PAD Class Teaching in Undergraduate English Courses in the Era of Information Technology

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Abstract

We studied the teaching effect of Zhang's Presentation - Assimilation – Discussion (or PAD) class mode in undergraduate English class. Taking undergraduates of Lanzhou University of Arts and Sciences in China as an example, we studied the teaching of undergraduate English using PAD in the information technology era. The new PAD mode has three well defined components: teacher presentation, student assimilation and discussion. Using experimental and control oral English classes, with similar input skill, after eight weeks, we found the English proficiency of both groups increased, but the PAD class was significantly better in scores for content and expression, With PAD style teaching, the experimental group improved their mean scores from 74.2 to 80.1 (median 74 to 81.5), whereas the traditional class only improved from 75.4 to 76.8 (median 74 to 79). A t-test confirmed that the results were significant.

Assessments, based on questionnaires and interviews, also showed that PAD class teaching improved attitude and learning habits. After the experiment, interviews with some students in the experimental class further confirmed this. Thus the improved learning effect is worth applying in more classrooms to improve undergraduate English ability.

Keywords: 'Presentation-Assimilation-Discussion' teaching mode, PAD, English class, Student attitude, Higher education

1. Introduction

During the relatively short class times allotted for undergraduate-level English instruction in China, teachers often rely on a lecture-heavy pedagogy to impart their expertise to their students. They cannot provide students enough opportunities to practice speaking, nor can they spend enough time with each student to assist them through a deep analysis and explanation of the text throughout reading. There is insufficient time for teachers to engage with their students. That means that students often do not actively participate in class, instead only listening attentively and taking notes. Moreover, it is challenging for educators to meet the demands of undergraduate students of varying academic backgrounds and abilities due to the prevalence of large classes. Many changes and innovations in undergraduate English instruction, such as the flipped classroom and PAD mode (described in the next paragraph), have been implemented in classrooms with the use of internet service in order to deal with the present situation.

The 'Presentation-Assimilation-Discussion' (PAD) teaching model was introduced by Zhang at Fudan University in 2014: it has gained wide acceptance in China, with at least 3400 articles discussing it, listed in the CNKI (Chinese National Knowledge Information database (CNKI, 2022) by 2022, but only a handful have mentioned it in international journals. Thus, here we describe the PAD class concept, as widely used in China to form an improved teaching model for English courses, supported by networked IT systems. English's international importance as the language of commerce, science and diplomacy requires English classroom teaching to be optimized. In several reform rounds, Lanzhou University of Arts and Sciences, participated in the reform, realized some changes, but also understood that further improvement of English classroom teaching could be achieved using networked IT infrastructure. Although a driving force for this research was a desire to improve English teaching in China, we believe that introduction of the PAD concept would have universal benefit and be beneficially adapted in many countries.

University English instruction based on the PAD class model is an innovative, very successful paradigm that differs significantly from the standard lecture-based model. Student motivation to participate in classroom environment and their improved communication are two signs that they are not exclusively passive receivers. They have access to stimulating reading materials, and the classroom environment is positive and stimulating. They are exposed to a wide range of publications, both literary and otherwise. So that they may acquire an understanding of English as a living language, rather than merely a set of rules for its formal use. Teachers report less need to deliver lengthy lectures, and more time is spent in meaningful dialogue with their students. As a result, teachers must now devote more time to lesson planning, and they must be ready to address a wide range of queries from students. Overall, PAD-based English instruction in higher education is a novel approach to address the challenges teachers confront by offering a framework for fostering students' capacities for critical thought, peer collaboration, and independent study (Zhang, 2017).

For many years, language has been considered an important resource for a country in the process of modernization (Cortazzi and Jin, 1996).

Similar to many other countries, English as a foreign language has been advanced in China, where English is required in the nine years of compulsory education (six in primary and three in secondary school). Further, the time devoted to English matches that devoted to Chinese in high school, even though Chinese is the mother tongue and the official language. In addition, English has a similar weight to Chinese in the National Higher Education Entrance Examination (高考- GaoKao). This is a heavy weight on both the Doctoral Admissions Test and the National Postgraduate Entrance Examination. Also, many countries in this region, either have English as an official language (*e.g.,* Singapore, Malaysia, Philippines, India and Sri Lanka) or a compulsory subject for several years (*e.g.,* Thailand, Myanmar, Laos and Vietnam).

However, in China, many have observed that the time and effort used in learning English does not match their eventual English fluency, causing it to be referred to as 'deaf and dumb English', due to a lack of oral fluency relative to formal knowledge, e.g. vocabulary and grammar (Wei & Su, 2008; Ng & Tang, 1997).Thus, innovation in teaching methods is imperative to overcome the reported deficiencies in traditional methods and new methods are needed, aligned as closely as possible with Chinese culture and customs. The Presentation-Assimilation-Discussion (PAD) class addresses this situation.

