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Promoting Self-Regulated Learning with Formative Assessment and the Use of Mobile App on Vocabulary Acquisition in Thailand

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Abstract:
Despite extensive studies on self-regulated learning in the past three decades, there is still little research exploring self-regulated learning on foreign language vocabulary acquisition. Therefore, in a classroom-based context, this study explores the effectiveness of a course design that promotes self-regulated learning coupled with formative assessment and the use of Socrative on students' vocabulary acquisition. The study involves the first-year students (N = 136) taking a general English course at Walailak University, Thailand. On CEFR levels, 68 of them are considered basic users (beginner), while the others are independent users (intermediate). Students' pre- and post-tests scores as well as students' total scores from 10 vocabulary tests were examined by using Wilcoxon signed-rank and Mann-Whitney tests. The results disclosed the effectiveness of the course design in enhancing EFL learners' vocabulary acquisition (Z = -4.055, p = .001, r = .35); however, significant differences were also found across basic and independent users (U = 448.5, p = .001, r = .70). The findings support the ideas that formative assessment reinforces students' self-regulated learning strategies and students' levels of English proficiency influence the extent of their self-regulated learning development and involvement.
Keywords: *self-regulated learning, formative assessment, socrative*

1. Introduction

Self-regulated learning has been explored extensively in the past three decades, supported by the belief that teaching students self-regulatory skills is of importance, not only during formal schooling, but also at the time when students leave school and must continue updating their knowledge on their own (Boekaerts, 1997). However, promoting self-regulated learning among learners are neither easy nor automatic, as this type of learning demands a higher level of engagement, more extra time, and surely, more motivation from learners (Pintrich, 1999). Therefore, a mere assumption that students would be able to self-regulate their own learning with no guidance could be misleading, since students' abilities in selecting, combining, and coordinating cognitive strategies for knowledge comprehension, retention, and transfer in their outside classroom learning are still a matter of inquiry in self-regulated learning (Boekaerts, (1999). Yet, despite these paradoxes, once learners have been able to fully self-regulate their own learning, their self-regulation skills will likely assist them to learn more with less effort and attain higher levels of academic satisfaction (Pintrich, 2000). Self-regulated learning has been found to be a significant predictor of students' academic outcomes (Zimmerman, 2008), and given current technological advances, student academic development may depend on their learning occurring outside of classrooms and in unsupervised environments (Bjork, Dunlosky, & Kornell, 2013).

In the context of foreign language learning, self-regulated learning has not been much examined and more empirical studies are still needed. Most of the discussions on self-regulated learning occur around the areas of motivation and language learning strategies (Choi, Zhang, Lin, & Zhang, 2018; Dörnyei, 1990; Tseng, Dörnyei, & Schmitt, 2006; Zhang, Lin, Zhang, & Choi, 2017). Thus, the present study explores the effectiveness of involving self-regulated learning, formative assessment, and mobile app in enhancing EFL learners' vocabulary acquisition. It involves university students at beginner and intermediate, which would be considered as basic and independent users respectively in the Common European Framework of Reference for Languages (CEFR). This classroom-based research seeks to shed light on the path of discovering a better way to enhance students' vocabulary acquisition. The significance of this study lies on the exploration of a specific course design emphasizing on self-regulated learning coupled with formative assessment on the acquisition of 500 words in one academic term – 12 weeks, in which the assessment utilizes a mobile app with Student Response System (SRS).

2. Literature Review

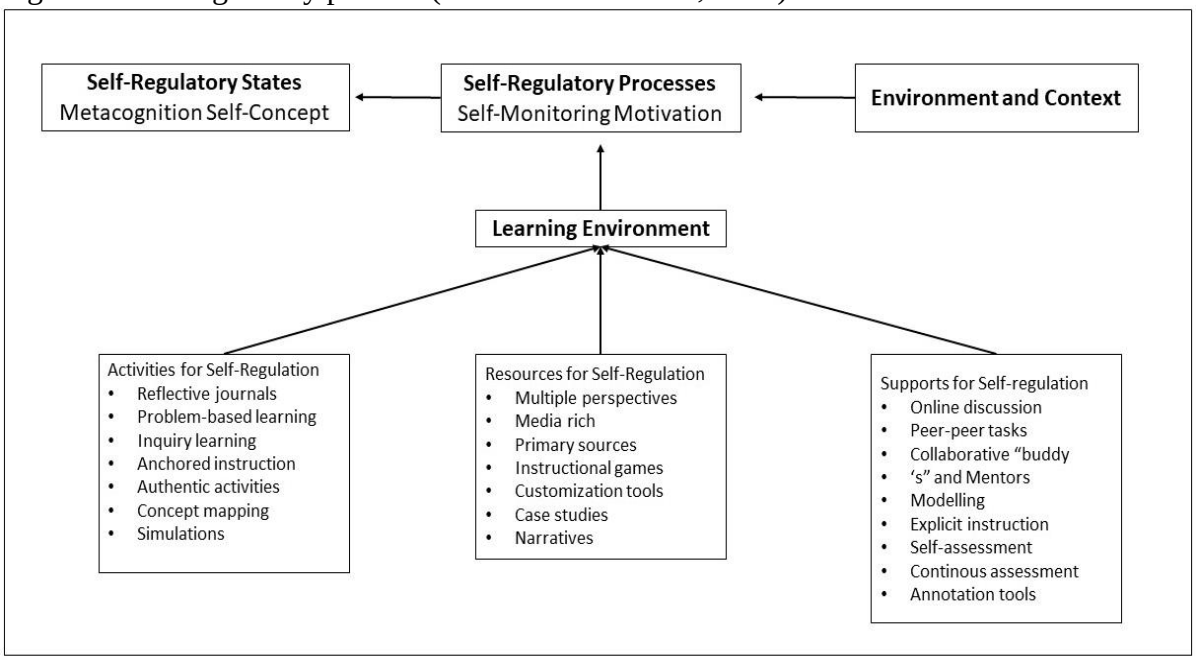
2.1. Promoting Self-Regulated (Language) Learning

Self-regulated learning is an interactive process that is complex for involving not only self-regulation cognitively, but also self-regulation motivationally (Boekaerts, 1997; Zimmerman, 1990). In self-regulated learning, learning is considered as an activity in which learners act in a proactive way instead of a mere reaction to teaching (Zimmerman, 2002), and may occur outside classroom and in unsupervised environment that requires self-initiated and self-managed learning to achieve desired academic outcomes (Bjork, Dunlosky, & Kornell, 2013). An early study from Lindner

and Harris (1992) on self-regulated learning and academic achievement found a substantially positive relationship between self-regulated learning and college students' grade point average (GPA), suggesting self-regulated learning as an important component in academic success at college level. Self-regulation, self-efficacy, and test anxiety appeared to be significant predictors of classroom academic performance (Pintrich & De Groot, 1990). Recent studies have also confirmed the consistency of the relationship between self-regulated learning and achievement (e.g. Dörrenbächer & Perels, 2016; Duckworth, Akerman, MacGregor, Salter, & Vorhaus, 2009).

