files onto Moodle for students to preview anywhere and at their own pace. Before coming to class, the students were asked to access the weekly assigned Moodle files, including a short reading passage, to prepare them for in-class learning tasks and discussion. The target English-conversation topics covered by the weekly assigned Moodle files included Favorite Foods, Physical Appearance, Clothes and Fashion, Jobs and Skills, Weather, and Personal Qualities.

For the second stage in-class learning activities, the students expressed their opinions and questions about the reading passage in groups and their questions were answered in class. The instructor then briefly went through the reading text and checked students' comprehension. Next, the students were paired off to engage in English conversations linked to the week's target conversational topic. As these pairs collaborated on orally presenting the model English conversation, the instructor circulated and facilitated the activity, assisting when required to meet the students' individual needs. After that, the students orally presented the role-playing conversations from the previous post-class assignment with their LINE group members. Finally, towards the end of each class session, for their next post-class assignment, the students received and viewed the new role-playing prompts that explained



**Fig. 1** Instructional design of LINE-integrated flipped classroom

their roles and tasks for the post-class activities and formed groups of two, three, or four, according to the scenario in LINE groups.

In the third, post-class stage, the groups of students that formed at the end of the preceding class session participated in role-playing activities using LINE, applying what they had learned (e.g., the target vocabulary and expressions) and working together to write their own role-playing conversations. After writing out a transcript of such a conversation, each student took turns practicing it with the assistance of their instructor and fellow group members on LINE. When each individual student felt ready, they later collaborated with their LINE group members in English and audio-recorded the role-playing English conversations. Then, they uploaded audio recordings of the role-playing conversations to their LINE groups. The instructor also joined the students' LINE groups to provide immediate assistance and to monitor students' interactions.

## Instruments

The instruments used to collect data for the present study included speaking tests, a questionnaire, and group interviews. All participants were asked to take a speaking test twice, once in week 1 (the pretest) and once in week 17 after the intervention had concluded (the posttest), individually in a face-to-face setting. The pre- and posttest questions were of the same level of difficulty. All students' spoken responses were audio-recorded for grading by two raters on the criteria of fluency, accuracy, content, and organization. Each rater independently assigned a score with a maximum of 100, and the raw scores were then averaged for data analysis. Both raters are college teachers who are experienced in teaching EFL conversation courses.

The questionnaire had three subscales covering pre-, in-, and post-class activities, and was used to measure students' perceptions of the intervention. It was administered the week after the intervention ended, with all responses given on a seven-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree. In addition to the questionnaire, the students were invited to participate in group interviews to allow the researchers to better understand their experiences and perceptions of LINE-integrated flipped classroom learning. Simultaneously, the LINE discussion messages were examined for evidence of how and how often the students interacted with their group members through the app.

## Procedure

In Week 1, as noted above, the pretest of the participants' baseline English-speaking proficiency was administered. In Week 2, the students were introduced to the objectives and participation requirements of the LINE-integrated flipped classroom, and given an explanation of how LINE was to be used for the post-class role-playing conversation activities.

During the instructional intervention, i.e., in Weeks 3–16, the students completed lessons on the target English-conversation topics and participated in the three stages of flipped-classroom activity described above. All messages that were delivered via



LINE during both the weekly classroom sessions and the post-class role-playing activities were collected for subsequent analysis. Figures 2 and 3 present a sample of LINE conversation activity.

In Week 17, all participants took the posttest and completed the questionnaire. Then, one week after the end of the course, each was invited to one of eight group