These novel methods of instruction have lately caught considerable interest of scholars in China. One example is Zhang's PAD class which has been adopted across a wide range of fields and courses, due to its demonstrable success in enhancing both in-class and extracurricular learning and teaching. The primary idea in the PAD approach separates the lecture given by the teacher from the subsequent conversation between students. Nonetheless, information absorption by students serves as a bridge between both the two. Learners need time to process new information, thus it is crucial that class discussions are not held in real time. If you want your students to learn from their discussions, wait until next week, after they have completed their tasks.

2. Previous Studies

2.1 Definition of PAD Class

A PAD class formally divides class time into 'Presentation', 'Assimilation' and 'Discussion' stages (Zhang, 2016).

During the teacher's presentation, participants in a PAD class are given opportunity to work together and study independently (Zhang, 2016). The PAD class merged the lecture-based, teacher-centered approach with a discussion-based, learner-centered approach (Zhang & Zheng, 2019; Chen, 2017) delivered by the teacher both for and by the learners, each of whom is an individual, with preferred ways of learning (Liu et al., 2016) - see Figures 1 - 3. As a result, rather than being a random, aimless chit-chat, the group conversation will be well-planned, focused and informative (Zhang, 2017). Students appreciated Zhang's effort to improve upon what they saw as the monotony of the standard classroom setting: a natural application was English as a Foreign Language (EFL) (Zhang, 2016).

There are three major categories of PAD classes:

（1）a very brief 'mini in-class PAD' which, in minutes, completes all sections,

（2）a brief 'in-class PAD' version (Figure 2), in which all sections require only one class, and the

（3）complex 'cross-class PAD' (Figure 3), where two or more classes were used.

Importantly, presentations and discussions take place 'in class', whereas assimilation can follow the 'in-class section. One alternative is a "small in-class PAD" (Figure 3), in which the PAD idea is executed in as little as three minutes (one minute introduction, one minute absorption, and one minute debate).

Figure 1. Very brief (3 minute) PAD class

Figure 2. In-class PAD class

Figure 3. Cross-class PAD class
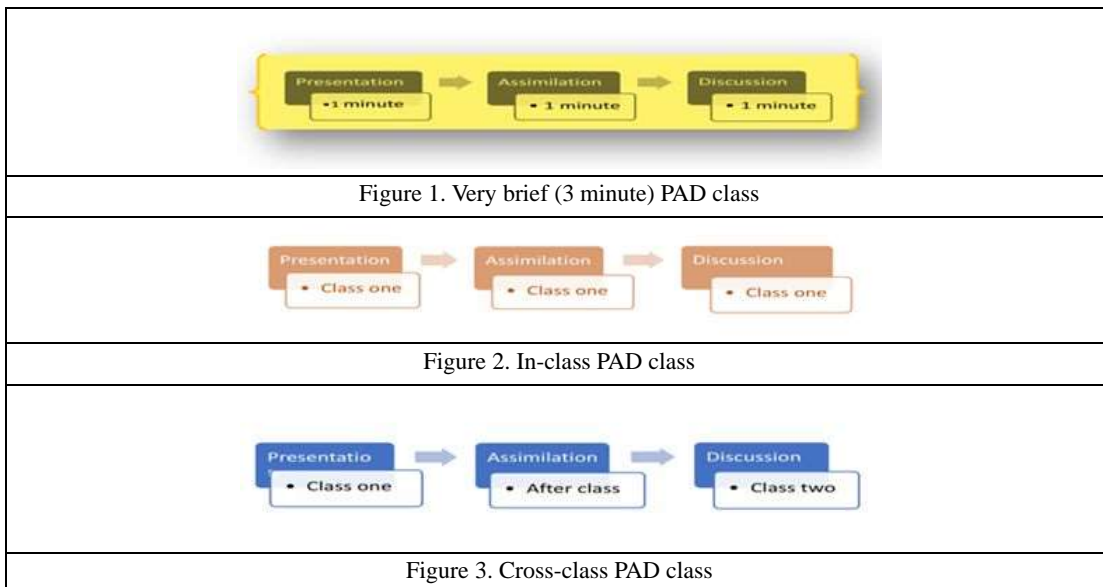
2.2 PAD Class Support Tools

To support PAD classes, a "PAD class APP" (Duifene, 2022, for classroom management and support, was developed and has been used successfully in the classroom to teach a broad range of subjects to good reviews from educators and students alike (Zhang, 2017). The WeChat mobile app version (WeChat, 2022)), has two interfaces: one for the teacher (Figure 4) and one for students (Figure 5). The main capabilities are listed in Table 1 along with simple translations of the original menu items. The interfaces have many common functions, making for convenience in teaching: differences are indicated in Table 1.

The app eases the administrative burden on educators by providing fast and easy access to data like attendance, analytics and class placement. Sharing materials and reaching more students are both made easier by the availability of information resources on the web. With a mobile app, students may study whenever and wherever they choose, expanding the scope of their individual education. The platform's discussion board is an important component, since it facilitates two-way communication between teachers and their students. Through self-assessment and providing feedback, students may optimize their learning with the use of online drills and examinations taken by their peers. Questionnaires, polling and class evaluations may be organized in a variety of ways to facilitate a wide range of instructional strategies. Because the platform is integrated within WeChat, users no longer need access to a computer to participate.

