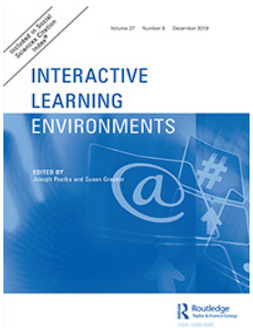

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# The effectiveness of the student response system (SRS) in English grammar learning in a flipped English as a foreign language (EFL) class

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**ABSTRACT**

Flipped classes are well-known for reversing the typical in-class lecture and out-of-class homework structure by instructing students to learn by themselves from on-line learning materials and inviting them to ask questions based on their individual difficulties in class. Many attempts at integrating this teaching method into English as a foreign language (EFL) classrooms have proven to be beneficial to students' learning achievement and motivation. However, there is little research on how to organize interactive, engaging and effective in-class activities for an EFL flipped classroom. In this study, a student response system (SRS) is proposed to support teachers in organizing in-class activities in a flipped class. To investigate the effectiveness of this approach, a quasi-experiment was conducted in an EFL classroom in an engineering school. The experimental group used the SRS to do in-class activities while the control group followed the conventional method. The results showed that the use of the SRS increased students' learning motivation and self-efficacy in learning English grammar and improved their participation and engagement in the in-class activities of the flipped learning process. Furthermore, the questionnaire results showed that students accepted the SRS as an instructional method in an EFL flipped class. However, the use of the SRS was not effective in improving students' grammar learning achievement.

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**KEYWORDS**
Flipped class; student response system; EFL grammar

## Introduction

English grammar is difficult for many students because it requires understanding of abstract concepts and complicated application in daily communication (Abdulmajeed & Hameed, 2017). Moreover, EFL grammar is very challenging because students who speak English as a second language are not in a natural language environment (Darus & Subramaniam, 2009). Compared with all other aspects of English, grammar and vocabulary are the crucial parts of constructing fluent and accurate sentences in communication (Zhang, 2009). Broadly speaking, the importance of English grammar should be emphasized because it is an instrument of language learning not a learning object (Debata, 2013; Kachru, 2010; Rutherford, 2014). Therefore, knowing grammar is not enough, and successful transferring from knowledge to communication matters more (Nan, 2015). Therefore, there is the need to design a better EFL curriculum to improve students' learning motivation.

English, as the most widely used language in the world and most frequently taught as the second foreign language, many researchers investigated the challenges and difficulties that teachers and

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students face. Larsen-Freeman (2003a, 2003b) analysed grammatical difficulty in terms of linguistic form, semantic meaning, and pragmatics, emphasizing that the use of grammar is more difficult for students. Shiu (2011) examined EFL learner perception in this area by using a questionnaire to investigate 20 selected features of grammar. Graus and Coppen (2015) examined the difficulties regarding 31 grammar points. It is more challenging to teach students with lower motivation and even resistance towards learning EFL grammar. Therefore, there is the need for offering a more inspiring instructional method.

The flipped classroom seems to provide an active learning environment by inverting homework and in-class activities (Jensen, Kummer, & Godoy, 2015). The flipped class makes it possible to create a student-centered interactive and communicative learning environment to improve students' motivation (Mehring, 2016), which is meaningful for teaching and learning grammar, the most difficult component of EFL. Adoption of the flipped learning approach in an EFL class requires preparing pre-class videos and optimizing in-class activities, which means more preparation before coming into the class and more interaction in class to ensure learning effectiveness. Many flipped learning researchers have studied pre-class aspects including video making, learning content design and student online feedback (Lancaster, 2013) while fewer studies focused on the in-class activities design.

This study concentrated on the student response system (SRS) in a flipped EFL classroom to engage students to participate in in-class activities and motivate them to watch the videos online before coming to class. Several previous studies examining the benefits of the SRS, or a similar polling instrument, indicated that they improve students' academic performance, at least some limited ranges (Bandura, 1977; Hung, 2017; Sun, 2014). Academic performance can easily be measured by learning achievement in certain subjects, which is more related to mastery-based learning goals (Nicholls, 1984). Moreover, students' academic performance may be influenced positively by their active engagement in the classroom (Johnson, 2005). In this study, a newly designed in-class activity with the SRS was used to investigate how it affects students' academic performance in mastering EFL grammar. Four variables have been measured: learning achievement, learning motivation, self-efficacy and engagement in grammar activities. In addition, acceptance of the SRS by students has also been investigated since acceptance of a new teaching tool by students is the key element for the progress of learning activities.