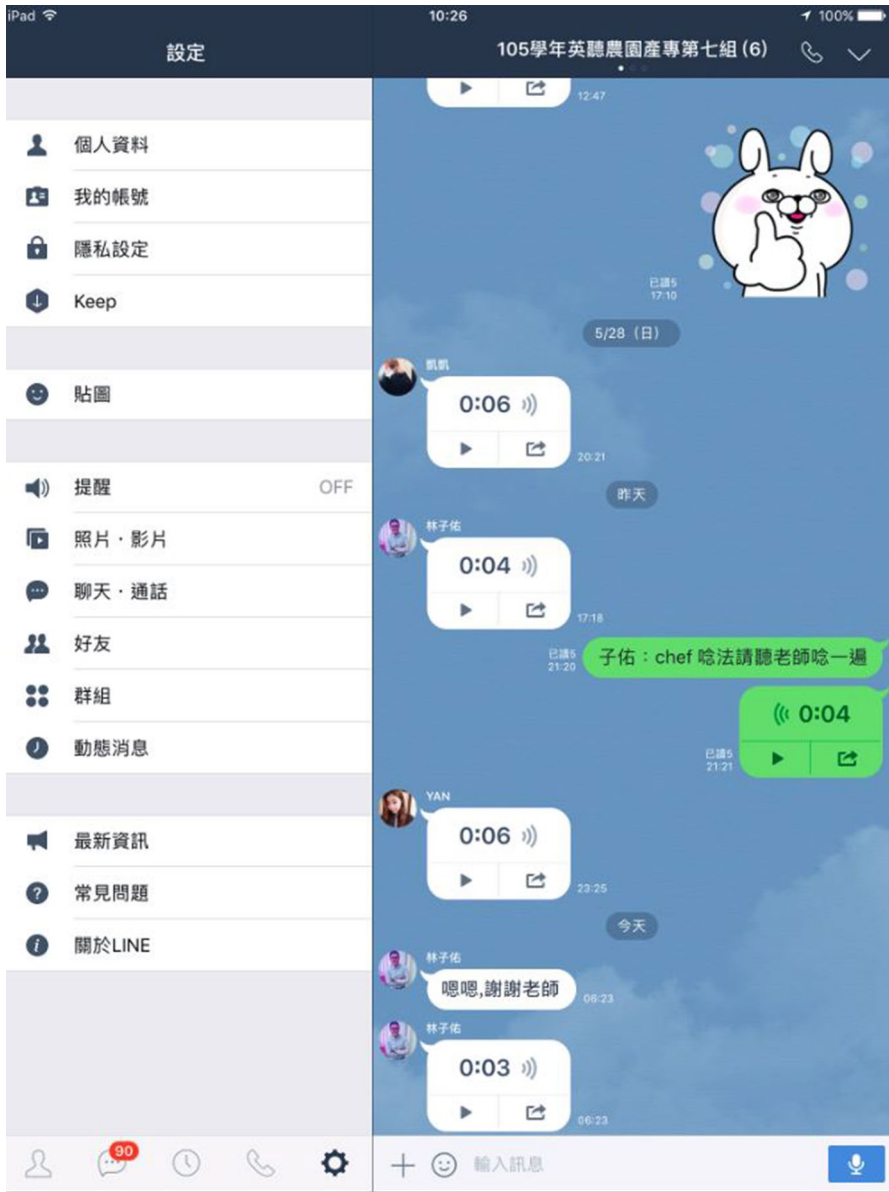
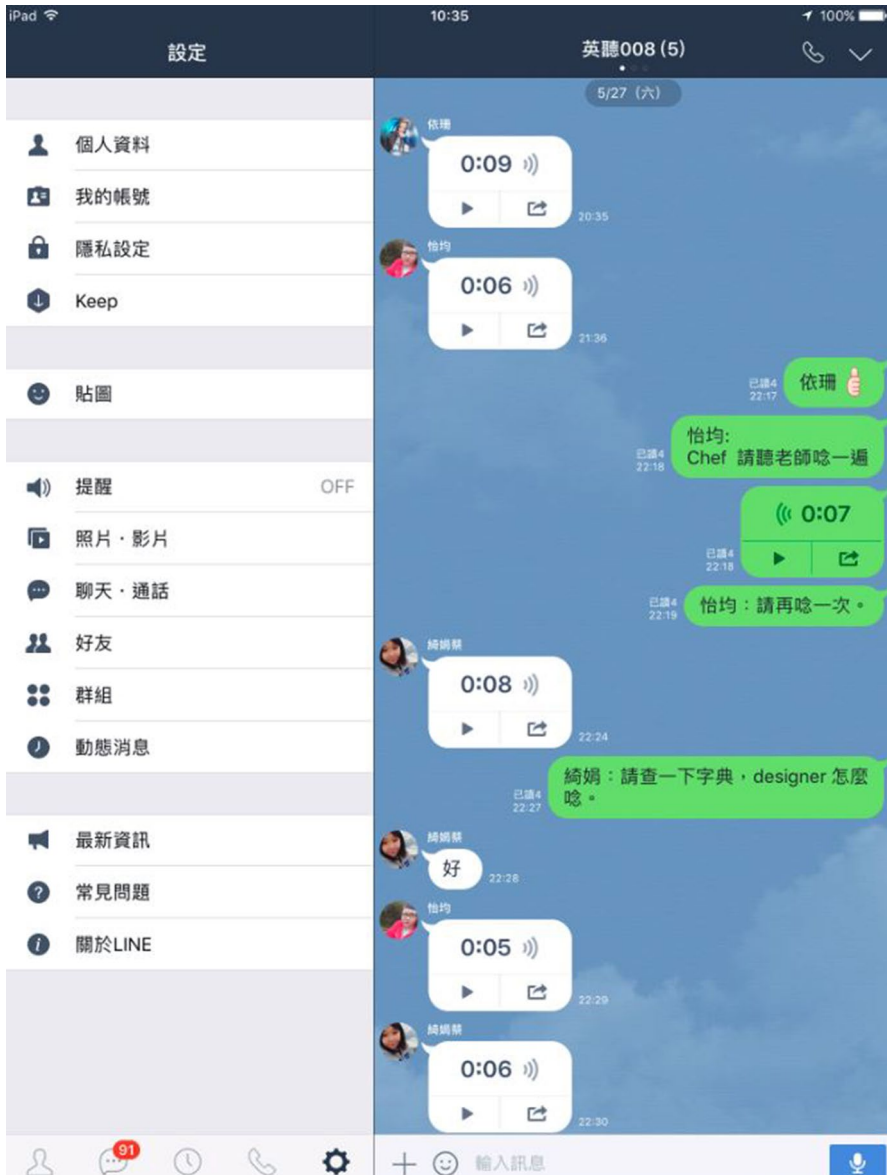