Table 1. PAD class app interface

Teacher Interface			Student Interface
Icon	汉字	English	Included
	班级	Class	Yes
	云资源	Cloud Resources	Yes
E	作业	Homework	Yes
	微信	WeChat	Yes
	出勤	Attendance	Only individual
	讨论	Discussion	Only in own group
countries	结果	Results	No
	在线练习	Online practice	Yes
A	课堂提问	Class questions	Yes
?	调查问卷	Questionnaire (statistics)	Only answer
	投票	Vote (census)	Yes
	课堂活动	Activity	Yes
	教学评价	Teaching evaluation (results)	Yes (input)
	电脑端	Connect to computer	Yes
	退出	Log out	Yes

In a nutshell, the "PAD class APP" promotes individualized instruction, digital information management, and the exchange of instructional materials among educators. It is an effective tool for bolstering instruction in PAD classes since it combines technology with education.

2.3 Theory

2.3.1 Presentation

学而不思则罔， learning without deep thinking leads to confusion,

思而不学则殆 thinking without practicing in learning leads to peril.

孔子， 論語 Confucius, Analects, ca479 BC

Fundamental to the PAD class is the notion of imparting knowledge before acquiring it; this concept originates in Confucian tradition, which has had a profound impact on many facets of Chinese education (Scollon, 1999). Teachers are revered because they are seen to be the bearers of wisdom, the dispersers of information, and the dispersers of doubt. For this reason, most students rely heavily on their English teachers and publications as their primary and most trustworthy data of English information and understanding (Cunningsworth, A. 1995). Consequently, the textbook-based presentation was crucial to the class's educational goals. Nevertheless, there are key distinctions seen between PAD delivery and the standard lecture format.

（1）Duration differs. Only about a quarter to a half of classroom setting should be devoted to presenting; the majority of the time should be used for individual and small-group student preparation and teacher-led discussion.

（2）Content differs. Unlike the conventional method, in which each information point and detail on the study guide is provided to students one after the other, the PAD class presentations are "clear and precise teaching yet leaving voids" (Zhang, 2016). The teacher, according to the principles of "clear and precise classroom instruction" (Zhang, 2016), should provide a demonstration that is "clear and precise," "guiding," and "framed" (Zhang, 2016) in nature, with the focus being on providing context and a framework within which to understand the material, as well as emphasizing the central notions and theories and how they relate to prior learning. This section leads pupils in three different ways: the

① "What to learn" section describes the material covered in a session, the

② "Why to learn" section explains why this material is important, and the

③ "How to learn" section details particular methods and techniques that may be used to better retain the material in the future. "Leaving gaps" in a presentation is not laying out complete material explicitly, but instead encouraging student curiosity and creativity via the use of questions, suggestions and suspense.

With these guidelines, the PAD class paradigm does not call for a preview prior to the teacher presentation (Chen, 2017). Self-study in advance of a learning experience or the teacher presentation is the meaning of "preview." In other terms, students are responsible for their own study of the learning experience, without any assistance from the teacher, which might result in varying levels of comprehension. Early reviews, on the other hand, before a teacher presentation might lead to confusion about intonation, vocabulary or grammar.

2.3.2 Assimilation

In the PAD classroom, the assimilation period is a time for students to silently reflect and explore on their own with a specific objective in mind, namely to do any homework that was given to them during the presentation. The most efficient learning occurs when the student is free to think and study on their own, without interruption. To put it another way, the absorption phase culminates in the execution of duties in silence. According to the quote in section 2.3.1, in Chinese educational theory, reasoning and knowledge are not only intertwined but also mutually supportive.

Student learning is enhanced when there is more time for reflection between teacher and student speech. The readiness of students to interact in their mother tongue will rise if they are given additional time to contemplate and respond (Kamdideh & Barjesteh, 2019). Therefore, students should be given sufficient time in class to actively participate in a manner conducive to deep thought. Nonetheless, it is challenging to observe the thought pattern in a prefrontal lobe since "thinking does not possess any observable markers" (Astington & Olson, 1995). The one and only way that an educator can obtain a sense of what students are thinking is through seeing their behavior in class and attending to their spoken replies to questions and discussion questions, as well as by evaluating their written and spoken work (such as essays, reports, and worksheets) after the fact (McGregor, 2007).

Thus, it is crucial for students to complete the homework papers provided by their teachers. These assignments might range from translating a paragraph to practicing everyday speech and writing using the new terminology and grammatical constructions they have acquired. These activities must be relevant to the subject matter of the demonstration as Zhang (2016) enumerated the traits that defined them.

Pertinence: Presentation material should have some bearing on the tasks at hand. Learners should be guided through tasks that require them to examine the foundation, grasp the essential ideas, and close any gaps in their comprehension that may have been left by the teacher.

Stepladder: The information required for each work should be reflected in the list's level of complexity, from moderate to challenging.

