

Exploring the Effects of Interactive Response System (IRS) in an EFL Grammar Class

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Abstract

Digital interactive language learning has become increasingly prevalent and significant in educational settings. It is challenging to apply collaborative learning methods because students tend to engage passively with traditional methods of lectures. Several studies have suggested that digital interactive technologies such as Zuvio Interactive Response System (IRS) have been applied to increase learning motivation. However, related studies on using IRS in English a foreign language (EFL) classrooms are limited in Taiwan, especially from learners' perspectives. The aim of this study was to integrate an interactive response system into an English grammar course and to explore whether the assistance of this digital tool could promote students' learning motivation and whether it could facilitate a student learning environment. Based on the research background and rationale, the following research questions were investigated: (1) How does the use of the IRS influence students' perceptions toward their learning attitudes? (2) How does the use of the IRS influence students' perceptions toward learning contents? (3) How does the use of the IRS influence students' perceptions toward classroom interaction? An experimental design was employed. This research was conducted in this one-semester project to uncover 49 EFL learners' views of IRS in a grammar class. Zuvio IRS and the British Council Grammar Snacks videos were utilized in this experimental instruction. A questionnaire was administered and consisted of demographic information, Likert scale questions, and open-ended short-answer questions. The results showed positive attitudes for learning with Zuvio IRS and videos, and the interactions between students and the teacher that mediated by Zuvio IRS. Future studies might explore learning outcomes of students from different majors, implement results of IRS studies into curriculum and instruction, and create more appropriate questions into IRS.

Keywords: EFL in Taiwanese context, grammar videos, interaction, interactive response system, motivation

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Introduction

In the past decade, many studies on teaching and learning in different educational contexts have shown significant concerns in the use of interactive technologies to promote interactions between teachers and students. Students' engagements of classroom interaction play a crucial role in language classrooms. There are various technologies and digital tools in recent years. Interactive response systems (IRSs) are one of the common digital tools for teachers' employment in the classroom. An increasing number of research papers concerning the application of such as new interactive response systems such as Clickers or Zuvio have revealed that the IRS has positive effects (Heaslip, Donovan, & Culle, 2014; McDonough & Foote, 2015; Wang, 2018).

On the other hand, other studies have some issues that the disadvantages and inadequacies of IRSs (Aljaloud, Gromki, Billingsley, & Kwan, 2015). For teachers' perspective, how to integrate technology into a classroom to enhance students' engagement, increase their learning motivation, and facilitate learning environment should be considered. In this study, the researcher wanted to discuss an IRS could enhance teacher-student and peer-to-peer interactions in a technology-mediated language classroom. Instructors could pose questions to different formats (e.g., true/false, multiple choice, short answer) and promptly collect student responses and display the results on projection screens. Then instructors could take opportunities to elaborate the answers or give feedback (Denker, 2013).

Many relevant studies describe IRS implementations for various disciplines like physics and chemistry (Chu, Lu, & Wann 2009; Lin, Liu & Chu, 2011). These studies have shown positive feedback after using IRSs, and students are more willing to interact with instructors and classmates. Past studies focused on the science fields; also, the majority of studies on the application of IRSs have been limited to traditional IRSs (e.g., Clickers or Kahoot). An online interactive system developed in Taiwan, Zuvio, is a cloud-based system which students can interact with their instructors and peers through any Internet-enabled hand-held device, for example, a smartphone or tablet computer. To date, not many studies have made attempts to discuss the effectiveness of using Zuvio to assist English learning, especially grammar class. Consequently, the purpose of this study was to integrate an interactive response system into an English grammar course and to explore whether the assistance of this digital tool could promote students' learning motivation and whether it could facilitate a student learning environment. Based on the research background and rationale, the following research questions were investigated: (1) How does the use of the IRS influence students' perceptions toward their learning attitudes? (2) How does the use of the IRS influence students' perceptions toward learning contents? (3) How does the use of the IRS influence students' perceptions toward classroom interaction?

Literature Review

Sociocultural Theory

The sociocultural theory is used to describe and understand how human learn through different social means and interactions. Instruction, therefore, is designed to be a collaborative event for students to learn in the zones of proximal development (ZPD). Furthermore, social networking is implemented into various cooperative learning pedagogies that contradicts and challenges traditional educational theories, especially those language acquisition theories from Chomsky (Lin, 2011). Because of the nature of learning cooperatively through using technologies, the

sociocultural theory rooted in Vygotsky's approach is essential in terms of knowledge constructed in social interactions (Daniels, 1993). The sociocultural theory is used in this study for its theoretical framework, research design, interpretation, and discussion.