Fig. 2 A screenshot of LINE group calls within group 7



**Fig. 3** A screenshot of LINE group calls within group 8

interviews, and all attended. The largest group to be interviewed comprised five students, and the smallest, four. The semi-structured interviews addressed three main topics: the students' learning experiences during the course; their individual use of and group interactions via LINE for the completion of post-class role-playing activities; and their overall reflections on the LINE-integrated flipped classroom

intervention. All eight group interviews were digitally recorded, and each lasted about 30 min.

## Data analysis

Quantitative data analysis including descriptive statistics, *t*-tests, and correlations was performed using SPSS statistical software. First, the mean difference between the students' pre- and posttest results was computed. Second, a correlation test was applied to examine the relationship between the students' frequency of involvement in post-class role-playing LINE conversations and changes in their speaking performance. To further explore the effects of the intervention, the students were classified into two groups—active and inactive LINE users—based on the frequency with which they participated in out-of-class LINE activities, and an independent *t*-test was conducted to check for any significant difference in speaking performance between these two groups.

Descriptive analysis of the data from the Likert-scaled questionnaires was analyzed, and means and standard deviations for each questionnaire item were computed. For the qualitative data from the group interviews, the researchers utilized the constant comparative analytic method: an inductive data-coding process used to classify, compare, and analyze qualitative data (Glaser and Strauss 1967; Merriam 2009). This enabled them to identify and compare all the recurrent issues, themes, patterns, and categories relevant to the students' experiences and perceptions of the LINE-integrated flipped classroom intervention, and where these experiences and perceptions converged and diverged.

## Results

### Speaking performance

To address Research Questions 1 and 2, the main effects of the intervention were examined via *t*-testing of the students' pretest and posttest speaking-performance scores. As shown in Table 1, these scores differed significantly (66.50 vs. 78.53,  $p < 0.001$ ). In addition, the students' frequency of involvement in LINE-based conversational role-playing activities was found to be positively and significantly correlated with their speaking performance ( $r = 0.372$ ,  $p = 0.026$ ), as shown in Table 2.