Fundamental: Students ought to be able to confidently perform a fundamental component of the assignments.

Challenging: Adding some challenge to the tasks will encourage students to dig deeper.

Selective: Students ought to be given freedom to complete assignments at their own pace and in light of their individual grasp of the material presented in class.

Openness: Statements included in the activities should not need a single, predetermined response, but rather a range of possible responses.

Individual: It is important for students to feel that their distinct perspectives will be valued in the subsequent group discussion, thus it is important that assignments be tailored to their specific backgrounds and learning styles.

2.3.3 Discussion

Discussion is the concluding part of a PAD lesson, and it usually consists of two stages: student-to-student interaction and group reporting (Zhang, 2016). Teacher-led discussions are most effective when they begin with a brief recap of prior material and an explanation of the task expectations, followed by encouragement of students to debate the issues on their work sheets in groups of three to four. After students have discussed the topic, teachers might encourage interaction between the entire class.

（1）The teacher may verify the outcomes of the group conversations by selecting a random subset of the students and then having the class's designated speakers report back on the class consensus or points of contention.

（2）The second step is for the teacher to randomly check students' discussion results to respond to questions that often arise during class.

（3）Finally, the teacher compiles unanswered questions from members of the class to address in a final explanation and summary.

At this point, the PAD process is completed.

Discussion allows learner viewpoints to be challenged by classmates, and where teacher opinions may similarly be criticized, where learners provide evidence to support their ideas (Engle & Ochoa, 1988). This fosters a free and democratic classroom environment, where students may learn about democratic values via open dialogue (Wilen, 2004). In addition, it is an efficient method of motivating students to investigate complex topics, find creative solutions and exercise sound judgement (Parker & Hess, 2001). More than that, the dialogue offers a number of benefits. The PAD class uses a technique called "delayed discussion", which is different from the "immediate discussion" used in the regular class (Zhang, 2016; Chen, 2017). Since the first kind of debate is a sharing of information, PAD classes encourage students to wait before talking until they have acquired the background knowledge and perspectives necessary to contribute to the conversation. However, in a "instant conversation", pupils have not yet developed their own perspectives and it is more challenging to successfully share ideas among classmates. Students in a postponed discussion all work using the same job sheet that is related to the presentations in some way. As a result, student perspectives, ideas, uncertainty, and difficulties they encounter during the integration stage are more highly likely to be interconnected, making the postponed conversation more efficient and saving time, particularly for some simple and easy questions, for which they will eventually return to a coherent solution.

It is evident that the success of this new paradigm depends on the use of peer-mediated education. In large classes, there are a number of issues that hinder student ability to learn English. Peer teaching is one approach that helps. The impact of student social interactions on their English development has been studied by several. Peer teaching may increase student oral competence and motivation by fostering an environment of interaction and collaboration. Taking part in group projects is one way for students to exercise their "learner agency"(Ma, 2017). Students in the same class are expected to teach and learn from one another. An individual's responsibility in the learning community extends beyond his or her personal development to the improvement of the education of his or her peers. Each student acts as a responder, supplier of information, or observer for a different pair. They collaborate with others to complete a job, offering new insights, explaining ambiguities, and correcting one another along the way. The teacher's only responsibility is that of counsellor, monitor, or prescription. While higher level students have more opportunities to assimilate what they have learned and practice, lower-level students may benefit by learning from and correcting the errors of other group members (Ma, 2017).

2.4 PAD Objectives and Advantages

PAD class objectives can be summarized as:

（1）To reduce stress and strain in the classroom, encourage a democratic and free setting;

（2）To prevent students from just sitting in class and absorbing information, we must encourage them to participate actively;

（3）Provide more forums for students to present their ideas in order to encourage active learning rather than memorization;

（4）To encourage students to own their own education and develop their own   learning strategies, classroom time is set aside for individual and group study;

（5）The capacity to study and think freely, collaborate with classmates, find creative solutions to challenges, and advance in their own educational growth should be fostered.
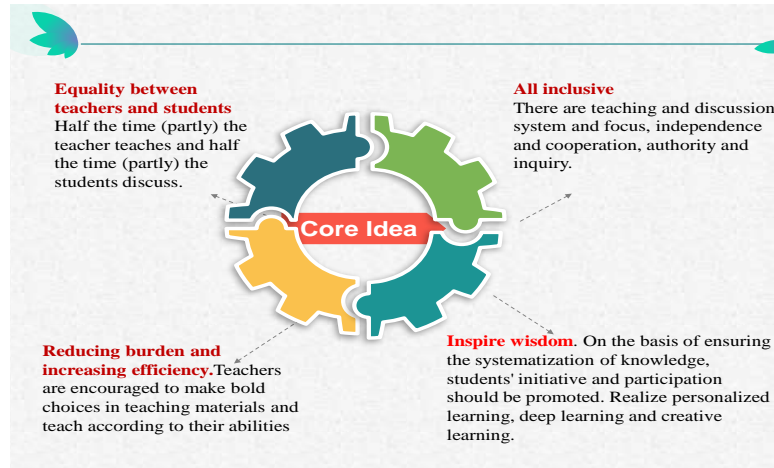
Figure 6. Core Idea of a PAD class (taken from Zhang & Zheng, 2019)