Mediation

Mediation is the central concept of sociocultural theories (Lantolf & Thorne, 2006, p59). For Vygotsky, mediation means "acting indirectly through something" (Cole, 2003a). For mediation, Vygotsky makes a cognitive justification between them by saying that "... the use of signs and tools using the schema ... shows each concept subsumed under the more general concept of indirect (mediated) activity." (Vygotsky, 1978, p. 54) Vygotsky thinks that meditation happens when tools and signs work together to perform an indirect function (Vygotsky, 1978).

Based on Vygotsky's notion of social interaction in human cognitive development, learning is socially constructed. The sociocultural context affects the use of tools and signs to construct the meaning of new knowledge.

Grammar Instruction for L2 students

Grammar learning is different from a native speaker than a second language (L2) student. Native speaker students have learned a great deal of grammatical knowledge through daily life experiences before entering formal education. Since all the grammatical skills are internalized and become natural to them, they do not aware of it until they are asked to make it externalized. Vygotsky describes this process as "... children are forced to create the situation or – more accurately – to represent it in thought" (Vygotsky, 1978, p. 203). In other words, grammar learning for native speaker students is a cognitive process moving from daily life concepts into scientific concepts. In addition to the concept formation process, Lantolf & Thorne (2006) depict Vygotsky's argument that "... instruction in writing and grammar does not depend on the developmental readiness of school children; on the contrary, it leads to the very development other approaches assumed to be necessary for learning to occur ... instruction leading development" (p. 293).

Moreover, this development is the process of "how language in general functions to serve human communicative needs and of how various subsystems (i.e., phonology, morphology, syntax, semantics, pragmatics) are organized" (p.293). Vygotsky describes the relationship between development and learning: Developmental processes do not coincide with the learning process. Instead, the developmental process lags behind the learning process; this sequence then results in zones of proximal development. (Vygotsky, 1978, p.90)

In terms of L2 students' grammar learning, on the other hand, is an opposite process than those native speakers' experience. In other words, L2 student is consciously taking the rules and functions of grammar and try to apply it in daily lives. It is a process of from scientific concept into daily life concept in Zone of Proximal Development (ZPD).

Zone of Proximal Development (ZPD)

Language learning, based on the concept of mediation and ZPD, is processed by using culturally constructed means. According to Lantolf & Thorne (2006), "with respect to symbolic artifacts, language activity, speaking, and writing, is the primary, though not exclusive, mediational means

humans deploy for thinking” (p. 79). Vygotsky introduced the ZPD for this mediational process in the concept formation. Vygotsky (1978) calls the difference of development between without and with adult assistance as the zone of proximal development and describes:

It [the zone of proximal development] is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers. (1978, p.86)

With this analogy, grammar learning for L2 students is not merely a proactive acceptance from rules of "the other," but an active procedure of concept formation from language mediated intrapsychological speech intertwined with inter-mental communication in the form of interaction with peers and teachers. The grammatic awareness is already there but trying to make it useful in a more casual way, which can be actualized in the process of classroom interactions in a collaborative perspective (Gutiérrez, 2006). The computer as a mediational tool in the processes of collaboration based on the understandings of the sociocultural theory, the implications of technology was utilized and integrated into learning. As part of the computer-mediated communication, pedagogical implementation of IRS can be very meaningful.

Interactive Response Systems in Classroom

The framework of IRS

The Interactive (or instant) Response System (IRS) is designed for increasing students' interaction for better learning. As early as 1991, Eric Mazur from Harvard University designed the "Flashcard" system for students to respond to questions and applied to peer instruction. As technology advances, wireless or mobile devices are used nowadays to collect and calculate students' learning performances; therefore, teachers can adjust their teaching methods and progresses accordingly. In recent years, learner-centered education with Flipped learning is one of the applications that incorporate the IRS. (Chu & Yang, 2017, p.619)

Application of Zuvio in L2 Learning

Zuvio is one of the Interactive Response Systems used in classroom settings. As described in the official website saying it as a powerful classroom supportive system that prepares teachers for test preparation, interaction, and statistics. A teacher can prepare different types of class questions ahead of time according to the course progress, post questions for students to answer, taking attendance, or ask questions, and collect answers from students for further discussions, instructions, and gradings (Zuvio, 2019). As Chu & Yang (2017) describe, Zuvio is "an online teaching and learning platform which provides a variety of assessment types, including the functions of an instant- response system (IRS)" (p.620). Because students can work in groups and solve problems together with its IRS functions, the Zuvio IRS can increase students' learning motivation by using its online peer assessment system (Wang 2016, Chu & Yang 2017).