The average frequency of LINE use during a single role-playing conversation activity was 5.86. Students with a frequency higher than 6.00 were classified as

**Table 1** Difference between pretest and posttest scores

	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
post	78.53	11.4	35	7.712***	.000
pre	66.50	5.43			

\*\*\* $p < .001$

**Table 2** Correlation between students' oral performance and LINE use ( $N=38$ )

	LINE frequency	Oral performance	$p$
LINE frequency	1	.372*	.026
Oral performance	.372*	1	

\* $p < .05$ 

active LINE users, and those with a frequency lower than 6.00 were classified as inactive LINE users. Six students who scored exactly 6.00 were excluded from this inter-group comparison, leaving 18 students in active group and 14 in the inactive group. As shown in Table 3, the active LINE users had significantly better oral performance than the inactive ones did ( $M_A = 83.89$ ,  $SD = 7.19$ ;  $M_I = 73.36$ ,  $SD = 12.74$ ;  $t = 2.769$ ,  $p < 0.05$ ).

### Perceptions of the LINE-integrated flipped-classroom intervention

Data from the questionnaire and group interviews were collected to address Research Question 3. Table 4 summarizes the students' responses regarding the 16 weeks of flipped classroom instruction and each of its three component types of learning activities. Overall perceptions of the flipped classroom were highly positive, at 5.93/7. In terms of the participants' use of LINE for post-class activities specifically, the average score was 5.64/7.

Table 5 presents students' perceptions towards the intervention's use of LINE as a tool for flipping the EFL conversation classroom, and especially for supporting post-class role-playing activities. The mean scores of the responses to the 12 relevant questionnaire items were all higher than 4.0, indicating that the students had generally positive attitudes towards this use of LINE. More than 70% of the students also reported that LINE practice activities decreased their English learning anxiety; boosted their confidence about speaking English; stimulated their learning motivation; provided them with more opportunities to interact with their instructor and classmates; were a useful means of practicing English speaking; and were

**Table 3** Comparison of oral test scores of the active and inactive groups of LINE users

Group	$N$	$M$	$SD$	$t$	$p$
Active	18	83.89	7.19	2.769*	.012
Inactive	14	73.36	12.74		

\* $p < .05$ **Table 4** Students' perceptions of their flipped-classroom experiences

	$N$	Min	Max	$M$	$SD$
Pre-class activities (via Moodle)	34	2.0	7.0	5.54	1.28
In-class activities (via game)	34	4.6	7.0	6.61	.61
Post-class activities (via LINE)	34	2.7	7.0	5.64	1.25
Overall	34	3.7	7.0	5.93	.90

**Table 5** Students' perceptions of LINE-integrated activities

Item	Min	Max	Mean	SD	Percentage (>4)
Practice on LINE lowers my anxiety	2.00	7.00	5.500	1.461	73.5
Practice on LINE improves my learning motivation	2.00	7.00	5.382	1.336	76.5
Practice on LINE increases the interaction between my teacher and me	2.00	7.00	5.571	1.421	76.5
Practice on LINE increases the interaction between me and my classmates	2.00	7.00	5.559	1.439	76.5
Practice on LINE improves my confidence when speaking English	2.00	7.00	5.588	1.416	79.4
LINE is useful for practicing English speaking	2.00	7.00	5.705	1.382	82.4
LINE is easy to use for practicing English speaking	2.00	7.00	5.471	1.461	73.5
LINE is convenient for practicing English speaking	2.00	7.00	5.412	1.459	70.6
I like the teacher's feedback on LINE	3.00	7.00	5.794	1.321	76.5
Teacher's correction on LINE is helpful	3.00	7.00	5.941	1.229	82.4
I like oral correction from the teacher on LINE	3.00	7.00	5.882	1.225	82.4
Oral correction on LINE is useful	3.00	7.00	5.882	1.175	82.4

convenient and easy. More than 80% expressed their appreciation for the teacher's immediate LINE feedback, whether in textual or oral form.

In addition to confirming their generally positive perceptions of the integration of LINE into their flipped-classroom experience, the students' group-interview data yielded two major themes: (1) the ability of LINE to support English-speaking practice and (2) the use of LINE to perform role-playing conversation activities. The benefits of LINE acknowledged by the students tended to support the viability of the flipped classroom approach that was implemented in the target EFL conversation classroom.

### **Ability of LINE to support English-speaking practice**

The majority of the participants stated that their anxiety about speaking English in class resulted from their fear of others students' negative evaluations. More specifically, many said that recording their spoken English via LINE, as compared with the conventional English-conversation course task of speaking English in front of their peers, resulted in lower anxiety about speaking English publicly and enhanced their confidence about doing so. As one student explained:

When being forced to speak English in front of my peers in English classes, I was concerned about losing face and I would rather keep silent. But with a smartphone and mobile app, I feel more comfortable while doing English speaking practice and recording English conversations.

Another remarked, "my smartphone and the mobile app LINE allow me to practice speaking English and record English conversations anytime, anywhere, at my own pace." In other words, the ubiquitous nature of the mobile app LINE helped the sampled EFL college students to practice more and feel better prepared for the challenging task of speaking English.

### **Use of LINE in role-playing conversation activities**

The majority of the students pointed out that LINE was a useful means of reducing the coordination cost of role-playing conversation activities. In other words, group work outside of classrooms generally requires more time to coordinate schedules, arrange meetings, meet, correspond, and make decisions collectively, but by using their smartphones and LINE, the participants reported being able to reduce these coordination costs by exchanging texts and audio/video messages while drafting, revising, and recording their role-playing conversation transcripts anytime and anywhere; and they linked this flexibility to increases in their motivation to collaboratively engage in post-class learning activities. As one put it,

For group work outside the classroom, it's not easy to schedule our meeting time. Two group members live in the dormitory and the others live off campus. We have different course schedules and some have part-time jobs. But our smart-

phones and LINE have done a lot of work to help us do our group work without being limited by space and time problems.

One participant further described how smartphones and LINE created a virtual rehearsal space that helped enhance the students' preparedness and confidence in their preparedness, and thus the quality of their final performance (i.e., of role-playing English conversation):

With the assistance of my smartphone and the mobile app LINE, I can practice speaking English and record my own part several times. Then I would send my audio messages [of English conversations] to my partners. They could help check for the errors and I would revise my own part. Our audio messages would go back and forth among our group members before our final presentations. The audio recording and audio messages via LINE offers us rehearsal space before the final presentations. The final presentation we sent to the instructor might be the ninth or tenth version.

In addition to praising LINE's effectiveness as a rehearsal space for their collaborative role-playing, many students stated they had benefited from LINE-facilitated teacher actions. About this, one stated that the teacher's immediate feedback and correction via LINE had engaged students in the post-class activities more deeply than might otherwise have been the case:

[T]he instructor joined our LINE group and her immediate assistance and feedback could stimulate the motivation of our group members; without the instructor's immediate feedback and supervision via LINE, we might not have felt as engaged or obligated to complete our group work outside the classroom.

The majority of the participants concurred that the teacher's immediate feedback and correction via LINE encouraged them to interact with her during collaborative role-playing conversation activities. As a corollary, they cited a range factors that they saw as obstacles to interacting with the instructor in class, notably including their self-perceived low English proficiency; their desire to avoid voicing opinions that the instructor might perceive as disrespectful; and their preexisting habits of having informal discussions with the teacher outside the classroom. As one student explained,

In English speaking class, we were usually careful about our own speech and tended to keep silent. Although we had questions, we would wait until after class to talk to the teacher privately. Now, with the mobile app, the instructor's immediate feedback and supervision via LINE made us feel more comfortable to ask the teacher questions or to respond to her questions.

## Discussion and implications

The present study's positive findings with regard to its first and second research questions echo the previous literature on the integration of LINE into flipped EFL classrooms (Chen Hsieh et al. 2017a), and confirm that flipping EFL oral-training

classrooms using mobile apps such as LINE can be an effective instructional design for non-English majors as well as English majors. Comparison of the participants' pretest and posttest scores indicated that the LINE-integrated flipped-classroom intervention benefited these non-English majors' speaking performance, which mirrors the results of much of the research conducted on students' active learning and learning performance in L1 settings (Bergmann and Sams 2012; Love et al. 2014; Missildine et al. 2013), in that the LINE-integrated flipped classroom intervention enabled the EFL students to do out-of-class previewing and reviewing of course content at their own pace, such as by studying Moodle files and working on role-playing conversation activities via LINE. This lends some additional support to the limited literature on the application of the flipped classroom approach in non-L1 settings such as EFL teaching and learning contexts (Huang and Hong 2016; Hung 2017a; Lee and Wallace 2017).

Even more than the significant difference between the pre- and posttest English speaking scores, the present study's finding of a high positive correlation between the students' frequency of involvement in LINE-based activities and their speaking performance lends some support to prior studies' arguments that the effectiveness of flipped EFL classroom instruction relies on students participating in out-of-class previewing and reviewing of course content (Roehl et al. 2013; Shih and Tsai 2017). Researchers have identified many factors as obstacles to flipping EFL classrooms, including the students' unwillingness to engage in out-of-class previewing and reviewing activities (Huang and Hong 2016; Hung 2015); and various technological tools have been employed to facilitate the participation of EFL students in such out-of-class activities and/or enhance their willingness to participate in them (Chen Hsieh et al. 2017a; Huang and Hong 2016; Hung 2017b; Lee and Wallace 2017; Mehring 2016). In light of prior recognition of the importance of fostering students' engagement in out-of-class activities in flipped EFL classrooms, the present study represents an important contribution to the relevant literature.

Most non-English majors regard speaking English as the most anxiety provoking of the four English-language skills, and their learning of this skill is hindered by large class sizes and limited class hours (Chen 2015; Lin 2007; Sun and Yang 2013). Echoing such findings, the non-English majors in the current study also expressed anxiety about speaking English publicly due to their worries about negative evaluations by the teacher and their peers. This study has shown that the flipping of an EFL oral-training classroom, augmented by the use of the mobile app LINE, can have a positive impact on how non-English majors perceive the English-language learning environment and engage in English speaking. While previous studies have acknowledged LINE's positive effects in terms of the creation of alternative dialogic spaces for EFL learners' English-language speaking practices (Chen Hsieh et al. 2017b; Liu and Wu 2016; Wu and Marek 2016), the current study took a further step by flipping the EFL oral-training classroom in which LINE was used. As the results make clear, many of the sampled non-English majors felt that recording their spoken English via LINE, as compared with the conventional task of speaking English in front of their classmates, resulted in lower anxiety about speaking English publicly and enhanced their confidence about doing so. This has demonstrated the potential of the LINE-integrated flipped classroom approach to decrease learners' English-speaking



anxiety, boost their confidence about speaking English, and facilitate their engagement in English-speaking practices.

Exploration of the current study's third research question, regarding perceptions of flipped classroom instruction in general and of its integration of LINE in particular, revealed widespread affirmation that LINE fostered a social environment that effectively supported the participants' English-speaking practice and – especially – their out-of-class group activities. More specifically, the LINE-integrated flipped classroom afforded these non-English majors more opportunities and space to (1) engage in target-language conversations in which they could apply what they had learned in class, (2) work together with their fellow group members, and (3) receive direct feedback from the teacher. The participants also commented on LINE's advantages for intra-group communication, such as cost-free exchange of one-on-one and group audio/video messages, both formally and informally, and unconstrained by either time or space considerations.

Another strength of the integration of LINE into the flipped EFL oral-training classroom was that the teacher's immediate feedback and correction via LINE enhanced teacher–student interaction. This afforded the teacher more opportunities to individualize learning based on the students' specific needs and interests: an approach whose importance has been highlighted in prior research on the flipped classroom (Bergmann and Sams 2012; Love et al. 2014). These non-English majors' positive perceptions of the integration of LINE into the flipped classroom confirm the potential of this and/or other similar mobile apps to enhance such students' participation in out-of-class conversation activities; thus, to transform traditional immersive EFL oral-training classrooms where students focus passively and silently on their teachers' lectures (So 2016; Yen et al. 2015).

The findings of the current study suggest that the integration of mobile apps into an EFL flipped classroom holds great promise for English-language teaching and learning. Aided by mobile apps such as LINE, the flipped classroom approach can take on a new form, providing EFL learners with more speaking opportunities, extending their learning experiences outside the classroom, and expanding how they can communicate, learn, and practice speaking English with their peers and teachers. On the subjective level, the present study has clearly demonstrated that English-speaking practice and interaction in a social-networking environment during LINE-integrated flipped-classroom activities lowered non-English majors' self-reported English-speaking anxiety; boosted their confidence about speaking English; provided them with more opportunities to interact with their instructor and classmates; and enhanced their engagement in out-of-class activities. Thus, it is believed that LINE-integrated flipped classrooms have the potential to stimulate students' English-speaking motivation and performance.

These results of the present study have several pedagogical implications. First, the use of LINE in flipped EFL classrooms can improve EFL college students' English-speaking performance, as demonstrated by comparison of the participants' pre- and post-intervention test results. Second, the use of LINE in flipped EFL classrooms can create alternative dialogic spaces for EFL college students' collaborative engagement, in which increased opportunities for both English-speaking practice and other interactions with fellow group members and teachers via social

networking can lower their anxiety about speaking English and enhance their confidence. Hence, LINE-integrated flipped-classroom activities have the potential to increase non-English majors' English-speaking motivation. And third, LINE-integrated flipped-classroom activities can provide teachers with more opportunities to individualize learning based on students' specific needs, interests, and learning speed. Unlike traditional lecture-based EFL classrooms, in which students are generally expected to focus passively and silently on lectures, teachers in flipped classrooms no longer deliver direct lectures and instruction, and this frees them to draw on freely available technology, including mobile apps such as LINE, as they take on their new roles as facilitators and increasingly work with students on a one-on-one basis. However, while most teachers in EFL classrooms feel comfortable using computer technologies for teaching, many do not feel as comfortable about incorporating mobile apps. Thus, there is a need to provide in-service teachers with professional development focused on the incorporation of new technologies and pedagogies into their current classroom practices, including the use of mobile apps in flipped classrooms.

### Conclusions and suggestions

Recognizing the specific challenges encountered by EFL students in traditional immersive EFL oral-training classrooms, teachers and educators in the twenty-first century are constantly adopting new pedagogies and technologies. The flipped classroom is arguably one of the most promising approaches to transforming learning experiences via the integration of technology. The results of the study shed light on how mobile apps such as LINE can be perceived as creating useful alternative dialogic spaces for learners' collaborative engagement. As shown in this study, through the aid of mobile apps LINE, the flipped classroom approach can take on a new form: providing EFL learners with more speaking opportunities, extending their learning experiences beyond the classroom, and expanding how they communicate, learn, and practice speaking English with their teachers, peers, and others. It is hoped that the findings and recommendations of this study can help teachers consider the possibilities of embedding available mobile technology into their flip teaching, and effectively fuse LINE-integrated flipped-classroom instruction into their EFL curricula. The study is also expected to serve as a basis for future research on effective integration and implementation of innovative instructional designs in college-level EFL teaching and learning.

It should be acknowledged, however, that the present study is not without limitations. For example, the present study has provided empirical evidence that flipping an EFL classroom with LINE can enhance non-English majors' English-speaking performance and collaborative engagement; yet, it has several limitations that should be borne in mind when interpreting or generalizing from its results. First, the number of participants was low, at 38, and limited to a relatively homogeneous group. It is therefore recommended that future researchers recruit a more diverse group of participants to enhance their findings' generalizability. Second, to protect the equal right of all participants to receive LINE-integrated flipped EFL classroom

instruction, the researchers made a purposeful decision not to divide the students into a control group and an experimental group, but instead relied on the results of the English Speaking pretest and posttest that were administered to all participants. As such, researchers in the future should consider the use of control groups, chosen by scientific random-assignment methodologies, to clarify how student-performance changes associated with the intervention compare to those associated with traditional teaching methods.

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### Compliance with ethical standards

**Conflict of interest** The authors report no conflict of interest.

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