Promoting and sustaining self-regulated learning requires continuous efforts on maintaining students' self-efficacy – confidence in learning, increasing students' awareness of task value – making the subjects interesting, engaging, and important, and adopting a mastery goal orientation – more than just attaining good grades (Pintrich, 1999). Such efforts on promoting self-regulation in learning will eventually prepare students as life-long learners because learners would prepare, observe, and assess their learning process (Schraw, Crippen, & Hartley, 2006). In self-regulated learning, students essentially operate at a top level of self-awareness and self-concept, which activates their self-monitoring and motivational processes encompassing the use of volitional, cognitive, and regulatory strategies thereby creating confident self-aware learners; nevertheless, the difficulty lies on the process level to achieve the level of being able to self-monitor learning and teaching self-regulated learning strategies does not automatically create self-regulation for all learners (McMahon & Oliver, 2001).

Figure 1: Self-regulatory process (McMahon & Oliver, 2001)



As shown in figure 1, to promote self-regulated learning, the implementation of a range of various activities, resources, and supports that can help shape students' self-

regulatory process is required, potentially leading to self-regulatory states with metacognition self-concept. These requirements on activities, resources, and supports seem to implicate that teachers play a key role in forming students' self-regulated learning, as also suggested by previous studies. Teachers' susceptibility and response in providing equal opportunities and supports for students with different characteristics, for instance, may limit student growth in self-regulated learning (Peeters, De Backer, Kindekens, Triquet, & Lombaerts, 2016). Certain culture-specific features related to teacher-centered classroom environment might contribute to the degree of teacher's influence on forming students' self-regulated learning, which is likely to happen in Asian countries (Lee, Yin, & Zhang, 2009). However, small mediating effects were found between perceived teacher support on self-regulated learning and students' achievement (Schuitema, Peetsma, & van der Veen, 2016). Also, when student-teacher interactions were studied, student-centered learning and strategy instruction appeared to be positively and significantly related to self-regulated learning, indicating that students likely self-regulate if student-centered learning is promoted and self-regulated learning strategies are taught (Yen, Bakar, Roslan, Suluan, & Rahman, 2005).

Moreover, on promoting self-regulation to foreign language learners, such factors as language learning history, proficiency, learning styles and strategies, attitudes toward language learning, and motivation can be crucial; therefore, preliminary needs analysis is suggested to be the first step of inquiring into students' previous language learning experiences as well as their preparedness for developing self-regulated language learning (Nakata, 2010). In the process, it is important to realize that language learning involves diverse learning behaviors rather than a uniform process (Dörnyei, 1990); thus, attention to learners' motivation in learning is decisive, not only because learners must be integratively motivated to really learn a foreign language, but also there is a connection between motivational beliefs and self-regulated use of learning strategies (Nakata, 2010). The results of a recent study from Rose and Harbon (2013) highlight that in the process of foreign language learning, many students are unable to control emotions, boredom, and procrastination, which leads to the inability to manage commitments. For advanced learners, they tend to lose self-regulation in learning because of frustration that is commonly caused by either a lack of progress in learning or self-criticism over an inability to attain learning goals. Hence, forming self-regulated learning among foreign language learners takes continuous efforts on scaffolding and monitoring students' autonomous learning development affectively and cognitively in the whole periods of learning.

In the literature, there are still a few studies specifically exploring the areas of self-regulated learning and vocabulary acquisition. The most recent study was conducted by Choi, Zhang, Lin, and Zhang (2018) who explored the framework of self-regulated learning in motivational factors and use of learning strategies on influencing L2 vocabulary knowledge of high school students Korea. The results of the analysis disclosed significantly indirect effects of motivation on vocabulary knowledge mediated by vocabulary learning strategies. Both intrinsic and extrinsic motivations were positively related to vocabulary learning strategies and vocabulary knowledge.

In the case of self-regulation in vocabulary acquisition, Tseng, Dörnyei, and Schmitt (2006) suggest empowering students through practical self-regulatory process rather than providing instructions of a set of strategies. Giving instructions are necessary, yet students need to have a sufficient foundation of self-regulatory capacity first which can only be gained through a practical process. The need to develop self-regulatory capacity is also suggested by Tseng and Schmitt (2008) who argue that learning vocabulary is a long-term task; thus, students must be able to proactively generate personal control of their vocabulary learning, which makes it necessary for students to have personalized self-regulated techniques coupled with vocabulary learning tactics.

Self-regulated learning connects motivation and learning strategies in vocabulary learning process (Mizumoto & Takeuchi, 2011). It has been found that students who had stronger depth of vocabulary knowledge used certain strategies more often than those who had weaker depth of vocabulary knowledge (Nassaji, 2006). Nonetheless, a study from Kormos and Csizer (2014) investigating the influence of motivational factors and self-regulatory strategies on autonomous learning behavior did not find a significant difference across learner groups. The differences were only found, first, on metacognitive monitoring, self-efficacy throughout the course, and reported use of learning strategies (DiFrancesca, Nietfeld, & Cao, 2016), and second, on students' EFL learning optimism and self-regulated language learning behavior (Khodarahmi & Zarrinabadi, 2016). Furthermore, motivation in self-regulated learning had indirect effects on students' proficiency, mediated by learning strategies; meanwhile, self-efficacy was strongly associated with cognitive strategies and effort regulation (Fukuda, 2018).