2.5 Related Works

Demands by growing populations for education and a lack of technology, led to more 'production line' approaches to mass education. The modern term, 'lecturer', was derived from the Latin *Legere* – to read or *lectus* (past participle) and early teachers did exactly that – *read* from the texts, laboriously hand copied, before the advent of printing, while students made notes. However, by the 18th century, leading philosophers, including Hebart and later Dewey and Brunner and many others, began to expound more active learning strategies (Cooper, Schinske& Tanner, 2021). It reviewed many strategies labelled collaborative, cooperative or active learning. Perhaps extracting some ideas from ancient Confucian philosophy (see Section 2.3.1), Lyman (1981) developed a 'Think-Pair-Share' (TPS) cooperative learning strategy, which starts with a question and follows in a similar way to the 'Assimilate-Discuss' phases of the PAD model. Cooper et al. (2021) have recently reviewed TPS. A key enhancement of TPS in the PAD approach is carefully leaving gaps in the presentation.

2.6 Research Questions

These questions addressed in this study were, for the PAD class technique:

(1) What research methods were used?

(2) What technologies were used?

(3) What skills were developed in those classes?

3. Research Method

The study's experimental and control groups were given the same curriculum. Using PAD class methodologies, the experimental class learned the very same information as the control group (i.e., the curriculum and teaching materials ("New Horizons College English" in the New Horizon Network Teaching Platform from the Chinese Ministry of Education, Undergraduate English Curriculum Requirements (Ministry of Education, China, 2017)). The study began in September of 2020 and lasted for one academic semester, or around five months. Both the control and experiment groups filled out the questionnaires in September of 2020. See Table 2 for detailed arrangement of experimental activities.

Table 2. Main Research Activities (Cochran-Smith & Lytle, 1999; Power & Hubbard, 1999)

Week	Experimental group	Control group	Test time
Week 1	PAD class	Traditional class	No class
	Finally, finish the pre-screening questionnaires and diagnostics exam (Learning motivation, learning strategy and self-monitoring ability)		
	Take in the whole picture and realize what you're supposed to take away		
Weeks 2-11	Presentation: Designing the perfect structured lesson plans Assimilation: Provide authentic contents to the students and make them to absorb this. Discussion: Set up a forum where students may interact in English (hearing, speaking, writing, producing) and develop their critical thinking and language abilities	Learn English by listening to the lecture notes, watching online videos, and filling out paper exercises (listening, speaking, reading, writing)	Before class

	1. Make adjustments for practices 2. Make needs for the perfect accommodation 3. Safe learning environment	Perfect feedback receiving	In class
	Establishment for the high expectations for the users		
	Reflection engagement due to the discussions	Hold conversations and interact with people in groups.	
	Online talking freely	Produce content while communicating	
Week 12	Send in your scientific reports and fill out the follow-up survey (Learning motivation, learning strategy and self-monitoring ability)		

3.1 Participants

This research was a quasi-experimental study, using non-English majors in 2020. We selected 60 students from two classes of English as a public course, which were randomly selected from 26 classes of 16 different majors in the university. 30 students were assigned to the experimental class, using PAD teaching methods, and 30 to a control class, using traditional teaching methods.

3.2 Instruments and Measurements

This investigation was relatively a random selection from the classes of 2020. All four facets of the English language (hearing, speaking, thinking, and writing) were tested (see Table 3). In January, 2021, after the experiment had ended, the English proficiency including both groups of students was assessed with a post-test and a survey.

Table 3. Test Measurement Design

Group	N	Time	Skills Assessed
Experiment group based PAD class	30	Pre-Test Post-Test	Listening
Control group based Traditional methods classes	30		Speaking Reading Writing

We examined how incorporating a PAD approach into university English classrooms affected student desire to learn and their sense of ownership in their own education. After a successful winter semester using the traditional lecture technique, the new semester marked the beginning of the experiment. Those in the control group were taught using traditional methods, such as lectures supplemented with classroom exercises. In contrast, while students in the experiment group had their evaluation criteria laid out from the start, with in-class participation and achievement accounting for 40% of their final grade. Twenty (out of a possible 40) points were based on how actively they participated in conversations. All group assignments were finalized at the beginning of the semester, and participants were not permitted to switch partners. Within every group, one high-proficient student assisted one or two intermediates and one or two novices.

4. Result Analysis

The data consisted of transcripts, following common procedures for qualitative research (Lincoln, 2007; Denzin & Lincoln, 2011). Rather than imparting an a priori perspective, induction analysis was used to discover the underlying structures underlying the production of data (Corbin & Strauss, 2014).

To validate the impact of PAD teaching method on English results, pre- and post-experiment tests were administered to both control and experiment groups. English application ability scores were based on the New Oriental online channel of the College English Test (2022): content and expression, fluency, and vocabulary and grammar correctness were scored and a final score was added. Tests were marked by the one of us (LD) and the teacher and totals were compared. If there was a discrepancy of more than a set threshold, a third teacher also called in. The test results were analyzed using SPSS.

We checked that sums of scores were normally distributed using the Shapiro-Wilk test, for example for sums leading to the total score (post-test) (2020C in Table 4), n =30, Shapiro-Wilks W = 0.98, p = 0.86. *i.e.,* not significantly different from a normal distribution, so parametric inferential statistics could be used for that sample. However, for the other three tests, the test indicated significant deviations from a normal distribution, although the skew was small. Table 5 displays the findings of an independent samples t-test comparing the before and after the test scores of the treatment group with those of the control group.

Table 4. Scores from experimental (E) and control (C) classes

Total Score	Class	N	Shapiro-Wilk		Mean	Std Devn	**Median**	Kurtosis (skew)
			W	P				
Pre-test	2020E	30	0.90	0.01	74.2	5.6	**74**	-0.2
	2020C	30	0.98	0.86	75.4	4.5	**74**	0.07
Post-test	2020E	30	0.91	0.01	80.1	6.6	**81.5**	0.02
	2020C	30	0.88	0.003	76.8	6.7	**79**	-0.39

Table 5. Independent sample test - experimental vs control class scores

		Levene test of variance equation		t-test of mean equation				
		F	Sig.	T	Dif	Sig. (Double side)	Mean dif.	Standard error
Total score (pre- test)	Assuming equal variance	0.407	0.52	0.36	87	0.713	0.062	0.168
	Assuming unequal variance			0.36	85.35	0.713	0.062	0.169
Total score (post- test)	Assuming equal variance	4.07	0.04	3.11	87	0.003	0.755	0.242
	Assuming unequal variance			3.07	74.26	0.003	0.755	0.245

4.1 Analysis of Total Scores

Both groups returned higher scores in the post-test, i.e., attending either class improved their score, but the experimental class total was significantly higher than that of the control class and the experimental group's improvement was significantly larger: the means increased by ~5.9 *vs* ~1.4 points and the medians by 6.5 *vs* 5. The score distributions were reasonably 'flat', covering quite a small range (reflected in the calculated standard deviations), so the Shapiro-Wilk metric confirmed that the distributions were not normal: but the means and medians were reasonably close, i.e. not strongly skewed – so that the median values represent a better measure of the benefit of the PAD class.

4.2 t-test Analysis

To confirm that the means from both groups were significantly different, Table 5shows the results of the independent sample test for the experimental versus control classes: the Levene homogeneity variance test shows that the significance probability (Sig.) of pre-test scores were 0.52 versus 0.04 for the post-test scores, i.e., variance of the pre-test scores was equal, whereas, for the post-test scores, it differed. The t-test for equal variance showed a probability of 0.713 for the pre-test at significance level of 0.05, i.e., confirming no significant difference between the experimental and control classes. However, for the post-test, the probability of equal variance was very low at 0.003<< 0.05, so that there was a significant difference between the two classes.

In summary, both classes improved after the experiment, but the experimental (PAD) class improved significantly more, so that the PAD class model had clear advantages. This result was significant because both the Levene and t-test showed no significant difference between the classes in the pre-test, but a significant difference in the post-test.

Table 6. Average scores for individual questions

Questionnaire topic	Category	Experimental class		Control class	
		Pre-test	Post-test	Pre-test	Post-test
1. My curiosity about the English language is strong.	Attitude	3.70	3.71	3.55	3.20
2. To do well on the test, I have been studying English.		2.53	2.95	2.78	2.39
3. The ability to communicate well in English is crucial, in my opinion.		4.30	4.48	4.35	4.11
4. I'm going to put in as much effort as I can into learning the language.		4.35	4.43	4.43	4.23
5. When it comes to English, I usually give my all.		4.03	4.24	3.98	3.59
6. I want to diligently do the English assignment that was given to us.		4. 0	4.10	4.4	3.8
7. Even outside of class, I make an effort to improve my English skills.		3.53	3.52	3.50	3.23
8. English is something I always work on and engage in.		3.53	3.58	3.81	3.25
9. Doing work in English is something I feel confident doing.	Confiden-ce	3.60	3.76	3.68	3.36
10. I never have to stress about coming up with anything to write or speak about.		2.88	2.98	3.00	2.89
11. The English language is just too complicated for me.		3.00	3.29	2.75	2.91
12. I feel comfortable articulating my thoughts in English.		3.28	3.52	3.35	3.55
13. I consider my command of the English language to be superior to that of the general populace.		2.68	2.88	2.78	2.61
14. As far as languages go, I feel comfortable with English.		2.65	2.86	2.75	2.68
15. The English language is a subject I want to study; thus I intend to arm myself with as much information as possible.	Habit	3.43	3.50	3.38	3.30
16. Earlier than class, I will provide a list of the outline.		3.63	3.67	3.40	3.50
17. It is my policy to double-check any written work for typos and grammatical errors before submitting it.		3.48	3.76	3.53	3.52
18. Whenever the teacher's feedback arrives, I'll check it over meticulously and make any necessary changes.		3.75	4.14	3.98	3.80

4.3 Analysis of Questionnaires

In order to gauge whether student levels of engagement changed during the experiment, an undergraduate scenario questionnaire (Table 6) was sent to both groups following the initial intervention. All surveys were answered "live" in class by reading the questions using the Questionnaire Star (2022) platform, and any responses that took more than 40 seconds were discarded. Each subgroup had 40 correct answers on the pre-test, and 30 on the post-test. There were 18 questions that probed students' motivation to learn English as well as their mindset, self-esteem, and routines (Table 6). The study of 250 data points from the pre- and post-test confirms the questions were genuinely separated into distinct groups after the questionnaires data collection (see Table 6).

There was no statistically significant difference between both the classes in their pre-test perceptions, self-belief, and behavioral patterns regarding English learning. However, there had been discrepancies just after test, primarily mirrored in the improvement of the experimental group's perceptions and acquiring knowledge behavior patterns as well as the student consciousness, and the decrease of the control group's behaviors and personality. Results showed that during the study, student average ratings on substance and presentation, fluidity, and norms rose by 7% to 8% in the experimental groups.

Concurrently, the mean score for behaviors in the control condition dropped. Teachers in the experimental group reported higher levels of interest, perceived severity in class and coursework completion, enthusiasm for practice, self-belief in their English level and vernacular capacity, and satisfaction level based on their responses to each inquiry, compared to those in the control sample. Thus, the PAD-class format provided extra benefits in boosting students' motivation, self-esteem, and study skills while learning English.

4.3.1 Student Interest in Learning English

The survey showed that there was no discernible gap between the two groups. The experimental group saw a 3.6 percent increase in their overall score on the post-test, whereas the control group saw a 2.9-point decrease; thus the experimental group saw improvements in all three areas of the survey (attitude, self-belief, and behavioral patterns), while the control group saw decreases in all three. Thus, the PAD model improved the interest in learning English. The interview produced similar results – see the next section.

4.3.2 Analysis of Interview Results

Ten students from either experimental group were picked at random using their ID numbers and contacted at the conclusion of the trial. We chose ten interviewed students, identified as STD 01 to STD 10. The participants were asked:

（1）how they felt about the PAD class mode,

（2）if they felt their skill level and proficiency had increased, and

（3）how they felt about providing feedback on the PAD classroom mode.

The interview results for each question follow:

4.3.2.1 Attitude towards PAD Class Teaching Mode

The first inquiry concerned general opinions on the PAD class are following:

Seven students gave a 'very good' evaluation, and the remaining three gave positive evaluations, therefore all participants loved this approach to teaching. They found it fascinating, since they had never seen anything like it before, and neither had the teachers of their previous courses. When compared to prior classes, students found the model where teachers spoke and students discussed to be more engaging.

They said:

"PAD is a new teaching method, which is my first experience and makes me very willing to participate in the classroom teaching activities organized by teachers." [STD05]

"PAD is a good method, its teaching and learning processes are very clear, and students have a lot opportunities to interact and communicate with teachers." [STD06]

"This teaching method is very attractive to me. I like it very much because I can actively participate in the process of learning English." [STD07]

"In such a classroom, my interest in learning English has improved, because I was afraid of English classes before." [STD08]

When asked to provide further detail, eight students singled out the opportunity to debate and discuss topics with their peers as a highlight. They reported that group discussions strengthened bonds of friendship in addition to fostering mutual learning. "One way in which we learned from one another and advanced our understanding was by having to reach consensus on solutions to the issues raised by the teacher".

Additionally, individuals found new language possibilities through reading the works of others. Some students even began looking forward for more PAD class teaching, since it provided them with additional opportunities for in-class debate, relieving them of the monotony of lectures.

4.3.2.2 Awareness of Level and Ability Improvement

The second inquiry probed how much the PAD class format had impacted their English proficiency and what specifically had made such an impact. Nine out of ten respondents who took the PAD class felt that their English skills improved as a result. When asked how they felt using the PAD method impacted their ability to think critically in English, nine indicated it helped. The traditional organization had students critique one other's writing only when the activity had finished. Inheriting this custom, the PAD class method encouraged students to debate the offered linguistic framework, allowing for a more methodical and in-depth understanding of student perspectives, as well as the opportunity to teach and be taught via open dialogue. Ten participants claimed they felt more confident speaking English after taking the PAD method, and three said it helped them better to organize their thoughts while writing and comprehend grammar.

They said:

"In the PAD class, especially in the discussion segment, I formed a critical thinking point of view, which made me more willing to show my views in English." [STD01]

"In the PAD class, the Presentation and Assimilation parts have made me have a deep learning demand for English learning, such as grammar and reading. I like to actively participate in every interaction activity." [STD02]

"After using PAD teaching method, my English communication became more fluent." [STD03]

"My English listening, speaking, reading and writing abilities are improving rapidly." [STD04]

"The discussion stage of PAD teaching has enhanced my confidence in expressing views." [STD05]

5. Conclusion and Reflection

This study answered the three research questions related to the PAD class technique: see Table 7:

Table 7. Research questions and outcomes

Research question	Outcome
(1) What research methods were used?	Quantitative research and interview.
(2) What technologies were used?	"PAD class APP" (Duifene, 2022) can be used by computer or cell phone
(3) What skills were developed in those classes?	Student listening, speaking, reading and writing abilities was improved

5.1 Inference from Data Gathered

Overall, the PAD class showed significant improvements. Formal scores based on content and expression, fluency, grammar and vocabulary showed that although there was no significant difference between experimental (using PAD) and control (using traditional methods) classes before the experiment, after the experiment, the PAD group was significantly better. PAD style teaching allowed the experimental group to improve mean scores from 74.2 to 80.1 (median 74 to 81.5), whereas the traditional class only improved from 75.4 to 76.8 (median 74 to 79). A t-test confirmed that the results were significant.

Assessments based on questionnaires and interviews, also showed that PAD class teaching improved attitude and learning habits. After the experiment, the interviews with some students in the experimental class confirmed this.

5.2 Improvement in English Application Ability

Before the trial, there was no discernible difference in the mean scores of contents and presentation, language use skill, and achievement tests between two groups, suggesting that they were on par with one another.

5.3 PAD Class Teaching Improved Interest in Learning English

There was no statistically significant distinction between the two groups' average pre-experiment focus on four key factors or their scores on any of the three factors. The post-test average for the experimental group was 3.0, whereas it dropped to 2.9 for the control group. In the questionnaire, following the study, the experimental group showed improved ratings for attitude, optimism, and behaviors, whereas the control group showed a deterioration. Thus using the PAD method to teach English in higher education might pique the interest of students in the subject. All interviewees' approval of the new pedagogical approach was more evidence that students saw the PAD approach favorably.

5.4 Contributions

The key contributions and advantages of the PAD class teaching mode – not widely used outside China were:

(1) Analysis and discussion were built into the schedule.

(2) Some details were deliberately omitted from the formal presentation.

    a. This encouraged students to fill in the gaps by themselves.

    b. It also helped them to find discussion points.

    c. A form of democracy was built into the class: students were not wholly reliant on the teacher and contributed to the lesson result.

(3) Learning before thinking concept introduced.

    d. Presenting a framework of points to be learnt (albeit not a complete one) contributed to efficient, guided discussion. Once the framework was learnt (in the assimilation phase), students were able to develop it further.

Specifically, in this work:

(1) The PAD teaching style was introduced to a class that had not seen it before and the performance of the class was compared with a traditionally taught class.

(2) We confirmed score improvements using the PAD approach in a controlled experiment.

(3) Reactions and comments from that class were acquired and analyzed to demonstrate the advantages of the PAD class.

6. Reflections

6.1 Establish a Mutual Evaluation List to Facilitate Discussion and Peer Support

Teachers need to provide lists of evaluation or discussion points. However, these should be simple (and fit time constraints): students would be encouraged to consider them as discussion leaders, not formal evaluations.

These regular mutual evaluations should be closely linked to the current content, to encourage regular self-examination and reflection on the current content.

6.2 Cultivating Independent Study Ability

Teachers should shift away from a focus on only completing assignments and instead focus on developing student linguistic and instructional abilities simultaneously. A practical approach to introducing the "idea of integration" was found to be the PAD class in this investigation. Class organization by the teacher is the primary step in developing student abilities; second, student proficiency in the language is enhanced through independent study outside of class; third, collaboration is fostered through peer review of assignments and class discussions; and fourth, student improved study habits are reinforced by the teacher's summaries of class material.

6.3 Class Atmosphere of Cooperation and Mutual Learning

Students were not always motivated to study in control group due to the dreary environment. This study demonstrated that using the PAD approach in the classroom may enliven a stale environment. In the PAD class, after the Presentation and Assimilation stages, students began the Discussion stage. Through talking to and working with their peers, they were able to go beyond the confines of their own minds and build upon the ideas of classmates. In the classroom discussion, participants made progress together by evaluating and learning from one another; in knowing and understanding, that piqued the interest of students to remark and assist each other grow confidence.

6.4 Limitations and Future Work

Although this study demonstrated the ability of the PAD class to improve the teaching level, it was limited. The number of people participating was small, and the scope was not large - only two classes from one university. Also, the research time was only one semester, which was inadequate to confirm the PAD class model efficacy. Though there are many encouraging accounts in the CNKI database, we still think further research is needed; also, because developing skills takes time, we need more experiments to corroborate our findings.

This study energized the experimental class even before the experiment to encourage students to participate in the experiment. This may have had some psychological implications and affected the results.

Although this study was limited to one class in one Chinese university, the number of papers and informal reports from other teachers in China found in the CNKI database, covering language teaching and other disciplines, suggests that similar results have been obtained, even if informally reported, in many other universities.

7. