

## THE APPLICATION OF A CLOUD-BASED STUDENT, TEACHER, AND PARENT PLATFORM IN ENGLISH AS A FOREIGN LANGUAGE EDUCATION

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### ABSTRACT

This study constructed a cloud-based student, teacher, and parent platform (CSTPP) in collaboration with a Taiwanese textbook publisher. Junior high school students' attitudes to learning English using the developed system were subsequently examined. The study participants were divided into 3 groups: Those in Group A employed the CSTPP with parental participation, those in Group B employed the CSTPP without parental participation, and those in the Control group received traditional lectures. A learning attitude questionnaire was used to assess the students' responses before and after adopting the 3 learning models. The results of this study indicated that the students who used the CSTPP with parental participation, exhibited altered attitudes toward the teaching methods within 1 month because their assumption that they could only learn from teachers was overturned. After the experiment, a system satisfaction survey was conducted with the students who had used the CSTPP on tablet PSs in classrooms and those who had used the CSTPP on computers at home. Regarding the survey results, both groups of students obtained high scores. In addition, the overall design of the CSTPP was popular among students. This platform is currently available on [www.ehanlin.com.tw](http://www.ehanlin.com.tw) for students to access and use.

**Keywords:** junior high school; cloud computing; attitudes to learning English

### INTRODUCTION

The prospering field of cloud computing provides a more open and diverse learning environment. In various countries, teachers are continuously introducing innovative learning models in classrooms to promote student learning (Sultan, 2010). Cloud computing has reduced operating costs for numerous enterprises (Gupta, Seetharaman & Raj, 2011) and decreased the cost of purchasing software and hardware for educational institutions (Stein, Ware, Laboy & Schaffer, 2013; Ercan, 2010). Numerous countries such as United States (Reynolds, 2011) and South Korea (Lee, 2013) have announced the goal of fully replacing traditional textbooks with electronic textbooks over the next several years. Electronic textbooks will become a new future trend of education with many advantages such as: portability, lower cost, and desired by the "Y" generation (Weisberg, 2011). Since most electronic textbooks from cloud computing technology, so countries began to establish variety of educational cloud (Mousannif, Khalil & Kotsis, 2013). In past studies, the parents through mobile phone messaging (Ho & Hung, 2013), blog (Ozcinar & Ekizoglu, 2013), and school management information system (Telem, 2005) to join student learning, the results have to improve academic performance. However, the two major characteristics cloud computing: "resource sharing" and "ubiquitous" are more suitable for communication among students, teachers, and parents. Paechter and Maier (2010) randomly selected 2,196 students from 29 Australian universities to survey. Regarding their results, the students asserted that online assessments provided a clear and consistent explanation of the class content, which enabled the students to self-adjust their efforts according to their learning speed, effectively enhancing their learning performance. Vasileios, Christos, and Anastasios (2013) found that the usability and entertainment value of computer-based assessments were two main reasons for students' continual usage. Terzis, Moridis, and Economides (2013) reported that the feedback function of computer-based assessments positively influenced student learning.

Active language learning attitudes stimulate students to exhibit positive attitudes toward learning English (Karahana, 2007). Teachers can encourage students to improve their learning attitude by providing positive learning environments and examples (Callahan & Clark, 1988). Gömleksiz (2010) asserted that the content and homework assignments of English courses crucially influenced students' attitudes to learning English. Dr. Gömleksiz recruited 1,275 Turkish undergraduate students as research targets, and investigated the influence that variables such as sex, college study year, and study major exerted on their attitudes to learning English. The results showed that sex, college study year, and study major significantly influenced students' attitudes to learning English. Kim (2010) also recruited 1,037 high school students to investigate Korean high school students' English learning motivation and attitudes. The results showed that the students' motivation comes from studies and career, on the other hand, the attitude comes from the history with United States. Cid, Grañena, and Tragant (2009) developed the foreign language attitudes and goals survey (FLAGS), which has subsequently

undergone a three-stage revision. The target of the original questionnaire was Spanish high school students studying English as a foreign language (EFL), which accorded with the research targets of this study. The first stage involved exploratory research conducted by Elsa and Muñoz in 2000 and 2001 with 900 teenagers aged 10, 12, 14, and 17 years. The results were divided into eight dimensions and then revised and edited into a questionnaire. The second stage involved a pretest. They revised the questionnaire based on the results obtained in 2000 to 2001, the theories and research of other scholars, student perspectives, and completed questionnaires. For the final stage, 83 students were recruited to complete the questionnaire. Based on the results, the questionnaire content was further revised into the three dimensions of “motivation to learn English and appeal of the English language,” “attitudes toward instruction,” and “linguistic self-efficacy.” The dimension of “motivation to learn English and appeal of the English language” concerned the determinants of students’ English language learning both in and out of class and whether they liked the English language. The dimension comprised 16 items with an  $\alpha$  value of 0.93. The dimension of attitudes toward instruction concerned students’ opinions of the English language learning classes and their own performance and comprised 11 items with an  $\alpha$  value of 0.91. The aspect of “linguistic self-efficacy” concerned students’ opinions regarding learning English, such as their ability to use English and the difficulties they experienced, and comprised 11 items with an  $\alpha$  value of 0.87.

Accordingly, the study researcher collaborated with a Taiwanese textbook publisher (Han Lin Publishing Co., Ltd.) to construct a cloud-based student, teacher, and parent platform (CSTPP). In the past, parents could only obtain an update of children’s learning situations from parent-teacher communication logs and grade reports. Opportunities for mutual communication between students, teachers, and parents were extremely rare, leading to parents’ limited involvement in student learning. The design concept of the CSTPP employed the lack of time or space restrictions characteristic of cloud computing to produce learning progress reports through a continuous process of testing, diagnosing, and remedying. Parents were kept informed of their children’s learning performance through close communication with teachers and could watch remedial teaching videos with their children. Thus, the parents were able to achieve their goal of assisting with their children’s homework. This study adopted English language learning as the research subject because many non-English-speaking countries require students to learn English as a second language. However, junior high school students’ level of English language ability differs substantially, and teachers are typically troubled when teaching a class of students with varying English levels. Therefore, the development of a learner-centered and progress-customized teaching platform has been anticipated by students, teachers, and parents. The CSTPP was employed as a research tool to investigate the influence that parental participation in using the CSTPP exerts on junior high school students’ attitudes to learning English.

### **THE CLOUD-BASED STUDENT, TEACHER, AND PARENT PLATFORM, CSTPP**

The primary research tool was the CSTPP prototype constructed in collaboration with a textbook publisher (Han Lin Publishing Co., Ltd.). Regarding the test environment, the developed system had the advantage of cloud computing and could be operated on any PC or mobile device (such as tablet PCs or smart phones). Moreover, the CSTPP recorded students’ learning progress, enabling them to identify and address their learning deficiencies. Thus, the goal of increasing students’ learning performance could be achieved. Every process of the cyclic learning mode developed in this study is explained below.

#### **Test**

Using the CSTPP, students can choose the test subject and scope for self-evaluations. The test questions were randomly numerically arranged by the system, and 20–23 multiple-choice questions were randomly selected for each learning unit. Because the order of the questions and answer options differed for every test, the students could conduct repeat tests on the same subject and scope without encountering the same questions.

#### **Diagnose**

Every test question in the CSTPP item pool corresponded to a subject-specific weakness. Thus, the students could identify their weaknesses based on the questions they answered incorrectly. The system also produced a diagnostic report based on the students’ test results, enabling the teacher and parents to understand the students’ current learning situation and plan additional remedial education. Only a few previous test activities have provided accurate diagnoses of students’ subject-specific weaknesses, hindering teachers and parents from offering assistance. Identification of the students’ subject-specific weaknesses not only enabled them to understand their barriers to learning and reduced their fear or uncertainty regarding the subject, but also provided the teachers and parents with a concrete understanding of the students’ learning situations, rather than a general idea based on abstract test scores.

#### **Remedy**

After identifying the participants' learning difficulties, the CSTPP provided remedial education targeted to the participants' subject-specific weaknesses. The students could read the answers to particular questions or watch educational videos related to subject-specific weaknesses. Finally, the students completed another test with the same scope to assess whether the subject-specific weakness had been resolved. The effectiveness of remedial education was then determined by the presence of subject-specific weaknesses.

The entire learning process involved an uninterrupted cycle of Test, Diagnose, and Remedy, forming a progressive improvement learning process (as shown in Figure 1). With the CSTPP, students who exhibited a superior performance spent less time in the remedy stage, showed enhanced learning progress, and were not restricted by the progress of the rest of the class. Students who exhibited a less satisfactory performance developed their confidence and overcame the barriers to their learning by continuously addressing their subject-specific weaknesses after each cycle.

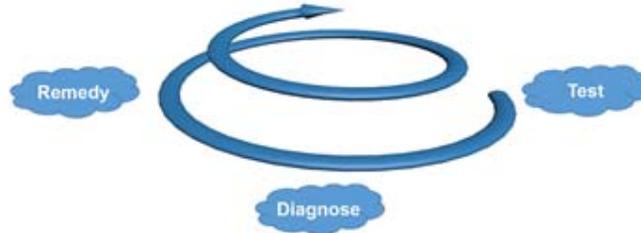


Figure 1. The continual improvement process in CSTPP

The CSTPP was constructed to provide a learner-centered and progress-customized teaching platform that provided gradual remedial education to every student to improve their learning performances according to their abilities and level. The user-end of the CSTPP was divided into student, teacher, and parent dimensions. The student-end included academic achievement testing, academic weakness diagnosis, and remedial learning. The teacher and parent-ends included modules of parent-teacher communication logs, study progress, and student's learning progress, as shown in Figure 2. The system design modules of the academic achievement testing, academic weakness diagnosis, remedial learning, parent-teacher communication logs, study progress, and student learning progress are explained below.

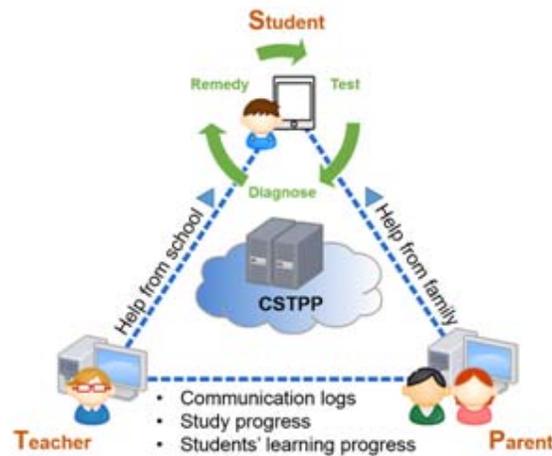


Figure 2. The relationship among students, teachers, and parent

## THE STUDENT-END

### Self-evaluation

Students can select 1 to 3 units for self-evaluation. To enhance the effectiveness of students' remedial education, the CSTPP contained over 100,000 test questions for each teaching topic of every field and unit. The students were presented with differing questions or choices every time, providing the opportunity for repeated practice. Furthermore, a timer appeared at the upper-right corner of the screen when the students were undergoing self-evaluations to record their answering speed for subsequent analysis.

### Self-evaluation transcript

The function of Self-evaluation transcript provided students with instant feedback. The transcripts in CSTPP is

different from traditional transcripts, it not only shows score but also includes the learning objectives, correspondence courses, and test questions analysis. Through these information, the students could review their answers immediately and identify the areas of knowledge that required improvement. Teachers could also identify the areas that the students misunderstood from the evaluation reports to correct their understanding and provide references for assisted teaching, such as the scaffolding effect of peer collaborative learning, to assist students in gaining a complete understanding. Consequently, evaluations were not only used to review learning outcomes but as a crucial tool for guiding student learning. The formative assessments of this platform were more valuable for students and teachers than traditional summative assessments (such as regular tests) because they provide instant feedback and allow teachers to adjust their teaching according to the students' learning requirements.

#### **Test questions analysis**

With traditional examinations, students obtain the results after teachers provide the answers and only comprehend the answer to questions completed incorrectly when teachers conduct reviews. However, the CSTPP provides immediate resolutions to questions answered incorrectly, and enables the students to obtain the test results instantly. Based on the evaluation diagnosis results, students can click to view the resolutions to questions answered incorrectly to acquire satisfactory learning scaffolding without guidance from teachers. Instantly addressing students' blind spots enables them to experience the effectiveness of immediate remedial education. Because the CSTPP provides prompt feedback during practice, the students' mistakes were efficiently amended.

#### **Remedial analysis**

The remedial analysis page shows that total correct rate of each subject and provides informations include importance, learning objectives, and corresponding unit for each learning weaknesses. Related teaching materials were collected based on the learning concept requirements of each teaching topic. Well-known cram school teachers were recruited to record teaching videos that addressed the students' learning weaknesses in every unit to provide clear resolutions. The students could watch the teaching videos anytime according to their learning progress, and undergo remedial education targeted to their incorrect concepts. Because the videos in the CSTPP were edited according to the students' learning weaknesses, every video was extremely short. Compared with the CSTPP videos, traditional teaching videos are typically excessively long because they are recorded according to units. Additionally, students tend to tire of traditional teaching videos easily.

#### **Database of personal learning weaknesses**

After each test, CSTPP will identify learning weaknesses from the wrong answer and create a database to manage. Students can understand their learning weaknesses in each subject, and then the learning weaknesses were terminated through system assisted (Such as marking importance, calculating the completion rate of review, Watching video review, and repeatedly test). Through learning weaknesses gradually reduced, students' confidence and learning interest relatively increased.

#### **THE TEACHER-END**

Teachers can log onto a dedicated page to execute the function of "one-to-many class management" and review students' performances in self-evaluation tests, as well as the distribution of their learning weaknesses. The results of these reviews were used as a reference for remedial education. The primary functions of the teacher dimension were as follows:

##### *Parent-teacher communication logs*

This function enabled teachers to search and review students' academic performance, subject-specific weakness distributions, remedial review times, and attendance for every subject.

#### **Study progress**

Teachers can arrange weekly review progress tables for students based on the teaching schedule progress of the school. The effectiveness of reviewing a specific unit or chapter can also be listed as a reference for teachers and parents in assisting students with reviews.

##### *Students' learning progress*

The learning status of all of the students was recorded in the CSTPP, including their previous test grades and the videos and animations watched. The teachers could then fully control the students' learning progress and provide timely supervision and guidance to students who were behind schedule or unmotivated.

#### **THE PARENT-END**

The webpage of the parent-end was similar to that of the teacher-end. Parents can log onto a dedicated page to review their child's performance in every self-evaluation test and the distribution of their learning weaknesses.

The interface of parent-end is the same of the teacher-end. The primary functions of the parent dimension were as follows:

#### **Parent-teacher communication logs**

This function enabled parents to search and review their child's academic performance, subject-specific weakness distributions, remedial review times, and attendance for every subject. Parents can understand the progress of the class, as scheduled by the teachers on the CSTPP, at any time to assess whether their children were left behind.

#### **Students' learning progress**

The learning status of all of the students was recorded in the CSTPP, including their previous test grades and the videos and animations watched. This enabled the parents to understand the time and energy their child spent studying based on their child's learning records. Thus, the parents could provide appropriate encouragement and reminders.

### **CASE STUDY**

A quasi-experimental and nonequivalent pretest-posttest research design was adopted to investigate the influence that the three learning styles of using the CSTPP with parental participation, using the CSTPP without parental participation, and traditional lectures had on junior high school students' English learning attitudes and performances. A class was regarded as one research sample unit, and three classes from a junior high school were randomly recruited for this study. Each class comprised 24 students, resulting in a total of 72 students. The students in Group A completed a teacher-assigned unit by using the CSTPP on a computer at home. The teacher monitored the progress of every student from the teacher-side platform and contacted parents via telephone calls and instant messages to ensure that every student used the CSTPP, particularly the three processes of test, diagnose, and remedy. The students in Group B used the CSTPP on tablet PC in English language class with the teacher's assistance. The teacher ensured that every student completed the three processes of test, diagnose, and remedy. The Control group received traditional lectures, in which the teacher provided didactic teaching using a projector and the multimedia compact disc included with the textbook. Test sheets were employed, and several questions that the entire class frequently misunderstood were reviewed. The duration of the experiment investigating changes in the students' attitudes to learning English alterations was 3 months. A system satisfaction survey was conducted with the students who had used the CSTPP with and without parental participation.

#### **Measuring Attitudes to Learning English**

The questionnaire used for this study was a revised version of the FLAGS proposed by Cid et al. (2009). The three dimensions of "motivation to learn English and appeal of the English language," "attitudes toward instruction," and "linguistic self-efficacy" extracted from the original questionnaire were revised into the five dimensions of "motivation to learn English," "attitudes toward instruction," "appeal of the English language and other foreign languages," "linguistic self-efficacy," and "diligence level," for which 31 items were designed. The participating students were instructed to answer the questions based on their personal status and feelings. The participants' responses to the questionnaire were scored using a 4-point Likert scale that comprised the answer options "extremely agree," "agree," "disagree," and "extremely disagree" (as shown in Appendix 1). During the revision process, three junior high school English teachers were recruited to edit and modify the attitudes to learning English questionnaire. After the revision, a pretest was conducted with a class of 30 eighth grade students who had not participated in the experiment. Internal consistency was adopted for reliability analysis. The reliability (Cronbach's  $\alpha$ ) was .798 for the overall scale, which indicated that the revised questionnaire was stable and reliable. Regarding validity, the total explanatory power of the five subscales reached 56.024%. The reliability and validity analysis results confirmed that the revised questionnaire possessed high reliability and validity and was suitable for use as a measuring instrument in this study.

### **FINDINGS**

Descriptive analysis was conducted on the results of the attitudes to learning English questionnaire provided by the students in Groups A and B and the Control group. Furthermore, pre and posttests of a paired samples t-test were conducted to identify differences. Finally, a satisfaction survey was administered to the students in Groups A and B who had used the CSTPP to conduct future improvements to the system.

#### **Pre and Posttest Differences in Attitudes to Learning English**

The means and standard deviations of the five dimensions "motivation to learn English," "attitudes toward instruction," "appeal of the English language and other foreign languages," "linguistic self-efficacy," and

“diligence level” are listed in Table 1. Data obtained in the pre and posttests were quite similar for every group; thus, further analysis was employed.

Table 1. The descriptive statistics of three groups

Subscales		Mean		Standard deviation	
		Pre-test	post-test	Pre-test	post-test
Motivation to learn English	Groups A	2.84	2.95	0.66	0.62
	Groups B	2.35	2.95	0.39	0.62
	Control group	2.86	2.34	0.57	0.32
Attitudes toward instruction	Groups A	2.68	2.96	0.71	0.64
	Groups B	2.45	2.52	0.13	0.21
	Control group	2.64	2.66	0.69	0.55
Appeal of the English language and other foreign languages	Groups A	2.88	3.12	0.42	0.55
	Groups B	2.19	2.03	0.23	0.15
	Control group	2.84	2.97	0.48	0.56
Linguistic self-efficacy	Groups A	2.60	2.75	0.68	0.72
	Groups B	2.76	2.74	0.07	0.14
	Control group	2.42	2.58	0.82	0.65
Diligence level	Groups A	2.55	2.57	0.38	0.36
	Groups B	2.66	2.46	0.32	0.31
	Control group	2.29	2.34	0.32	0.46

The pre and posttests of the paired samples t-test results for Group A are presented in Table 2. Observing every subscale of the attitudes to learning English questionnaire, the differences in the means of the pre and posttest results for “attitudes toward instruction” achieved a level of significance. This showed that there was a significant difference in the pre and posttest scores regarding “attitudes toward instruction” compared with the Control group. The pre and posttests means of the other four dimensions “motivation to learn English,” “appeal of the English language and other foreign languages,” “linguistic self-efficacy,” and “diligence level” did not exhibit significant differences.

Table 2. The paired samples t-test results for Group A

Pre-test/post-test	Mean	Standard deviation	t-statistic	p-value
Motivation to learn English	.113	.505	1.10	.282
Attitudes toward instruction	.275	.612	2.20	.038 *
Appeal of the English language and other foreign languages	.233	.663	1.72	.098
Linguistic self-efficacy	.152	.852	-.878	.389
Diligence level	.020	.396	-.257	.799
Total	.154	.488	1.55	.135

\*p<.05

Group A showed an obvious increase in “attitudes toward instruction” after using the CSTPP with parental participation. Because the CSTPP made learning simple and interesting and reduced learning anxiety, the students’ attitudes to English instruction were significantly improved.

The pre and posttests of the paired samples t-test results for Group B are shown in Table 3. The statistical results indicated that the differences in pre and posttests regarding the overall attitudes to learning English of the 24 students in Group B did not reach the level of significance. Therefore, no significant difference existed in the students' pre and posttest attitudes to learning English for Group B.

Table 3. The paired samples t-test results for Group B

Pre-test/post-test	Mean	Standard deviation	t-statistic	p-value
Motivation to learn English	-.008	.213	-.127	.901
Attitudes toward instruction	.070	.133	1.175	.305
Appeal of the English language and other foreign languages	-.158	.261	-1.355	.247
Linguistic self-efficacy	-.023	.144	-.396	.708
Diligence level	-.200	.169	-2.371	.098
Total	-.008	.213	-.127	.901

\*p<.05

The pre and posttests of the paired samples t-test results for the Control group are shown in Table 4. The statistical results indicated that the differences in the pre and posttests regarding the overall attitudes to learning English of the 24 students in the Control group did not reach the level of significance. Therefore, no significant difference existed in the students' pre and posttest attitudes to learning English for the Control group.

Table 4. The paired samples t-test results for Control group

Pre-test/post-test	Mean	Standard deviation	t-statistic	p-value
Motivation to learn English	.007	.471	-.079	.938
Attitudes toward instruction	.016	.698	-.117	.908
Appeal of the English language and other foreign languages	.125	.604	1.014	.321
Linguistic self-efficacy	.160	.920	-.850	.404
Diligence level	.052	.494	-.516	.611
Total	.063	.522	-.592	.560

\*p<.05

### The CSTPP Satisfaction Survey

After the experiment was conducted, a system satisfaction survey was administered to the students in Groups A and B who had used the CSTPP. As shown in Table 5, the questionnaire comprised 10 items, which were scored using a 4-point Likert scale, where 4 = "extremely agree," 3 = "agree," 2 = "disagree," and 1 = "extremely disagree." Data in Table 5 show that both groups had high evaluations of the system. However, the scores of Group A were slightly higher than those of Group B. Regarding the differences between the two groups, the top three items for which the results achieved by Group A substantially exceeded those of Group B were Item 1 "The CSTPP makes learning more efficient," Item 2 "Using the advanced CSTPP in class makes me feel superior," and Item 4 "I know how to use the CSTPP without guidance from the teacher." The top three items for which the results achieved by Group B substantially exceeded those of Group A were Item 8 "I am very satisfied with the visual design of the CSTPP," Item 9 "My interest in learning English increased after using the CSTPP," and Item 5 "I can operate the CSTPP skillfully and swiftly after instruction from the teacher."

Table 5. The questionnaire learning attitudes

Items	Group A	Group B	Deviation
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1.	The CSTPP makes learning more efficient	3.27	4.17	.90
2.	Using the advanced CSTPP in class makes me feel superior	3.12	3.75	.63
3.	CSTPP relieve my academic stress.	3.46	3.71	.25
4.	I know how to use the CSTPP without guidance from the teacher	2.29	2.88	.59
5.	I can operate the CSTPP skillfully and swiftly after instruction from the teacher	4.13	3.12	1.01
6.	I can adapt the CSTPP quickly	4.25	3.27	.98
7.	The diagnosis of CSTPP can help me understand my weaknesses	3.67	3.35	.32
8.	I am very satisfied the visual design of CSTPP	4.13	2.92	1.21
9.	My interest in learning English increased after using the CSTPP	3.71	2.58	1.13
10.	I am very happy to learn other subjects through CSTPP	3.75	3.15	.60
Average scores		3.58	3.29	

## CONCLUSIONS

This study applied the CSTPP as a research tool and investigated the effects that the test, diagnosis, and remedy cyclic learning model has on junior high school students' English language learning. Students' attitudes to learning English differed before and after using the CSTPP with parental participation, without parental participation, and after receiving traditional lectures.

Generally, before and after using the CSTPP, both with (Group A) and without (Group B) parental participation, and receiving traditional lectures (Control Group), the students did not exhibit significant differences in their attitudes to learning English. Only the students who used the CSTPP with parental participation exhibited substantial progress in their pre and posttest results for "attitudes toward instruction" in the learning attitude questionnaire. This finding indicates that the CSTPP is better suited to home-based self-study. Compared with using the CSTPP in classrooms without parental participation, when students conducted self-study at home, and teachers interacted closely with parents via the telephone or messages to collaboratively supervise students' learning progress, students attitudes' toward instruction were more effectively enhanced, and a learner-centered innovative teaching mode was achieved.

The system satisfaction of the students who used the CSTPP without parental participation was superior to that of the students with parent participation. The three main findings of the system satisfaction survey regarding whether using the CSTPP with parental participation was superior to using the CSTPP without parental participation were as follows:

First, the students asserted that using the CSTPP without parental participation was comparatively more efficient. After conducting the experiments and surveying the students, the researchers found that when the parents participated in using the CSTPP, because the learning environment was at home, the students could arrange their own study time. When parents did not participate in using the CSTPP, because the learning environment was in the classroom, the students were required to complete the assignment allocated by the teacher within a certain time frame. Second, using the CSTPP without parental participation resulted in a higher sense of superiority than using the CSTPP with parental participation. After conducting the experiments and surveying the students, the researchers found that using tablet PCs in classrooms and cloud computing technology services before other classes enhanced the students' sense of superiority. Because the learning environment was at home for the students who used the CSTPP with parental participation, they could not perceive a sense of superiority by comparing themselves with other students. Third, a higher score of students could use the CSTPP without assistance from the teacher when using the CSTPP in the classroom compared with that of students who used the CSTPP at home. After conducting the experiments and surveying the students, the researchers found that using tablet PCs and cloud computing technology in classrooms increased the students' confidence and willingness to use new software.

Regarding suggestions for future researchers, the test, diagnosis, and remedy cyclic learning model in the CSTPP clearly informed the teachers and parents of the students' learning blind spots and provided more precise remedial education according to the students' inaccurate knowledge perceptions. In addition, the CSTPP

provided immediate feedback that allowed the students to identify the areas they misunderstood in real time. The learning assistance provided by the CSTPP, such as the answers to questions completed incorrectly and teaching videos, enabled the students to comprehend the class content completely. Furthermore, similar to other online examination systems, Internet access is required to use this system, which could lead to some students becoming distracted by online games or social networking websites. Accordingly, this study suggests that teachers and parents remind and supervise students in developing satisfactory habits of online assessment use before conducting online assessments or learning, to prevent students from becoming lost on the Internet. Finally, regarding the cloud education environments in schools, considering Taiwan for example, although nearly all schools are equipped with broadband Internet, wireless Internet access is rare. In response to the trend in mobile learning initiated by the emergence of electronic textbooks and tablet PCs, this study suggests that schools include wireless broadband Internet equipment in their budgets for computer-related equipment. Thus, the education vision of ubiquitous learning for students can be realized.

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**APPENDIX 1. The questionnaire of measuring attitudes to learning English**

Dimensions	Items
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Motivation to learn English	<ol style="list-style-type: none"> <li>1. I like learning English.</li> <li>2. I would like to be able to speak English as well as I speak Chinese.</li> <li>3. I am interested in learning English.</li> <li>4. I would like to learn more languages, not just English.</li> <li>5. I really want to learn English</li> <li>6. If I could choose the subjects I like best, I would probably choose English.</li> <li>7. If English was not taught at school, I would like to learn it somewhere else.</li> <li>8. When I grow up, I will want to be able to speak English.</li> <li>9. When I leave secondary school, I'd rather not go on learning English.*</li> <li>10. I like it when the teacher talks to us in English.</li> <li>11. I like it when the teacher uses videos or cassettes in class.</li> </ol>
Attitudes toward instruction	<ol style="list-style-type: none"> <li>12. In general, I have always found English class Exciting.</li> <li>13. I like the way English is taught at school.</li> <li>14. In general I find that learning English is fun.</li> <li>15. I like English class because it is more entertaining than other subjects.</li> <li>16. What we usually do in class is boring.*</li> </ol>
Appeal of the English language and other foreign languages	<ol style="list-style-type: none"> <li>17. I find English an attractive language to learn.</li> <li>18. I would like to learn more languages than just English.</li> <li>19. I don't like the sound of spoken English.*</li> <li>20. I think English is a nice language.</li> <li>21. I like other foreign languages better than English.</li> </ol>
Linguistic self-efficacy	<ol style="list-style-type: none"> <li>22. In general, I am doing very well in English.</li> <li>23. I have noticed that my English is getting better.</li> <li>24. I find it easy to understand the videos and cassettes that the teacher brings to class.</li> <li>25. I think my English will never be good enough to understand movies.*</li> <li>26. In general, I find it easy to learn languages.</li> <li>27. Sometimes I don't understand my English homework.*</li> </ol>
Diligence level	<ol style="list-style-type: none"> <li>28. At home I usually go over what we have done in English class.</li> <li>29. In English class I pay close attention to the activities that the teacher tells us to do.</li> <li>30. I pay less attention in English class than I do in other subjects.*</li> <li>31. When I see something in English, I try to see if I can understand it.</li> </ol>

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\*Negatively worded items.