## Literature review

### *Active learning theory*

Active learning, which is often perceived as a radical change from the traditional instruction, has attracted the attention of both academia and faculty over the past several years (Prince, 2004). Active learning theory has also been well introduced in the education field with regard to integrating technology in a classroom (Hoffman & Goodwin, 2006). Active learning in course-related activities refers to engaging learners actively in the learning process through discussion, analysis, synthesis and evaluation rather than through passively absorbing instruction of a lecturer. Generally speaking, active learning theory emphasizes the importance of students' active participation in the instructional process (Singh & Mohamed, 2012). Furthermore, grounded in constructivist and social-cultural learning theories, another study has synthesized and categorized four different types of in-class activities in college science classroom settings, which indicated that active learning is linked to positive learning outcomes (Arthurs & Kreager, 2017).

It is possible to put in action the active learning theory with the help of technology, especially through the student response system (SRS). And the current consensus is that the SRS, or similar tool, has positive influence on students' cognition, attitudes and behaviours in learning activities (Hunsu, Adesope, & Bayly, 2016), which refers to better learning achievement, higher motivation to learn, higher level of self-efficacy and more effort in class engagement.

### *In-class activities in an EFL flipped classroom*

The concept of the flipped class proposed by Bergmann and Sams (2012) implies that traditional class lectures are put online and are used as homework for preparing for the class, while questions-answers, group discussions, problem-based projects and other interactive learning exercises are used as in-class activities. Recently, the amount of research integrating the flipped class approach in language teaching and learning has been increased greatly (Hsieh, Wu, & Marek, 2017; Hung, 2015).

The key element for introducing flipped learning in an EFL classroom is thoughtful planning (Butzler, 2015). Several recent studies payed attention to the impact of the in-class activities design on students' learning performance. Gopalan and Klann (2017) investigated the effects of team-based learning on student performance in the flipped learning process and discovered that students prepared more and better. Danker (2015) adopted in-class learning activities including inquiry-based learning, active learning, and peer-learning in his study in a performing art course. Wasserman, Quint, Norris, and Carr (2017) used conceptual activities and homework problems as in-class activities and no huge difference in students' performance and perception was found. DeLozier and Rhodes (2017) examined out-of-class activities (e.g. video lectures) and in-class activities (e.g. quizzes and student discussions) of both flipped and non-flipped classes practice, and emphasized the importance of learners' individual engagement and practice in these learning activities. Therefore, it is necessary to design effective in-class activities to ensure the quality and effectiveness of a flipped classroom in improving students' learning achievement, learning motivation, self-efficacy and engagement in activities, which were found to be frequently investigated variables in various studies.

### *Flipped in-class activities with the SRS*

Self-regulated behaviour is a key requirement for flipped learning process and it directly relates to students' performance in class (Sletten, 2017). There are two imperative elements which influenced students' self-regulation behaviour in learning EFL: learning motivation and self-efficacy. Motivation theory has been developed in many disciplines, such as biology, psychology, management and education (Alkaabi, Alkaabi, & Vyver, 2017) and also has been studied in multiple dimensions, including cognition, phenomenology and culture. Learning motivation focused on learners' both internal and external motivation to initiate and sustain goal-directed action or get involved in one activities but avoid others, which emphasizes the mastery of objectives (Nicholls, 1984). Self-efficacy is an integrative theoretical framework to explain psychological procedure and to predict the coping behaviours to realize the goals (Bandura, 1977). Thus, self-efficacy in learning environment refers to psychological expectations of learners to initiate behaviour, and the expected efforts to expend and sustain in the face of obstacles. Distinguishing the nuances of motivation and self-efficacy facilitate analysing students' learning behaviour effectively. Accordingly, learning motivation and self-efficiency for the EFL also strongly determine students' learning performance regardless of whether it is a class with a traditional instruction or a flipped class. A probable direct way to increase the learning motivation and self-efficacy may innovating methods to organize learning activities in the class. Mehring (2016) proposed several possible technological tools for an EFL flipped classroom. One of them is the Student Response System that provides an immediate and real-time assessment by clickers or other interactive programmes, which enables instructors to ask students questions and immediately collect their responses and display the responses of the entire class (Draper & Brown, 2004; Preszler, Dawe, Shuster, & Shuster, 2007; Trees & Jackson, 2007). This approach provides EFL teachers in a flipped class an effective method to organize their in-class activities through several basic steps: ask a question, gather responses, display responses and generate a report. In this way, an in-class lecture in a flipped EFL (Lancaster, 2013) could be effective at engaging and teaching students, probing their understanding and ensuring students are able to apply knowledge effectively.

Therefore, in this study, the SRS in an EFL flipped class is proposed for assisting students in learning English grammar and for motivating them to prepare well during a pre-class phase and engage in

in-class activities. Moreover, some research questions are investigated to evaluate the effectiveness of the proposed approach:

Q1: Can an interactive flipped class with the SRS improve students' learning achievement in EFL grammar in comparison with conventional flipped learning?

Q2: Can an interactive flipped class with the SRS improve students' learning motivation in EFL grammar in comparison with conventional flipped learning?

Q3: Can an interactive flipped class with the SRS improve students' self-efficacy in EFL grammar in comparison with conventional flipped learning?

Q4: Can an interactive flipped class with the SRS improve students' engagement in pre-class phase in comparison with conventional flipped learning?

Q5: How do students perceive the SRS in learning EFL grammar? Do they accept this new method?

## Method

### *Participants*

We invited 50 second-year students in the French Engineering Institute (INSA Strasbourg) to participate in our learning activities. We randomly divided these students into the control group and the experimental group with different approaches to organize in-class activities in an EFL flipped classroom. The experimental group consisted of 26 students learning with the interactive SRS method, that is, using a platform to give student immediate responses to organize the in-class activities. On the other hand, the control group students ($N = 24$) learned with the conventional video-based flipped learning approach and did the same exercises, group tasks and a mini workshop. Both groups were taught by the same teacher, who is the second author of this article, in order to guarantee that these two groups received the same learning content, flipped class teaching method and the same pre and post-test with the only difference in how in-class activities were organized.

### *Learning environment*

#### *Learning platform and in-class activities for flipped learning*

We used the Moodle platform to share the video for pre-class activities and four main videos explaining four grammar points (past simple, present continuous; past simple, present perfect, present perfect continuous; present and past participles as adjective; future). Each week, students had a main grammar task to finish. Both groups had to watch the videos on the Moodle independently. An English teacher with more than 20 years of teaching experience prepared all the videos used in this study. Different colours were used to help students distinguish between tasks for pre-class and in-class activities. In addition, students could interact with the teacher and other students and manage their courses on the Moodle platform (Figure 1).

#### *In-class activities with the student response system (SRS) supported by Peardeck in the flipped class*

Peardeck is a Google education online platform that provides an interactive approach to engaging students in learning activities in class and offers teachers the possibility to know students' responses immediately. Compared with the traditional SRS with clickers, Peardeck is more convenient, easy to use, and low cost because any digital device with the internet can be used to access the platform. Below, we give an introduction of different views and question types, and demonstration of a student response and teacher analysis in Peardeck.

Figure 2 shows three different viewing interfaces that illustrate the arrangement and function of the SRS supported by Peardeck. In the student view, questions and answers area are separated in

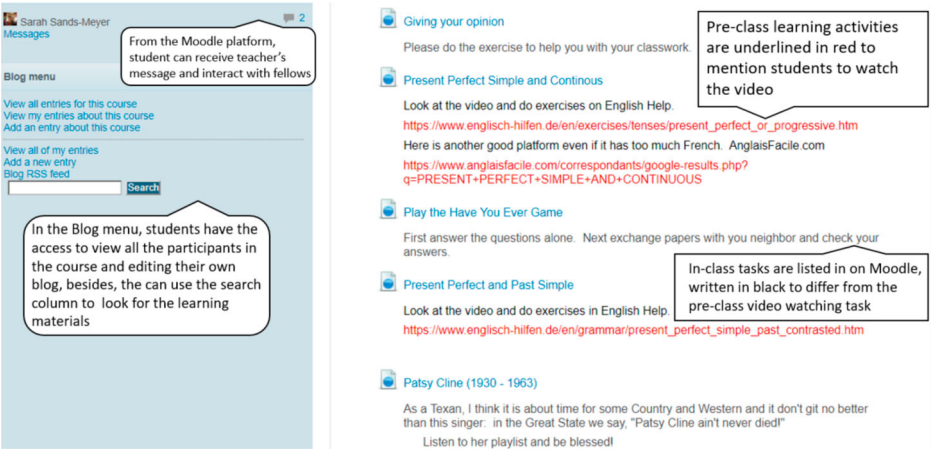


**Figure 1.** Introduction of the flipped learning platform.

order to give students accurate instruction. In the teacher view, a teacher has access to all students' answers including the typing process, which cannot be seen by students. In the projector view, a teacher can choose a time to stop accepting students' answers and can show all their answers anonymously on the projector. These answers can be seen by all students and can be used to motivate and engage them.

Peardeck provides different question types to meet teachers' different needs to organize diverse activities in class. The most common types of questions include multiple choice, short text, debate and free drawing questions, as shown in Figure 3.

Each time students finished answering, the responses were displayed on the projector and the teacher gave the explanation and the correct answer. It is extremely exciting for students to see all answers simultaneously and it increases the concentration degree in class. At the same time, all students' answers with their names are displayed in the teacher view.

Therefore, the SRS provides a strategic approach for teachers to organize in-class activities in flipped learning process. Teachers can use the SRS to organize group projects, discussions, debates and give exercises concerning pre-class videos (Figure 4).

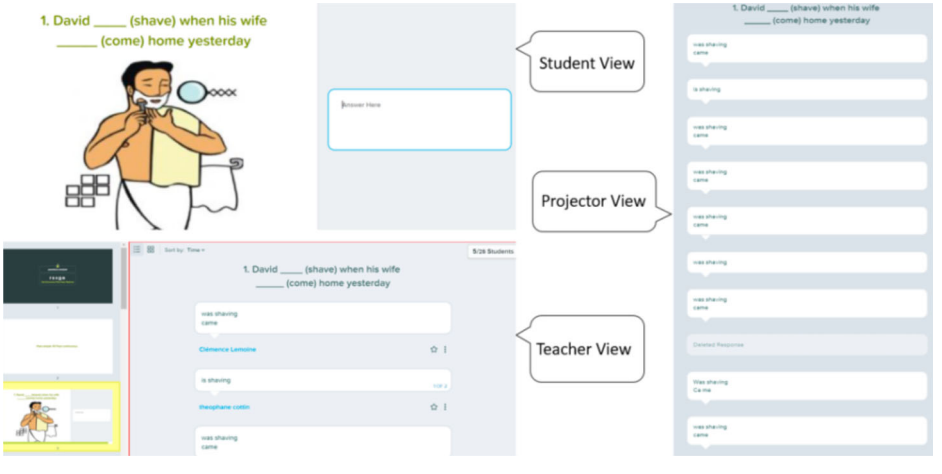


**Figure 2.** Different views in Peardeck for students, a teacher and a projector.

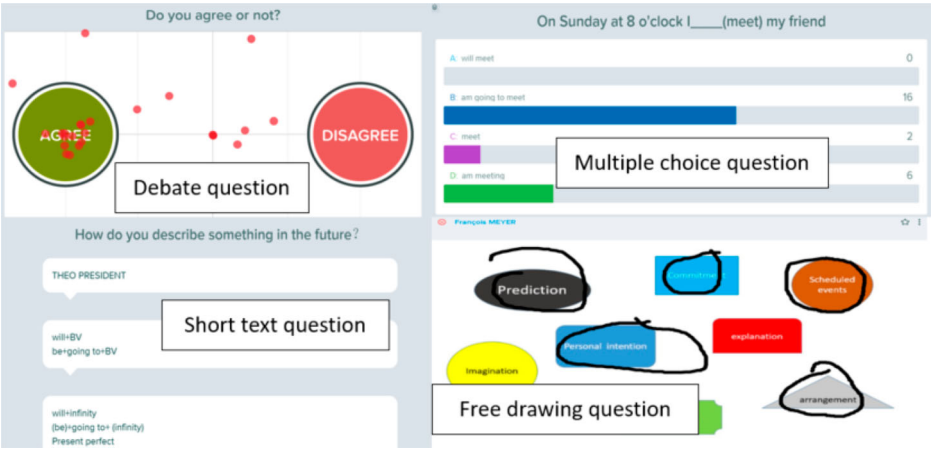


**Figure 3.** Question types in Peardeck.

### *Devices used in activities*

In class, students of the experimental group could freely choose the devices to use for their learning purposes. Field observation notes were taken in order to analyse students' manipulation with different devices. The interfaces of the learning activities were the same, consisting of a question part and an answer part while the arrangement changed a little (Figure 5).

### *Measurement*

As illustrated by the research questions, five important elements were investigated in this study. We adopted different measuring instruments for each research question.

Firstly, a pre-test and a post-test were used to investigate the effects of the SRS in improving students' learning achievement in EFL grammar. The pre and post-tests were taken from the TOEIC grammar tests that have the same difficulty levels. These tests were conducted by the second


**Figure 4.** Student answers manifestation in the projector and the teacher view.

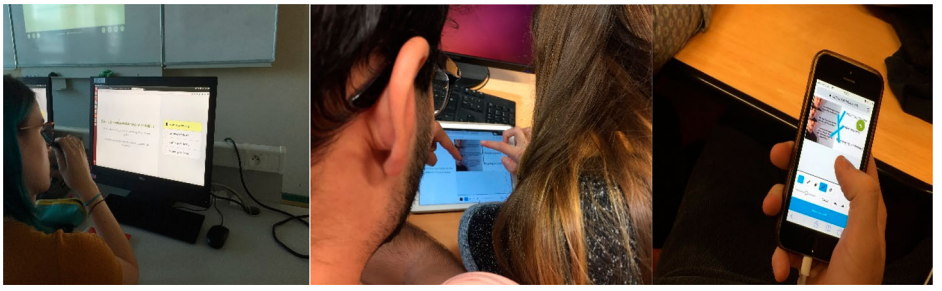

**Figure 5.** Three digital devices used in the study.

author of this article. The pre-test and the post-test were standard tests with 10 multiple choice and 10 fill in the blank questions specifically focusing on tenses of the English grammar and the perfect score for these tests was 20. The objective of the pre-test was to evaluate whether the two groups of students had the same prior knowledge of the tenses. The post-test aimed to explore the differences between the two groups after the intervention and investigate whether students' learning outcome was positively influenced by the new approach or not.

Secondly, a questionnaire survey was conducted to inquire if the SRS has a positive influence on student learning motivation in learning EFL grammar. The questionnaire on motivation originates from Hwang, Yang, and Wang (2013) and was modified to suit the context of an EFL classroom, and we compared the differences between the two groups.

Thirdly, another questionnaire survey was implemented for exploring the effects of the SRS in increasing students' self-efficacy, which came from Wang and Hwang (2012). We have also made the modifications for EFL classroom and a similar comparison between experimental and control group

Besides, in this study, students' engagement in learning activities refers to students' activity in Moodle, the platform where we put the videos before the class. Therefore, the frequency of each students' video watching has been calculated automatically to see if students in the experimental group have watched the video before the class and how many time they watched it.

In addition, the questionnaire on technology acceptance (Hwang et al., 2013) was also used with the purpose of investigating students' experience with EFL flipped learning and their acceptance of this new approach.

The experimental process is shown in Figure 6, two groups of students followed the same procedure, which means that they had the same learning task, the same pre and post-test, they worked with the same teacher and were both involved in flipped learning. The only difference between them was that the teacher used the SRS to organize in-class activities for experimental group, and students in the control group followed the traditional instruction to discuss and interact with the teacher and students.

## Result

In this study, we adopted the experimentation method to investigate the effects of SRS in students' learning achievement, learning motivation, and self-efficacy. Furthermore, we investigated students' engagement in the learning activities and their technology acceptance.

### *Learning achievement*

In order to examine the effects of the proposed approach, the students' learning achievement in experimental and control groups was measured respectively before and after the experiment. For the experimental group, the mean values and standard deviations of the pre-test scores were 10.47 and 1.05 while the mean values and standard deviations of the post-test scores were 11.46

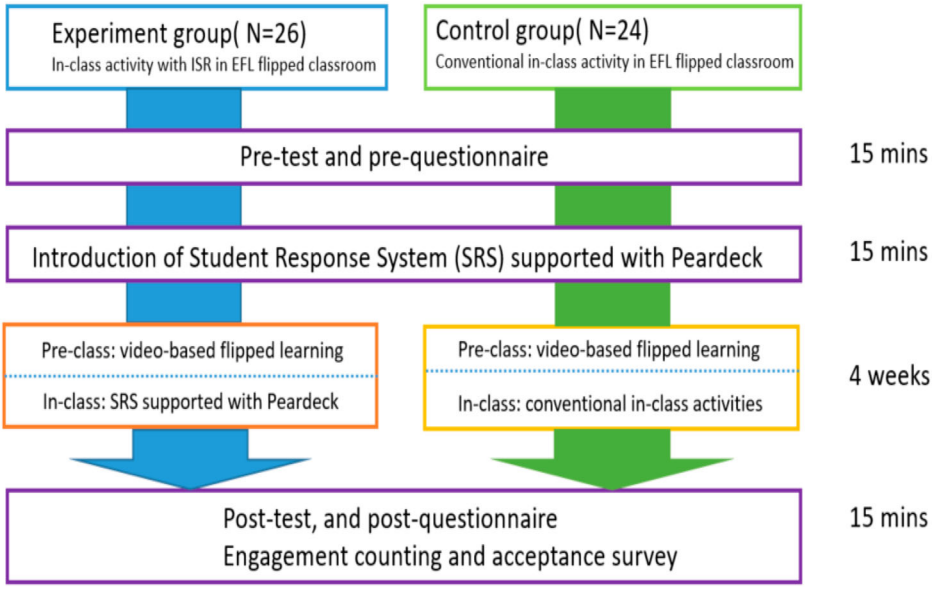


**Figure 6.** Experimental process.

and 2.45. The independent *t*-test shows that there was no significant difference between pre-test and post-test of the experimental group ($t = 1.872$, $p > .05$). Another independent *t*-test was also conducted for the pre-test and post-test of control group. For the control group student, the mean values and standard deviations of the pre-test scores were 11.01 and 1.15 while the mean values and standard deviations of the post-test scores were 13.50 and 2.57. The independent *t*-test shows that there was a significant difference between pre-test and post-test of the control group ($t = -4.311$, $p < .05$).The *t*-test result indicated that there is no significant difference between the pre-test and post-test scores for the experimental group, indicating that the SRS approach is not effective for improving students' learning achievement (Table 1).

### *Learning motivation in learning EFL grammar*

An independent-sample *t*-test was conducted to investigate students' learning motivation before the flipped learning process. The mean values and standard deviations of the pre-questionnaire on learning motivation were 28.25 and 2.92 for the experimental group students, and 28.85 and 2.93 for the control group students. The *t*-test showed that there was no significant difference between the two groups ($t = -0.719$, $p > .05$), indicating the equivalent learning motivation of the two groups of students before engaging in the learning activity.

Another independent *t*-test was used to analyse the group difference in learning motivation after the learning activity. Table 2 shows the *t*-test result of the post-questionnaire on learning motivation of the two groups. The means and standard deviations were 30.58 and 3.80 for the experimental group students, and 27.88 and 2.939 for the control group students. The *t*-test results indicated that the post-test scores of the two groups were significantly different ($t = 2.792$; $p < 0.05$) (Table 3).

**Table 1.** The *t*-test result of the pre-test and post-test for two groups in learning achievement.

| Variable | Group | Mean | SD | *t* | *p* |
|---|---|---|---|---|---|
| Experimental group | Pre-test | 10.47 | 1.05 | −1.87 | 0.67 |
| ($N = 26$) | Post test | 11.46 | 2.47 | | |
| Control group | Pre-test | 11.01 | 1.15 | −4.311 | 0.00 |
| ($N = 24$) | Post-test | 13.50 | 2.57 | | |

**Table 2.** The *t*-test result of the post-test on learning motivation of the two groups.

| Variable | Group | *N* | Mean | SD | *t* |
|---|---|---|---|---|---|
| Learning motivation | Experimental group | 26 | 30.58 | 3.80 | 2.792* |
| | Control group | 24 | 27.88 | 2.939 | |

*$p < 0.05$.

**Table 3.** The *t*-test result of the post-test on self-efficacy of the two groups.

| Variable | Group | *N* | Mean | SD | *t* |
|---|---|---|---|---|---|
| Self-efficacy | Experimental group | 26 | 33.50 | 4.624 | 2.195* |
| | Control group | 24 | 30.96 | 3.420 | |

*$p < 0.05$.

### *Self-efficacy in learning EFL grammar*

An independent-sample *t*-test was conducted to investigate students' self-efficacy before the flipped learning process. The mean values and standard deviations of the pre-questionnaire on learning self-efficacy were 30.69 and 4.287 for the experimental group students, and 30.88 and 3.207 for the control group students. The *t*-test showed that there was no significant difference between the two groups ($t = -0.169$, $p > .05$) before the learning activities, indicating that two groups of students before have the equivalent level of self-efficacy.

Another independent *t*-test was used to analyse the group difference in self-efficacy after the learning activity. Table 2 shows the *t*-test result of the post-questionnaire on self-efficacy of the two groups. The means and standard deviations were 33.50 and 4.624 for the experimental group students, and 30.96 and 3.420 for the control group students. The *t*-test results indicated that the post-test scores of the two groups were significantly different ($t = 2.195$; $p < 0.05$).

### *Learning engagement*

In order to investigate the impact of the SRS on students' out-of-class learning behaviour, this study analysed the frequency of students' watching the pre-class learning videos. The Moodle platform automatically recorded the number of times each student watched videos during each week. Figure 7 shows four-week results for the experimental group. It shows graphically if students watched the required videos before the class, and the number of times they watch them each week. According to the records, students' engagement in watching pre-class videos improves greatly. On the one hand, the frequency of watching videos increased a lot during the four weeks (from 19 times during the first week, to 47 times during the last week). On the other hand, we paid attention to the number of students who didn't watch the videos, and it was found that in the first week 42% of students didn't watch the videos, and in the next three weeks, the proportion of non-watching students decreased greatly (11%, 19% 11%).

In conclusion, students' engagement in pre-class preparation improved significantly. Firstly, the overall view frequency during the four weeks increased, indicating that there was more engagement in preparation before the class. Besides, the amount of students who didn't watch the videos decreased, showing that the new approach motivated students to watch the videos for learning English grammar. The number of times the videos were watched by each student each week also increased, allowing to assume that most students adapted to flipped learning and set their own pace to learn and were encouraged to be prepared before the class.

### *Technology acceptance*

Davis (1985) suggested that users' motivation could be explained by three factors: perceived ease of use, perceived usefulness and attitude toward using the system. The attitude towards new

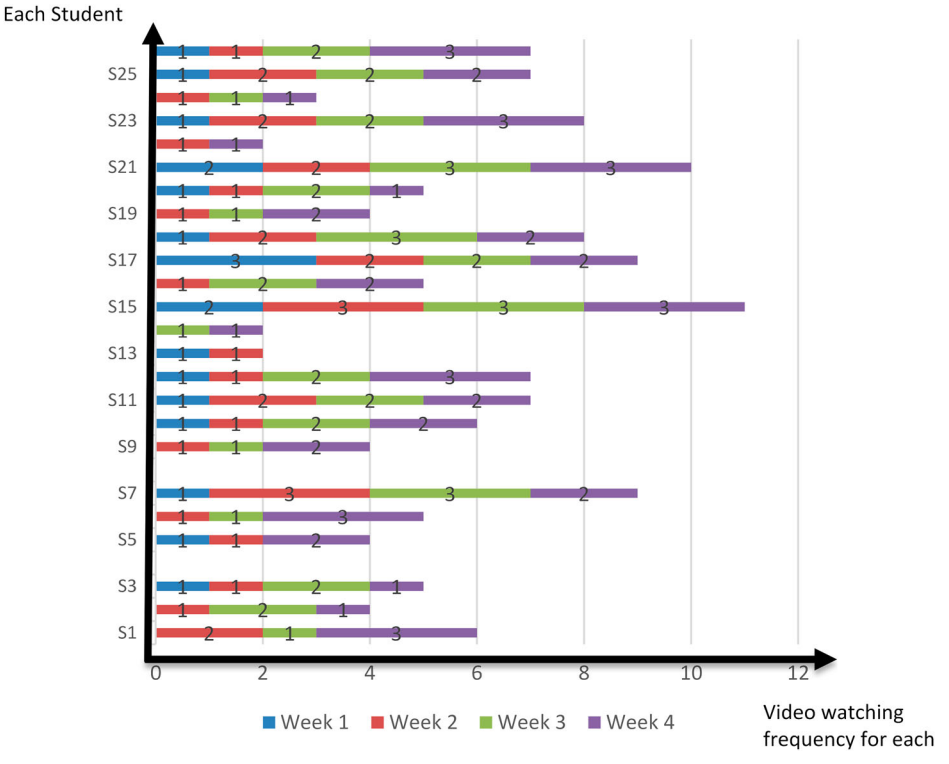


**Figure 7.** Video watching frequency in the experimental group.

technology was considered to be influenced by two major beliefs: perceived usefulness and perceived ease of use. Therefore, this study also analysed students' acceptance of the SRS with Peardeck used in an EFL flipped classroom.

Figure 8 shows that 76% of students reported that Peardeck is easy to learn and use (>30, with perfect the score of 35), which didn't add to their cognitive load. 34% of students had a strong

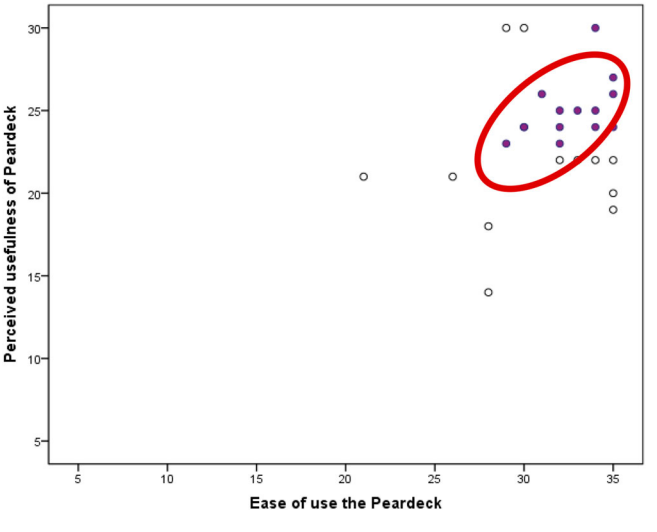


**Figure 8.** Students' technology acceptance.

perceived usefulness in using Peardeck to learn English and supported integrating Peardeck into EFL flipped learning. More than 50% of students shown in the red circle in Figure 8 hold both positive attitude towards ease of use and perceived usefulness of Peardeck.

Therefore, two main conclusions can be drawn. First, most of the students enjoyed their learning experience in using the SRS with Peardeck and they felt it was easy to use and useful for learning. Second, the perception of the ease of use of Peardeck is higher than the perceived usefulness, indicating that even though students had a positive learning experience with Peardeck, they didn't agree on its absolute usefulness for learning improvement.

## Discussion and conclusion

After analysing the recent research on flipped EFL learning, it can be found that, there are two main research directions: one is effectiveness of flipped learning in an EFL class based on the experimental studies and the other is creating or proposing better strategies for the flipped process in EFL in the view of pedagogy (Adnan, 2017; Hung, 2015; Hwang & Chiu-Lin, 2017; Mehring, 2016). However, most of the studies either investigated the effectiveness of flipped learning in an EFL class in general or focused on the out-of-class activities design to ensure a better preparation before the class. In order to explore a better approach to design interactive in-class activities, this study proposed a new SRS to improve students' EFL grammar learning.

To answer the five research questions mentioned before, we can summarize the main results as following. Interactive flipped classes with the SRS were effective in improving students' learning achievement in EFL grammar, while it improved significantly students' learning motivation and self-efficacy in EFL grammar. Besides, students in the experimental group presented a high level of engagement in learning activities. In addition, students were glad to participate in a flipped class with the SRS and had a high level of technology acceptance.

In general, the results proved that a flipped class with the SRS can benefit students in a flipped learning environment and encourage them to review learning material before going to a class. The SRS or any other technology that provides interactive learning environment has the potential to improve retention of knowledge (Blasco-Arcas, Buil, Hernández-Ortega, & Sese, 2013), which is important for students who have to memorize abstract grammar notions. Besides, a flipped class with the SRS makes in-class activities dynamic and varied, which can weaken students' impression that grammar learning is boring. However, there was a negative result of EFL grammar achievement for the experimental group. It may be explained by the fact that it takes students too much effort to adapt to this new approach during a limited period of time. There may also be some demographic factors involved, such as the impact of the mother language and the differences in students' capacities to learn a foreign language.

The result of this study is consistent with the previous work (Hsieh et al., 2017) in regard to the impact of a flipped EFL class in motivating students to learn actively. Furthermore, this study focused on pre-class and in-class phases to optimize the flipped learning process with the SRS. Therefore, the main contribution of this study was to explore a new approach in organizing in-class activities of an EFL flipped class in order to provide an interactive learning platform for students to learn enthusiastically. Besides, this attempt of integrating the SRS in teaching English grammar contributes to overcoming the long-lasting problem in teaching grammar: student boredom caused by working with abstract grammar concepts. In future, more practical pedagogical approaches both for out-class and in-class activities can be implemented in the flipped learning process in other parts of EFL, such as writing, reading and oral comprehension, and it will also be possible to develop new digital tools or utilize other existing instruments to accelerate active learning in both teaching and learning.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Notes on contributors

***Chenchen Liu*** is a Doctor in Educational Sciences in the University of Strasbourg. Her research interests are integrating technology into teachers' instruction in class and evaluating the effectiveness of technology in improving student achievement.

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## Appendix

Part 1 Motivation

(1) I think learning English grammar is interesting and valuable.
(2) I would like to learn more and explore more in the English course.
(3) It is worth learning those things about English grammar.
(4) It is important for me to learn the English course well.
(5) It is important to learn English for communication in daily life.
(6) I will actively search more information and learn about English grammar.
(7) It is important for everyone to take English course.

Part 2 Self-efficacy

(1) I can always manage to solve difficult problems if I try hard enough.

(2) If someone opposes me, I can find the means and ways to get what I want.
(3) I am sure I am proficient in the skills required in this assignment.
(4) I am confident that I could understand the teaching content.
(5) I can solve most problems if I invest the necessary effort.
(6) I am confident that I can understand all the basic concept of the course.
(7) I can get a high score in the exam
(8) Based on the learning difficulty, teaching method and my learning skills, I am confident that

Part 3: What do you think of Peardeck? Is it useful for you?

(1) The learning platform enriched the learning activity.
(2) The learning platform was helpful to me in acquiring new knowledge.
(3) The learning mechanisms provided by Peardeck smoothed the learning process.
(4) The learning platform helped me obtain useful information when needed.
(5) The learning platform helped me learn better.
(6) The learning platform is more useful than the conventional computer-assisted learning approaches.

Part 4: Is Peardeck easy to use?

(1) It is not difficult for me to learn to operate the learning platform.
(2) It only took me a short time to fully know how to use it.
(3) The learning activity conducted in Pear deck was easy to understand and follow.
(4) I quickly learned to use Peardeck.
(5) It was not difficult for me to use it during the learning activity.
(6) I felt that the interface of Peardeck was easy to use.
(7) To sum up, Peardeck was easy to learn and use