Methodology

Participants

The participants were 49 Taiwanese college students who took English Grammar as a requirement at a four-year university in Kaohsiung, Taiwan. 80 % of all the participants were freshmen. 15 %

of juniors, and 5% of exchange students. 75% of the students were female, and 25 % male students. The majors of the participants are mostly Applied English (80%), International Business (15%), and Mass Communication (5%). This particular course was a required one for freshman students with two credit hours per week. Participants studied English for at least eight years. The average score of practice Oxford Practice Grammar Intermediate Diagnostic Test that the participants took as a placement test was 55 out of 100, which shows that they have an intermediate level of English Grammar proficiency. Most participants did not have experience of using an interactive response system in their high school English classes.

Instruments

Diagnostic Grammar Test

This diagnostic test contains 100 multiple-choice and write-in questions based on grammar points covered at the Intermediate level such as verbs, passive voice, adjectives and adverbs, and relative clauses. Oxford Practice Grammar Diagnostic Tests have three levels, basic, intermediate, and advanced. The researchers adopted the intermediate level because most students learn English grammar for six years. The reliability of this test was Cronbach alpha .681.

Zuvio IRS

Zuvio is an Interactive Response System (IRS) developed by a Taiwanese team in 2013 (see Figure. 1). The purpose of this system is to increase students' learning motivation, improve teaching quality, and facilitate digital education (Yan, 2014). Zuvio IRS contains various features and functions for both teachers and students. Teachers could design different types of questions like the multiple-choice, short answer, and open-ended questions. Besides, teachers divide students into different groups to complete questions and present students' responses in class. Grading rubrics could be set in advance before the class, and it is allowed to ask students to give comments for their classmates. For students' platform, they can answer questions instantly, peer-evaluate classmates' responses, and have some interactive discussions with teachers and classmates. Meanwhile, students could use digital devices such as smartphones, computers, or tablets to answer questions immediately. After class, students could also read the previous exercise to review the course.



Figure 1 The Interface of Zuvio IRS

Course Materials

British Council has valuable online materials such as puzzle, games, and videos that can be available for beginners or intermediate learners. Grammar Snacks videos (see Figure. 2) were

chosen for this course, and students were required to watch videos after learning grammar points. These videos show the grammar being used in natural conversation. After watching videos, students read an explanation of the grammar point and do the exercises to check the understanding of grammar points. The research prepared ten multiple-choice questions for each grammar point, and the students were required to answer the questions via the platform of Zuvio IRS in class.



Figure 2 The Interface of British Council Grammar

The questionnaire with open-ended questions

A 5-point Likert scale questionnaire of 39 items was modified based on the questionnaire from Carreira's study (2016) for the evaluation of language learning motivation and attitudes. The questionnaire was designed to investigate the students' perceptions from three perspectives, including their perception toward their attitudes toward grammar videos and Zuvio IRS (39 items), interaction, and learning materials. Each item was measured on the 5-point Likert scale, ranging from 5 (Strongly Agree) to 1 (Strong Disagree). Moreover, the researcher designed several open-ended questions for participants to understand their more in-depth reflection of using Zuvio IRS and learning grammar by watching videos.

Procedure

This experiment was conducted in 2018 and lasted for 18 weeks. One video was demonstrated per week, and each video lasted for only several minutes and took 30 minutes to complete follow-up exercises. The researcher designed at least ten questions for each grammar point based on the content of the British Council Grammar Snacks videos before the class. During the class, the instructor first taught grammar points, asked students to do exercises, and played the specific grammar video to the students. When the instructor considered that the students watched the video that students might not understand well, the instructor would then pause the video and make students answer the questions via Zuvio IRS. Since each video just played several minutes, most students watched the whole video once and answered all the questions simultaneously. At the end of the questions, the instructor would check the students' answers and discuss with them. In the last week of grammar class, students were asked to complete the questionnaire and open-ended questions. Those procedures were in a sociocultural context (see Figure. 3).

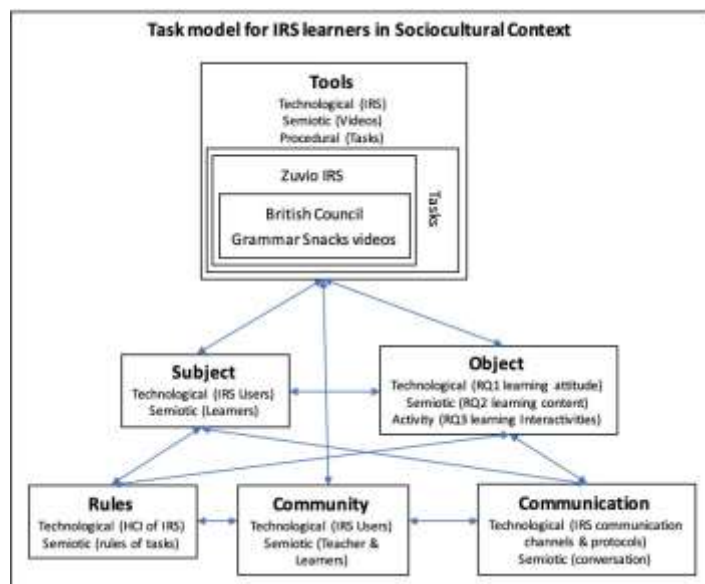


Figure 3 Task model for IRS learners in Sociocultural Context

Data Analysis

The data from the questionnaire and open-ended answers were analyzed according to the research questions. SPSS 18 for Windows was used as the leading software for statistical analysis. Descriptive statistics were calculated to describe the means, and standard deviations were adopted to analyze the questionnaire results of perceptions toward English grammar learning in a Zuvio IRS classroom. For the open-ended questions from the questionnaire, each participant was given a code; for example, AE-0001 represents learner 0001 in AE. The researcher firstly translated the responses to the open-ended questions into raw data for each participant and then re-coded the raw data to different themes to understand the learners' perceptions of grammar learning via Zuvio IRS. The themes were designed according to the research questions and their feedback in open-ended questions.

Results

Results of Students' three closed-ended questions

1. How does the use of the IRS influence students' perceptions of their learning attitudes?

The data from the questionnaire regarding learners' perceptions of their attitudes were analyzed to answer the first question. Table 1 shows the descriptive results of the students' response to their learning attitudes. Among the 56 returned questionnaires, five were incomplete and invalid. Thus, the researcher only computed the results for 49 questionnaires. The mean scores of 18 questions ranged from 2.98 to 3.71 with acceptable standard deviations; thus, all students displayed moderate levels of agreement regarding the statements in the questionnaire. Items 1 to 9 are related to the students' perceptions toward learning attitudes of using Zuvio IRS. As shown in Table 1, the students agreed that they enjoy using Zuvio IRS to help their learning grammar ($M=3.67$) and are willing to learn more in this way ($M=3.55$).

Item 10 to 18 investigated students' perception of learning attitudes by watching grammar videos. Students agreed that watching English videos could improve their listening skills ($M=3.69$).

and increase their learning motivation ($M=3.71$). On the other hand, students reported that they are less willing to watch grammar videos after class ($M=2.65$). Results of these questions indicated that the students feel positive and joyful with the use of Zuvio IRS; also, they believed in improving their listening proficiency by watching British Council Grammar videos and could continue to practice it for improving my grammar.

Table 1. *Descriptive results for participants' perceptions toward the learning attitudes*

RQ	No	Statement	Mean	SD
Learning Attitudes	1	It is a pleasure to learn in this way.	3.67	.774
	2	I want to learn in this way in more subjects (classes).	3.55	.914
	3	I am satisfied with my performance in learning activities.	3.31	.742
	4	Using Zuvio is very rewarding when I learn.	3.27	.953
	5	Using Zuvio is very helpful to my learning.	3.27	.972
	6	Using Zuvio is very helpful in making my positive learning attitude toward this subject.	3.06	1.008
	7	Using Zuvio helps me to increase my learning interests toward this subject.	3.04	.999
	8	Using Zuvio allows me to concentrate on my studies.	3.08	1.017
	9	Using Zuvio lets me learn the course content faster.	3.20	1.020
	10	Using Zuvio to learn is easy for me, no pressure at all.	3.71	.898
	11	Using British Council Grammar videos increases my learning motivation.	3.45	.937
	12	Using British Council Grammar videos to learn English is less stressful.	3.51	.845
	13	I use British Council Grammar videos, both in-class and after-class.	2.65	1.032
	14	Because of this method of English training, I begin to listen to British Council Grammar videos.	2.98	.924
	15	I like to use British Council Grammar videos after-class because I can repeat learning the content that I am not familiar with.	3.35	.948
	16	After listening to British Council Grammar videos, I learn more methods of self-learning English at home.	3.59	.888
	17	After listening to British Council Grammar videos, I would like to continue using it for improving grammar.	3.65	.879
	18	I believe that practicing more with British Council Grammar videos can improve my English listening proficiency.	3.69	.796

1. How does the use of the IRS influence students' perceptions toward learning contents?

The data from the questionnaire regarding learners' perceptions toward their learning contents were analyzed to answer the second question. Table 2 shows the descriptive results of the students' response to their learning contents. In this domain, "Learning contents about British Council Grammar videos," obtained mean scores ranging from 3.20 to 3.90, which indicates that students experienced a moderate level of an agreement the questions. Question 4,6,9, and 10 obtained the higher mean scores of 3.67, 3.67, 3.73, and 3.90, respectively, indicating that students thought that

the contents of grammar videos indeed facilitate their English learning in terms of the practical English usage, general knowledge, and spoken language.

Table 2. *Descriptive results for participants' perceptions toward the learning contents*

RQ	No	Statement	Mean	SD
Learning Content	1	Using British Council Grammar videos helps learn new English vocabularies.	3.60	.818
	2	Using British Council Grammar videos makes English grammar learning fun.	3.59	.788
	3	I will continue to use British Council Grammar videos to improve English grammar.	3.20	.935
	4	Practicing with British Council Grammar videos is helpful in my English grammar learning.	3.67	.826
	5	Using British Council Grammar videos enriches my English grammar learning and life.	3.53	.868
	6	British Council Grammar videos provide much information on English grammar learning.	3.67	.851
	7	I like to use British Council Grammar videos to learn with varieties of video contents.	3.51	.916
	8	I like to use British Council Grammar videos to enhance the training of my English listening.	3.43	.957
	9	I like to learn general knowledge through British Council Grammar videos in the English grammar class.	3.73	.811
	10	I like to learn the usage of spoken language through British Council Grammar videos in an English listening and speaking class.	3.90	.714
	11	After listening to British Council Grammar videos, I found more vocabularies and usages from the video than the textbook.	3.63	.883

2. How does the use of the IRS influence students' perceptions toward classroom interaction?

The data from the questionnaire regarding learners' perceptions toward classroom interaction was analyzed to answer the third question. As illustrated in Table 3, descriptive statistics for each questionnaire mean, ranging from 3.16 to 4.04, which indicated that students possessed moderately high levels of agreement and positive feedback on classroom interaction. Question 5, 10, and 6 obtained the high mean scores of 4.04, 3.63, and 3.41, respectively, indicating that students addressed that Zuvio IRS was easy to use and interacted with the teacher via Zuvio IRS after watching grammar videos. The mean score of Question 3 and 4 is 3.16, which reveals that a few of the students did not consider using Zuvio IRS help their interaction with classmates and answer questions in class. In particular, question 3, "I think using Zuvio can increase opportunities for me to discuss with other classmates," obtained the lowest score of 3.16, indicating that students did not have enough practices to interact with classmates.

To conclude, the moderate average mean scores on 39 statements in the learning attitudes, contents, and classroom interaction survey completed by the 49 students indicate that students possessed positive attitudes toward British Council grammar videos learning and IRS Zuvio platform.

Table 3. *Descriptive results for participants' perceptions toward classroom interaction*

RQ	No	Statement	Mean	SD
Interaction	1	Using Zuvio can let me realize if my classmates and I understand the course content or not.	3.35	1.091
	2	Using Zuvio can let me know if I am following the progress of the course.	3.41	.998
	3	I think using Zuvio can increase opportunities for me to discuss with other classmates.	3.16	1.067
	4	I think Zuvio can help me to answer questions in class.	3.16	1.067
	5	Using Zuvio is simple for me to operate.	4.04	.789
	6	I think the interaction with teachers is better with using Zuvio than the traditional instruction.	3.41	1.135
	7	I think the discussion in a class by using Zuvio is better than traditional instruction.	3.27	1.095
	8	I think I like to interact with teachers by using Zuvio in classes overall.	3.29	1.080
	9	I like to discuss the content of videos with classmates in English grammar class.	3.18	.811
	10	I like the way that the teacher guides us learning by using British Council Grammar videos.	3.63	.668

Analysis of Students' three open-ended questions

Question1: Do you think that you have more fun and achievement in English grammar learning by using British Council Grammar videos? Why?

The qualitative data from students' feedback of question 1 were organized and presented in Table 4. The feedback for the first question open-ended question was further categorized into three categories: Interesting videos, Learning daily conversation, and Different learning materials. The data show that the students affirmed that watching British Council Grammar videos was more, and they were willing to continue learning grammar. The second category was learning daily conversation. The data show that students agreed that the content in British Council grammar videos would help them to learn new words and more daily English conversation. Moreover, students reported that they felt a sense of achievement after they learned new vocabulary or knew something new about western culture. The third category was different learning material. Some students thought that it was boring when they listened to lectures for grammar points. With British Council grammar videos, they enjoyed watching some interactive English episodes.

Table 4. *The organized qualitative feedback from the questionnaire question 1*

Theme	Responses
a. Interesting videos	<ul style="list-style-type: none"> • Increase interest in learning. There are videos and cartoons, not merely teachers' lectures. AE-0024 • It is fun to learn grammar with videos. If I can understand the English content by listening, I have a sense of accomplishment. AE-0003 • It is more interesting and fun to learning with videos. AE-0033 • It attracts people because it is interesting comparing with traditional learning methods. AE-0042
b. Learning daily conversation	<ul style="list-style-type: none"> • I can learn dialogs from daily lives, it is helpful to my English listening and speaking. AE-0012 • The language used in the videos is colloquial and not too formal. It is more fun. AE-0033 • I can learn more new cultures, vocabularies that makes me feel accomplished. AE-0025 • I can learn more phrases and vocabularies AE-0038
c. Different learning material	<ul style="list-style-type: none"> • Using video with short stories can make learning closer to your daily lives. Video can present the learning content lively. • AE-0029 • Because it is boring to listen to teachers always in a class, it is better to have us watch. AE-0048

Question 2: What are the effects of using British Council Grammar videos in learning English?

The qualitative data from students' feedback of question two were organized and displayed in Table 5. The feedback for the second question open-ended question was further categorized into two categories: Learn the British accent and Increase learning motivation. The data show that the students agreed that watching British Council Grammar videos could help them to practice the British English accent and they would have more opportunities to learn different accent from videos by improving their listening comprehension. The second category was to Increase learning motivation. The data show that students asserted that grammar videos broaden their horizons because of the different themes in the episodes. After watching grammar videos, they would increase motivation to learn more about different grammar points.

Table 5. *The organized qualitative feedback from the questionnaire question 2*

Theme	Responses
a. Learn the British English accent	<ul style="list-style-type: none"> • Practice British pronunciation and improve my listening skills. AE-002 • I get used to British English accent. AE-0009 • It is an additional opportunity to practice listening while studying grammar. AE-0012 • It let me have some improvements and learn foreign accents. AE-0012
b. Increase learning motivation	<ul style="list-style-type: none"> • I have interests in learning English, and I have the motivation to learn more. AE-0011 • Can train my English listening and understand directly how to use grammar correctly. AE-0051

- I understand grammar in a different way. AE-0002
- I can enrich and widen my knowledge and understand the world more. AE-0042

Question 3: What are your suggestions on Zuvio IRS?

The qualitative data from students' feedback of question three were organized and demonstrated in Table 6. The feedback for the third question was further categorized into three categories: More various question designs, Instant and interactive response, and distraction in the classroom. Students suggested that teachers should give more diverse exercises, not only multiple-choice. Other students stated that they could check whether their understanding of the content was correct via Zuvio IRS instantly; however, a few students suggested that it would be better if they could see an explanation to each answer via the interface of Zuvio IRS. Another student mentioned that students could answer questions anonymously, so it would be less stressful to answer questions. As for the second category, students agreed that the feature could instantly help the teacher check their answers and also allow both the teacher and students observe all of the students' answers. On the other hand, several students mentioned that it would distract their learning when using Zuvio IRS to answer questions. They would prefer traditional lectures because they would tend to over-rely on smartphones.

Table 6. *The organized qualitative feedback from the questionnaire question 3*

Theme	Responses
a. More various question designs	<ul style="list-style-type: none"> • The teacher can have a variety of types of questions. AE-0003 • The teacher can assign more types of homework. AE-0021 • The teacher can provide more extracurricular grammar questions for students to practice. AE-0036
b. Instant response	<ul style="list-style-type: none"> • Review the answers immediately. AE-0009 • It is easier to know if I understand clearly by reviewing with the teacher and classmates. AE-0016 • I can get answers immediately and study the lesson that I get wrong. AE-0041
c. Distraction in the classroom	<ul style="list-style-type: none"> • My spelling skill gets weaker because of relying on a cellphone too much. I prefer learning in a traditional way when it is related to a course. AE-0023 • It is quite inconvenient if the cellphone is out of battery or cannot be connected to the Internet. AE-0019

Discussion

The purpose of this study was to integrate an interactive response system into an English grammar course and to explore whether the assistance of this digital tool could promote students' learning motivation and whether it could facilitate a student learning environment. The results of this experimental study indicate that students need more learning contents to practice both for grammar materials and online materials. Also, the use of Zuvio IRS in a language classroom indeed facilitates students' learning. In answer to the first question (How does the use of the IRS influence students' perceptions toward their learning attitudes?) the current research results reveal that the

students felt positive and joyful with the use of Zuvio IRS in class, but it was noticed that the students reported that they are less willing to watch grammar videos after class. This result is consistent with other IRS research findings (Chen, 2014; Khalil & Fahim, 2016; Wang, 2016) which reported the IRS' positive effects of formative assessment. The IRS made it possible to assess the degree of students' understanding instantly and assist the teacher to decide how much to explain in detail or proceed to the next part of the lesson. Thus, in answer to the second question (How does the use of the IRS influence students' perceptions toward learning contents?), the finding showed that the contents of grammar videos indeed improve their English learning in terms of the practical English usage, general knowledge, and spoken language. This could be explained by the findings of the qualitative data which addressed that teachers should always leave room for learner agency and design meaningful in-class and follow-up activities (Liu & Chao, 2017).

The results of the open-ended question also revealed that students enjoyed watching grammar videos to broaden their horizons because they liked different themes in the episodes. To answer the last research question (How does the use of the IRS influence students' perceptions toward classroom interaction?), the study presented that, according to the questionnaire and open-ended question results, students reported that Zuvio IRS was easy to employ and it was a tool to interact with the teacher after watching grammar videos. The current findings were in accordance with Lee and Oh's (2014) study which suggested that students had positive feedback on IRS in an EFL reading class, and the current finding supported the fact that college learners would like to participate in the IRS activities in class. Besides, according to the students' qualitative feedback, it was also found that some students were aware of some drawbacks of Zuvio IRS such as the failure of Internet connection and distraction in the classroom. This observation was in line with Chen's (2019) findings on the effects of web-based IRS research.

Conclusion

Over the past years, different mobile technologies have been integrated into classroom settings. Among those technologies, the IRS can be used for increasing classroom interaction and students' learning motivation. The purpose of this study was to integrate an interactive response system into an English grammar course and to explore if this digital tool promoted students' learning motivation and facilitated students' learning. After 18 weeks of English grammar class instruction with Zuvio IRS and the British Council Grammar Snacks videos, data was collected through questionnaires consisted with demographic information, close-ended Likert scale items, and open-ended short answer items. The results showed a positive attitude from students when learning with Zuvio IRS with video. Students also enjoyed learning with the content video via Zuvio IRS but only in the class time, not after class. Zuvio mediates the interactions between students and the teacher and other classmates. Students liked to interact with the teacher directly, but unaware of the interaction mediated by Zuvio IRS with the teacher, and other classmates were incorporated with the direct interaction with the teacher.

Future studies might explore whether students from different majors will have different learning outcomes. Besides, learners' detailed demographic data could be collected for further cross-data analysis. Further IRS research topics could focus on how the results of IRS studies could be implemented into curriculum and instruction. More importantly, it is crucial for teachers to

design appropriate questions of the IRS platform to have better interaction and more effective learning in large language classes.

About the author

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