2.2. Reinforcing Self-Regulated Learning through Formative Assessment

The idea of using formative assessment to reinforce students' self-regulated learning strategies has been a matter of discussion (Meusen-Beekman, Joosten-ten Brinke, & Boshuizen, 2015). The aspiration of formative assessment is essentially to support learning through formative feedback operating to disclose recondite learning processes, which potentially reinforces students' self-regulated learning strategies to improve and attain better outcomes (Andrade & Cizek, 2010; Clark, 2012; Crossouard & Pryor, 2012). Quality feedback in formative assessment can serve as a catalyst of learning with coaching values, inspiring students' confidence and hope, then self-regulating their own learning (Sadler, 1998). At this point, formative assessment and self-regulated learning converge in the sense to help students actively monitor and regulate their learning processes, involving learning orientation, goals, strategies used to realize goals, resources management, efforts exerted, reactions to external feedback, and lastly, outcomes produced (Nicol & Macfarlane-Dick, 2006). Further, Nicol and Macfarlane-Dick (2006) outline seven principles of good feedback practice in formative assessment that can help facilitate students' self-regulated learning (table 1).

Table 1: Seven principles of formative feedback to support and develop student's self-regulated learning

1. Clarify what good performance is
2. Facilitate self-assessment
3. Deliver high quality feedback information
4. Encourage teacher and peer dialogue
5. Encourage positive motivation and self-esteem
6. Provide the opportunities to close the gap
7. Use feedback to improve teaching

As discussed in the previous section, much of the discussion around self-regulated learning occur around the intersection of motivation and metacognition (Zimmerman & Moylan, 2009) and formative assessment also happens to support student motivation and achievement that requires continuous adjustments of learning involving the use of cognitive and metacognitive strategies (Cauley & McMillan, 2010). However, a study from Yin et al (2008) who explored the impact of formative assessment on student motivation, achievement, and conceptual change did not confirm significant impact. In the context of language learning, formative assessment has been found to have positive impacts on enhancing students' attention and participation, leading to the improvement of students' listening comprehension (Ross, 2005) and speaking proficiency (Radford, 2014).

2.3. Mobile App: Socrative

The use of online quizzes as a tool in teaching and assessment has been found to have positive influences on student's academic performance (Cohen & Sasson, 2016; Salas-Morera, Arauzo-Azofra, & García-Hernández, 2012) and Socrative is one of those tools equipped with Student Response System (SRS) accessible on web and mobile app. The potential of Socrative to be used for teaching and assessment has been confirmed in the aspects of supporting collaborative learning (Awedh, Mueen, Zafar, & Manzoor, 2015), enhancing student engagement (Dervan, 2014; Kaya & Balta, 2016), providing immediate feedback (Balta & Guvercin, 2016), and certainly, facilitating real-time quizzes (Ferrándiz, Puentes, Moreno, & Flores, 2016). This type of innovative pedagogy that involves social computing technologies and mobile application is necessary in the present day as it can promote learner agency, autonomy, and engagement, thereby shaping personalized and self-regulated learning (McLoughlin & Lee, 2010).

3. The Study

The present study is built upon the concept of self-regulated learning (Boekaerts, 1997; Bjork, Dunlosky, & Kornell, 2013; Zimmerman, 1990, 2002) and the use of formative assessment in reinforcing student's self-regulated learning (Clark, 2012; Crossouard & Pryor, 2012; Nicol & Macfarlane-Dick, 2006). Then, the idea of using mobile app – Socrative as a potential tool for teaching and assessment comes along with current technological advances in mobile learning and assessment and positive

results from previous studies exploring this mobile app (e.g. Awedh, Mueen, Zafar, & Manzoor, 2015; Dervan, 2014; Kaya & Balta, 2016, etc.).

This study examines the effectiveness of promoting self-regulated learning with formative assessment and the use of mobile app in enhancing EFL learners' vocabulary acquisition. As the measurement, it looks at the results of students' pre- and post-tests on vocabulary and investigates the differences between basic and independent users.

The research questions are formulated as follows:

1. How is the effectiveness of promoting self-regulated learning with formative assessment and the use of mobile app in enhancing EFL learners' vocabulary acquisition?
2. How is the effectiveness of promoting self-regulated learning with formative assessment and the use of mobile app in enhancing EFL learners' vocabulary acquisition across basic and independent users?

4. Researc Methodology

4.1. Research Design

This is a classroom-based research with a quantitative research design focused on exploring correlation and group comparison. Quantitative research design allows the quantification of relationships among variables that is depicted in effect statistics, such as correlations, relative frequencies, or means differences (Hopkins, 2008). The variables involve a course design on vocabulary acquisition that promotes self-regulated learning, formative assessment, and the use of Socrative as an assessment tool. This study also considers students' prior and post vocabulary knowledge to see the effectiveness of the given treatment. Exploring the differences across students categorized as basic (beginner) and independent (intermediate) users based on CEFR is one of the primary interests.

4.2. Context and Course Description

The study was conducted at Walailak University, Thailand on one general English course entitled "English in Cultural Diversity", from January to May 2018, the third term of 2017-2018 academic year. The course aims to facilitate students with the opportunities to acquire English speaking, listening, reading, and writing skills at higher levels, encompassing contextual, practical vocabulary and grammar, meaningful for students' futures in the ranges of arts and cultural exchanges, living abroad, careers, and lifestyles. The integration of Information and communications technology (ICT), like Socrative.com and writeabout.com, and formative assessments are embedded in the syllabus and weekly teaching guidelines. In addition, students are distributed to classes based on their English proficiency levels, meaning that one class only has students at one level, e.g. beginner, intermediate, or advance.

One of the academic policies at Walailak University is that students are required to take general English courses in the first and second year – six terms, and targeted to have acquired 3000 English vocabulary, which means that in one term, students must

learn 500 English words. Therefore, in English in Cultural Diversity course, the design puts emphasis on learning and acquiring 500 words. Ten vocabulary sets are provided and attached to the course book, in which students can find them easily. One vocabulary set consists of 50 words, which include such information as word, part of speech, definition, and example in sentence. In this course, students must self-regulate their vocabulary learning outside classroom and they are encouraged to use resources available online; teachers are reachable through Facebook messenger if students have questions.

Students' self-regulated learning begins after class in week 1 for vocabulary set 1; then, in week 2, the first 10 minutes of the class are allocated for students to do vocabulary test 1 through Socrative, in which students access it using their smartphones. Vocabulary test 1 is intended to measure students' vocabulary acquisition on vocabulary set 1; vocabulary test 2 is to measure students' vocabulary acquisition on vocabulary set 2, etc. The learning process stays the same until vocabulary test 10, which will be held in week 11. A post-test is given in week 13. The pre-test is given prior to week 1. The details of the course design are explained in table 2 and the example of the vocabulary set can be seen in table 3.

Table 2: Class schedule for vocabulary learning and test – 13 weeks

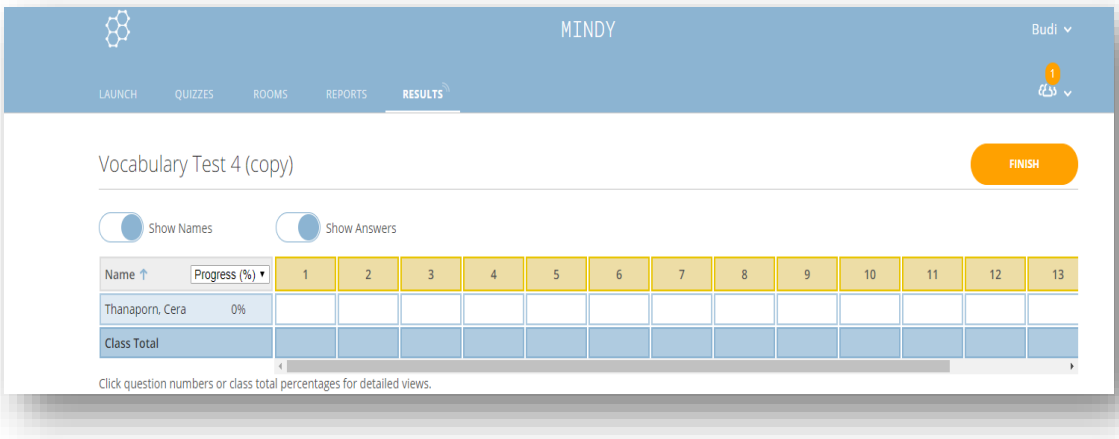
Weeks	**In class**	**Outside/ after class**	**Formative Assessment**
1	Course introduction		Students' scores from each vocabulary test are uploaded to the online google spreadsheet. Teachers have the chance to inform students about their scores and encourage students to improve their self-regulated learning by taking the most advantage of available learning resources, such as online dictionary, search engines, educational websites, etc.
		Students self-regulate their study on vocabulary set 1.	
2	Students take a 10 minute-vocabulary test through socrative accessed by using their smartphones. This is considered as vocabulary test 1.		
		Students self-regulate their study on vocabulary set 2.	
3	Students take a 10 minute-vocabulary test through socrative accessed by using their smartphones. This is considered as vocabulary test 2.		
		Students self-regulate their study on vocabulary set 3	
The process stays the same until week 11, where students take vocabulary test 10.			
13	Students take a post-test		

Table 3: One example of the vocabulary set

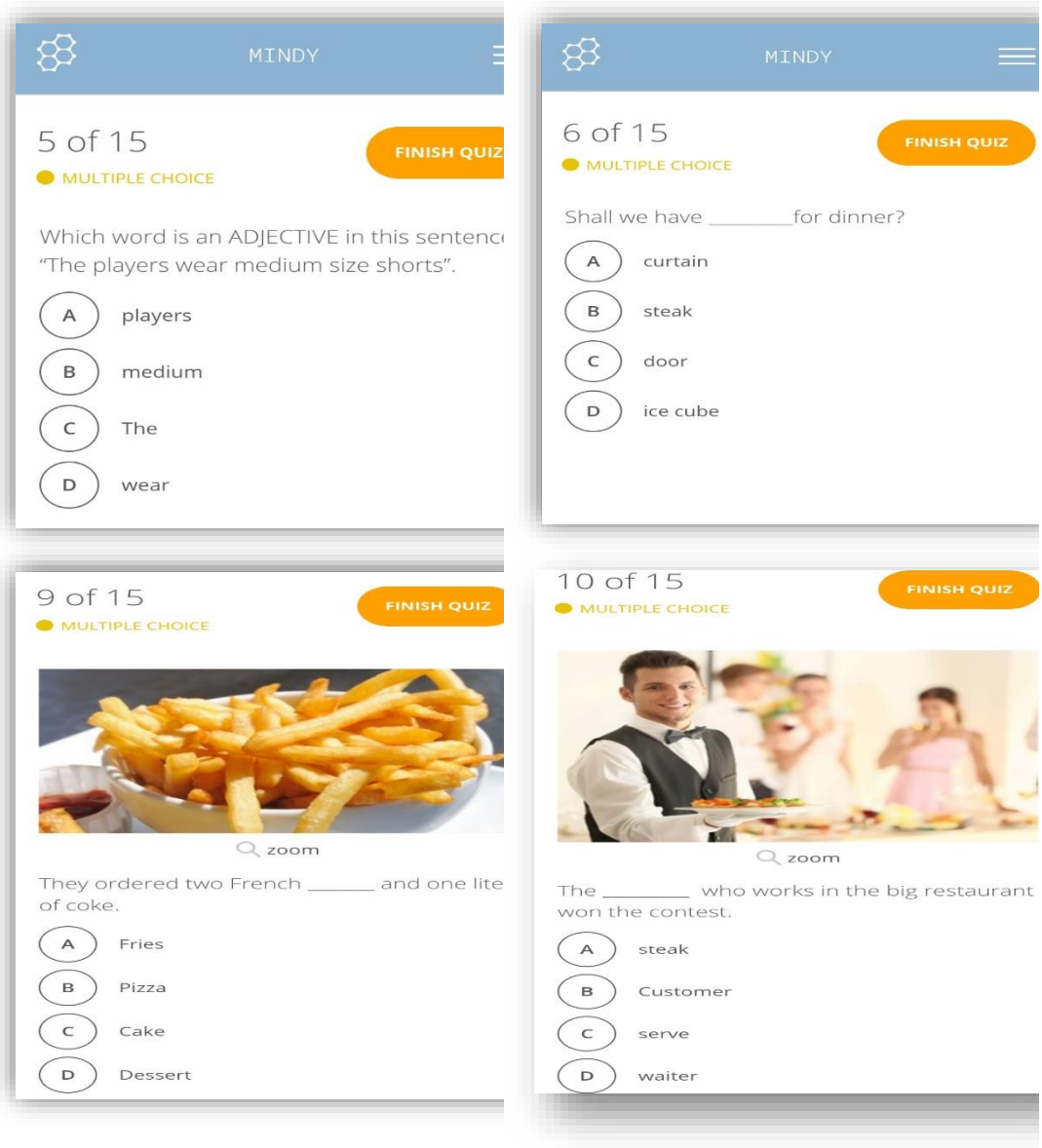
No.	Word	Part of Speech	Definition	Example
1.	Aisle	Noun	A long, narrow space between rows of seats in an aircraft, cinema, or church	I'd like an aisle seat, please.
2.	Allowance	Noun	An amount of something that you are allowed	My monthly allowance is 10,000 baht.
3.	Apartment	Noun	A set of rooms for living in, especially on one floor of a building (US)	There's a new apartment unit available for sale next month.
……..				
50.	Unit	Noun	A single apartment in a bigger building	She lived at unit #34 in that building.

There are 15 questions given in each vocabulary test, including synonym, antonym, part of speech, definition, and sentence completion. Pictures are added to some of the questions. The classroom is equipped with computer, projector, and internet connection, so teacher can launch the vocabulary test on the class computer, which appears on the projector too. Teachers shuffle the questions among students to minimize cheating. Teachers can monitor student progress on the vocabulary test being conducting by looking at the percentage of completion shown on the projector. After 10 minutes, teachers finish the vocabulary test and close the Socrative application. The reports of the results are downloadable on Socrative.com, which can be done after class by teachers. The following pictures display the appearance of vocabulary test on Socrative.

Picture 1: One example of the appearance of the vocabulary test by teachers



Picture 2: The appearance of the question on students' smartphones when doing the vocabulary test



4.3. Sample

The data came from one term – 12 weeks of English in Cultural Diversity course (January – May 2018) at Walailak University, Thailand. Six classes were used as the sample of this study, consisting of 3 basic user (beginner) classes and 3 independent user (intermediate) classes. The total number of the students was 136, distributed equally: 68 beginners and 68 intermediate students. The classes were taught by Thai and foreign lecturers at Walailak University Language Institute (WULI), Thailand. The students were in the first year of their undergraduate program, majoring in Chinese Language, Medical Technology, and Tourism and Hotel. The students' background characteristics are presented in table 3.

Table 4: Students' background characteristics

Characteristics	Frequency	Percentage
Gender		
Male	23	16.9%
Female	113	83.1%
Classes		
Beginner 1	21	15.4%
Beginner 2	28	20.6%
Beginner 3	19	14%
Intermediate 1	22	16.2%
Intermediate 2	25	18.4%
Intermediate 3	21	15.4%

4.4. Data Collection and Analysis

To answer the first research question, this study conducted pre- and post-test on vocabulary. The pre- and post-tests have different questions, yet constructed on the same types of questions: synonym, antonym, part of speech, definition, and sentence completion. Besides, this study also collected students' scores on vocabulary test 1 – 10; the average of the students' scores was used to answer the second research question. After obtaining all the required data, test of normality was run to decide whether parametric statistics is appropriate for the data using SPSS. The results of the analysis were presented in the subsequent section.

5. Results

5.1. Test of Normality

Despite having more than one hundred participants, the test of normality of was still conducted to ensure whether parametric tests would be appropriate for the data analysis. There is also an argument that most data in social and behavioral science are likely to fail to meet the assumption of multivariate normality (Micceri, 1989). Hence, two criteria of normality were applied: 1) the Shapiro-Wilk test, assuming that the normal distribution occurs when the p-value is greater than .05 (Shapiro & Wilk, 1965), 2) skewness and kurtosis between -2 and +2 (George & Mallery, 2010). After running the analyses, the results indicated non-normal data for students' scores on pre- (M = 5.63, SD = 1.83) and post-tests (M = 6.40, SD = 1.96). Non-normality was also found in the average of students' scores from 10 vocabulary tests (M = 10.62, SD = 2.83). The p-values for the data of interests were significantly lower than .05. Because of these non-normal data, non-parametric tests were chosen. The details of the descriptive statistics and results of tests of normality are presented in table 5 below.

Table 5: Descriptive statistics and tests of normality

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Total	136	10.62	2.858	-1.443	.208	2.442	.413
Post	136	6.40	1.960	-.380	.208	-.321	.413
Pre	136	5.63	1.825	-.175	.208	-.587	.413
Valid N (listwise)	136						

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total	.132	136	.000	.878	136	.000
Post	.136	136	.000	.962	136	.001
Pre	.139	136	.000	.956	136	.000

a. Lilliefors Significance Correction

5.2. Research Question 1

The first research question explores the effectiveness of promoting self-regulated learning with formative assessment and the use of mobile app in enhancing EFL learners' vocabulary acquisition. Students' scores on pre- and post-tests were examined by using Wilcoxon signed-rank test, a type of paired t-test in non-parametric statistics (Conover & Iman, 1981). The outcomes of the Wilcoxon signed-ranked test exposed that the course design involving students' self-regulated on vocabulary, formative assessment, and the use of Socrative significantly enhanced students' vocabulary acquisition (Z = -4.055, p = .001, r = .35). The median of students' scores were 6 and 7 for both pre- and post-tests respectively.

Table 6: The results of Wilcoxon signed-rank test

Ranks

		N	Mean Rank	Sum of Ranks
Post - Pre	Negative Ranks	30[a]	56.98	1709.50
	Positive Ranks	80[b]	54.94	4395.50
	Ties	26[c]		
	Total	136		

a. Post < Pre
b. Post > Pre
c. Post = Pre

Test Statistics

	Post - Pre
Z	-4.055[b]
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

5.3. Research Question 2

The second research question investigates the differences on the effectiveness of promoting self-regulated learning with formative assessment and the use of mobile app in enhancing EFL learners' vocabulary acquisition across basic (beginner) and independent (intermediate) users. Both students' scores on post-test and students' total scores from 10 vocabulary tests were examined by using Mann-Whitney test, which is like independent t-test in parametric tests (Hart, 2001). On post-test, the outcomes of the Mann-Whitney test disclosed that vocabulary acquisition in independent users was higher than the basic users (U = 448.5, p = .001, r = .70), which means that the course design worked more effectively for intermediate level students than beginner level students.

Table 7: The results of the Mann-Whitney test on post-test

Ranks

	Level	**N**	**Mean Rank**	**Sum of Ranks**
Post	Beginner	68	41.10	2794.50
	Intermediate	68	95.90	6521.50
	Total	136		

Test Statistics

	Post-Test
Mann-Whitney U	448.500
Wilcoxon W	2794.500
Z	-8.210
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: Level

On students' total scores from 10 vocabulary tests, the outcomes also indicated that vocabulary acquisition was greater for independent users that basic users (U = 695.5, p = .001, r = .60).

Table 8: The results of the Mann-Whitney test on students' total scores

Ranks

	Level	N	Mean Rank	Sum of Ranks
Total	Beginner	68	44.73	3041.50
	Intermediate	68	92.27	6274.50
	Total	136		

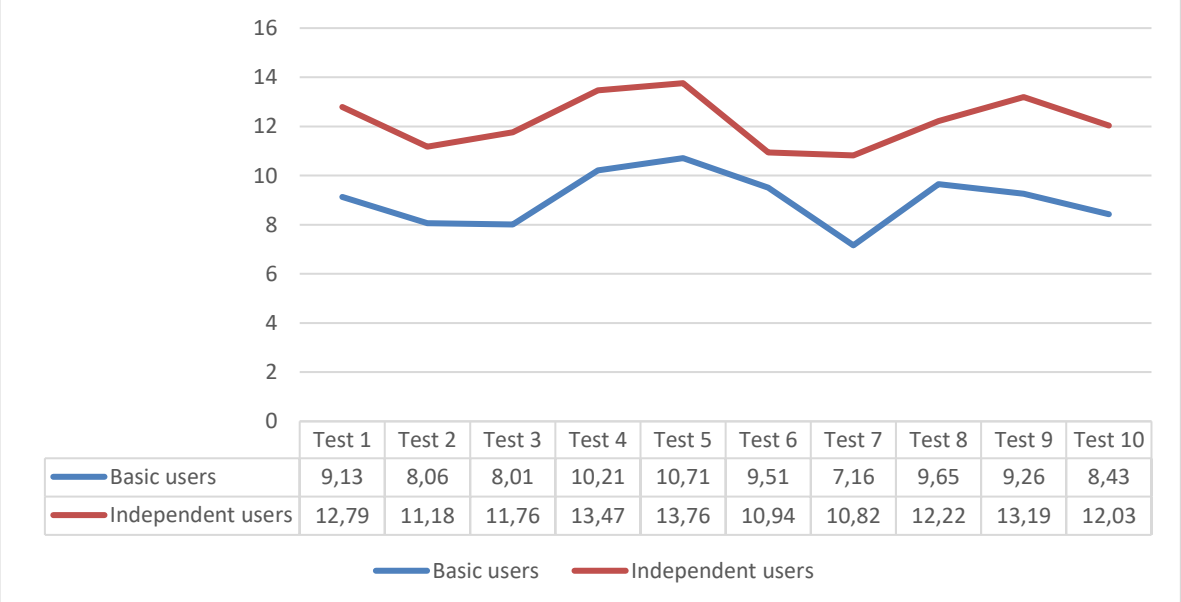
Test Statistics

	Total
Mann-Whitney U	695.500
Wilcoxon W	3041.500
Z	-7.037
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: Level

In addition, the difference on vocabulary acquisition was reflected on the average scores achieved by both groups basic and independent users on each vocabulary test. The highest mean for basic users was at 10.71 on vocabulary test 5, while independent users made 13.76 on the same vocabulary test. The following line graph illustrates the trends of means differences between basic and independent users on vocabulary test 1 – 10.

Graph 1: The trends of means differences



6. Discussion

Promoting self-regulated learning coupled with formative assessment and the use of Mobile App, such as Socrative, were found to be significantly effective in enhancing EFL learners' vocabulary acquisition. In this study, practically, teachers did not explicitly teach students vocabulary, yet rather, students had to self-regulate their own vocabulary learning outside classroom. The finding resonates with the basic concept of self-regulated learning, in which students explore learning materials in a proactive way (Zimmerman, 2002), and self-initiate and self-manage learning to attain desired academic outcomes (Bjork, Dunlosky, & Kornell, 2013). As promoting self-regulated learning demands continuous efforts on maintaining students' engagement and self-efficacy (Pintrich, 1999), formative assessment plays a role in alerting students about their learning strategies when the expected outcomes were not obtained, e.g. a student who knew that s/he got a low score on vocabulary test 1 would re-adjust their learning strategies for attaining a better score in the next vocabulary test. Thus, the finding of this study supports the idea that formative assessment can reinforce students' self-regulated learning strategies as suggested by Andrade and Cizek (2010), Clark (2012), and Crossouard and Pryor (2012). Besides, after successfully conducting ten vocabulary tests by a means of Socrative, the finding suggests the use of mobile apps that can facilitate real-time quizzes (Ferrándiz, Puentes, Moreno, & Flores, 2016); however, further investigations are still needed to confirm how far such mobile apps can support students' self-regulated learning.

Another important result from this study is that independent users (intermediate level students) benefitted more from the course design involving self-regulated learning and formative assessment than basic users (beginner level students) did. The examination on the post-test results and students' total scores from 10 vocabulary tests revealed a significant difference between the two groups. On average in each vocabulary test, intermediate level students always obtained higher scores than their counterparts. Therefore, based on this finding, the present study confirms that a student's level of English proficiency is likely to influence the extent of the student's self-regulated learning development and involvement. It is argued that students with higher levels of English proficiency might have developed self-regulatory capacity and personalized self-regulated techniques as well as vocabulary learning tactics (Tseng and Schmitt, 2008). Thus, empowering students to develop practical self-regulatory process is recommended at the beginning of the process of promoting self-regulated learning on vocabulary (Dörnyei & Schmitt, 2006).

A study from DiFrancesca, Nietfeld, and Cao (2016) who compared self-regulated learning variables between high and low achieving students also confirm the existence of significant differences between these two groups. From students' reports, Khodarahmi and Zarrinabadi's study (2016) found that high-language achievers used self-regulatory strategies more frequently than low achievers, while there was no significant difference across genders. The most recent study specifically exploring self-regulated learning of vocabulary from Choi, Zhang, Lin, and Zhang (2018) suggests positive correlations between learners' motivation in learning vocabulary and their use of vocabulary learning strategies in enhancing their vocabulary

knowledge. Hence, this study sustains the argument that self-regulated learning occurs differently to learners with different levels of English proficiency. Teachers, nonetheless, should pay more attention to low achievers or low level students as they need more help in self-regulating their own learning.

6.1. Limitation of the study

This study has some limitations to be acknowledged. The data analyzed in this study primarily rely on students' scores. Involving students' perceptions on the course design might have elicited more meaningful insights. Besides, this study mainly focuses on the outcomes of vocabulary tests rather than on the process of how students self-regulated themselves on vocabulary learning. The implementation of formative assessment and use of Socrative in this study might need some further exploration. Such things as giving quality formative feedback to help students improve their self-regulated learning strategies might not be conducted greatly in this study.

7. Conclusion

Promoting self-regulated learning at university level is undeniably important, not only because university students must take responsibility for their own learning, but also, they need to practice self-regulated learning skills to advance knowledge in their specific area of study. The present study has provided one example of a course design that attempts to promote self-regulated learning on vocabulary and the results on enhancing students' academic achievement on vocabulary acquisition reveal the effectiveness of the implementation. Formative assessment and the use of mobile app are added to the course design, which contribute to the development of research in self-regulated learning. Additionally, students' levels or English proficiency seem to be related to their advancement of using self-regulatory strategies in learning. Therefore, future research is recommended to explore alternative solutions to help low level students use self-regulatory strategies better.

References

Andrade, H., & Cizek, G. J. (2010). Students as the definitive source of formative assessment: Academic self-assessment and the self-regulation of learning. In *Handbook of formative assessment* (pp. 102-117). Routledge. Retrieved from https://opencommons.uconn.edu/cgi/viewcontent.cgi?referer=https://scholar.google.co.th/&httpsredir=1&article=1007&context=nera_2010 (October, 23, 2018)

Awedh, M., Mueen, A., Zafar, B., & Manzoor, U. (2015). Using Socrative and Smartphones for the support of collaborative learning. *arXiv preprint arXiv:1501.01276*. https://doi.org/10.5121/ijite.2014.3402

Balta, N., & güvercin, S. (2016). Increasing undergraduate students' exam performances in statistics course using software Socrative. *TOJET*. Retrieved from https://www.researchgate.net/profile/Nuri_Balta/publication/307589507_Increasing_Undergraduate_Students'_Exam_Performances_In_Statistics_Course_Using_Software_Socrative/links/57caeaaf08aedb6d6d9a21cc.pdf (October 23, 2018)

Bjork, R. A., Dunlosky, J., & Kornell, N. (2013). Self-regulated learning: Beliefs, techniques, and illusions. *Annual review of psychology*, *64*, 417-444. https://doi.org/10.1146/annurev-psych-113011-143823

Boekaerts, M. (1997). Self-regulated learning: A new concept embraced by researchers, policy makers, educators, teachers, and students. *Learning and instruction*, *7*(2), 161-186. https://doi.org/10.1016/s0959-4752(96)00015-1

Boekaerts, M. (1999). Self-regulated learning: Where we are today. *International journal of educational research*, *31*(6), 445-457. https://doi.org/10.1016/s0883-0355(99)00014-2

Cauley, K. M., & McMillan, J. H. (2010). Formative assessment techniques to support student motivation and achievement. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, *83*(1), 1-6. https://doi.org/10.1080/00098650903267784

Choi, Y., Zhang, D., Lin, C. H., & Zhang, Y. (2018). Self-regulated learning of vocabulary in English as a Foreign Language. *The Asian EFL Journal Quarterly*, 20(1), 52-82.

Cohen, D., & Sasson, I. (2016). Online quizzes in a virtual learning environment as a tool for formative assessment. *JOTSE*, 6(3), 188-208.

Conover, W. J., & Iman, R. L. (1981). Rank transformations as a bridge between parametric and nonparametric statistics. *The American Statistician*, *35*(3), 124-129. https://doi.org/10.1080/00031305.1981.10479327

Dervan, P. (2014). Increasing in-class student engagement using Socrative (an online Student Response System). *AISHE-J: The All Ireland Journal of Teaching and Learning in Higher Education*, 6(3).

DiFrancesca, D., Nietfeld, J. L., & Cao, L. (2016). A comparison of high and low achieving students on self-regulated learning variables. *Learning and Individual Differences*, 45, 228-236. https://doi.org/10.1016/j.lindif.2015.11.010

Dörnyei, Z. (1990). Conceptualizing motivation in foreign-language learning. *Language learning*, 40(1), 45-78. https://doi.org/10.1111/j.1467-1770.1990.tb00954.x

Dörrenbächer, L., & Perels, F. (2016). Self-regulated learning profiles in college students: Their relationship to achievement, personality, and the effectiveness of an intervention to foster self-regulated learning. *Learning and Individual Differences*, 51, 229-241. https://doi.org/10.1016/j.lindif.2016.09.015

Duckworth, K., Akerman, R., MacGregor, A., Salter, E., & Vorhaus, J. (2009). Self-regulated learning: a literature review. [Wider Benefits of Learning Research Report No. 33]. Retrieved from http://discovery.ucl.ac.uk/10015842/1/WBLResRep33.pdf (October 23, 2018)

Ferrándiz, E., Puentes, C., Moreno, P. J., & Flores, E. (2016). Engaging and assessing students through their electronic devices and real time quizzes. *Multidisciplinary Journal for Education, Social and Technological Sciences*, 3(2), 173-184. https://doi.org/10.4995/muse.2016.6375

Fukuda, A. (2018). Examining the Relationship Between Self-Regulated Learning and EFL Learners' Proficiency. *Intercultural communication review*, 16, 17-31.

George, D., & Mallery, P. (2010). *SPSS for Windows step by step: A simple guide and reference, 17.0 update*. Pearson Education India.

Hart, A. (2001). Mann-Whitney test is not just a test of medians: differences in spread can be important. *BMJ: British Medical Journal*, *323*(7309), 391. https://doi.org/10.1136/bmj.323.7309.391

Hopkins, W. G. (2008). Quantitative research design. Retrieved from http://www.citeulike.org/group/6675/article/3424132

Kaya, A., & Balta, N. (2016). Taking advantages of technologies: using the Socrative in English language teaching classes. *International Journal of Social Sciences & Educational Studies*, 2(3), 4-12.

Khodarahmi, E., & Zarrinabadi, N. (2016). Self-regulation and academic optimism in a sample of Iranian language learners: Variations across achievement group and gender. *Current Psychology*, 35(4), 700-710. https://doi.org/10.1007/s12144-015-9340-z

Lee, J. C. K., Yin, H., & Zhang, Z. (2009). Exploring the influence of the classroom environment on students' motivation and self-regulated learning in Hong Kong. *The Asia-Pacific Education Researcher*, 18(2), 219-232. https://doi.org/10.3860/taper.v18i2.1324

Lindner, R. W., & Harris, B. (1992). Self-Regulated Learning and Academic Achievement in College Students.

McLoughlin, C., & Lee, M. J. (2010). Personalised and self-regulated learning in the Web 2.0 era: International exemplars of innovative pedagogy using social software. *Australasian Journal of Educational Technology*, 26(1). https://doi.org/10.14742/ajet.1100

McMahon, M., & Oliver, R. (2001). Promoting self-regulated learning in an on-line environment. Retrieved from https://files.eric.ed.gov/fulltext/ED466194.pdf (October 23, 2018)

Meusen-Beekman, K. D., Joosten-ten Brinke, D., & Boshuizen, H. P. (2015). Developing young adolescents' self-regulation by means of formative assessment: A theoretical perspective. *Cogent Education*, 2(1), 1071233. https://doi.org/10.1080/2331186x.2015.1071233

Micceri, T. (1989). The unicorn, the normal curve, and other improbable creatures. *Psychological bulletin*, 105(1), 156. https://doi.org/10.1037//0033-2909.105.1.156

Mizumoto, A., & Takeuchi, O. (2011). Adaptation and validation of self-regulating capacity in vocabulary learning scale. *Applied Linguistics*, 33(1), 83-91. https://doi.org/10.1093/applin/amr044

Nakata, Y. (2010). Toward a framework for self-regulated language-learning. *TESL Canada journal*, 27(2), 1. https://doi.org/10.18806/tesl.v27i2.1047

Nassaji, H. (2006). The relationship between depth of vocabulary knowledge and L2 learners' lexical inferencing strategy use and success. *The Modern Language Journal*, 90(3), 387-401. https://doi.org/10.1111/j.1540-4781.2006.00431.x

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in higher education*, 31(2), 199-218. https://doi.org/10.1080/03075070600572090

Peeters, J., De Backer, F., Kindekens, A., Triquet, K., & Lombaerts, K. (2016). Teacher differences in promoting students' self-regulated learning: Exploring the role of student characteristics. *Learning and Individual Differences*, 52, 88-96. https://doi.org/10.1016/j.lindif.2016.10.014

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of educational psychology*, 82(1), 33. https://doi.org/10.1037//0022-0663.82.1.33

Pintrich, P. R. (1999). The role of motivation in promoting and sustaining self-regulated learning. *International journal of educational research*, 31(6), 459-470. https://doi.org/10.1016/s0883-0355(99)00015-4

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In *Handbook of self-regulation* (pp. 451-502). https://doi.org/10.1016/b978-012109890-2/50043-3

Radford, B. W. (2014). The effect of formative assessments on language performance. *Doctoral dissertation*. Retrieved from https://scholarsarchive.byu.edu/cgi/viewcontent.cgi?article=4977&context=etd (October 23, 2018)

Rose, H., & Harbon, L. (2013). Self-regulation in second language learning: An investigation of the kanji-learning task. *Foreign Language Annals*, *46*(1), 96-107. https://doi.org/10.1111/flan.12011

Ross, S. J. (2005). The impact of assessment method on foreign language proficiency growth. *Applied linguistics*, 26(3), 317-342. https://doi.org/10.1093/applin/ami011

Sadler, D. R. (1998). Formative assessment: Revisiting the territory. *Assessment in education: principles, policy & practice*, 5(1), 77-84. https://doi.org/10.1080/0969595980050104

Salas-Morera, L., Arauzo-Azofra, A., & García-Hernández, L. (2012). Analysis of online quizzes as a teaching and assessment tool. *Journal of Technology and Science Education*, 2(1), 39-45. https://doi.org/10.3926/jotse.30

Schraw, G., Crippen, K. J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning. *Research in science education*, 36(1-2), 111-139. https://doi.org/10.1007/s11165-005-3917-8

Schuitema, J., Peetsma, T., & van der Veen, I. (2016). Longitudinal relations between perceived autonomy and social support from teachers and students' self-regulated learning and achievement. *Learning and Individual Differences*, 49, 32-45. https://doi.org/10.1016/j.lindif.2016.05.006

Shapiro, S. S., & Wilk, M. B. (1965). An analysis of variance test for normality (complete samples). *Biometrika*, 52(3/4), 591-611. https://doi.org/10.1093/biomet/52.3-4.591

Tseng, W. T., Dörnyei, Z., & Schmitt, N. (2006). A new approach to assessing strategic learning: The case of self-regulation in vocabulary acquisition. *Applied Linguistics*, 27(1), 78-102. https://doi.org/10.1093/applin/ami046

Tseng, W. T., & Schmitt, N. (2008). Toward a model of motivated vocabulary learning: A structural equation modeling approach. *Language Learning*, 58(2), 357-400. https://doi.org/10.1111/j.1467-9922.2008.00444.x

Yen, N. L., Bakar, K. A., Roslan, S., Suluan, W., & Rahman, P. Z. M. A. (2005). Self-regulated learning and its relationship with student-teacher interaction. *Pakistan Journal of Psychological Research*, 20(1-2).

Yin, Y., Shavelson, R. J., Ayala, C. C., Ruiz-Primo, M. A., Brandon, P. R., Furtak, E. M., ... & Young, D. B. (2008). On the impact of formative assessment on student motivation, achievement, and conceptual change. *Applied measurement in Education*, 21(4), 335-359. https://doi.org/10.1080/08957340802347845

Zhang, Y., Lin, C. H., Zhang, D., & Choi, Y. (2017). Motivation, strategy, and English as a foreign language vocabulary learning: A structural equation modelling study. *British Journal of Educational Psychology*, 87(1), 57-74. https://doi.org/10.1111/bjep.12135

Zimmerman, B. J., & Moylan, A. R. (2009). Self-regulation: Where metacognition and motivation intersect. In *Handbook of metacognition in education* (pp. 311-328). Routledge.

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational psychologist*, 25(1), 3-17. https://doi.org/10.1207/s15326985ep2501_2

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into practice*, 41(2), 64-70. https://doi.org/10.1207/s15430421tip4102_2

Zimmerman, B. J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American educational research journal*, 45(1), 166-183. https://doi.org/10.3102/0002831207312909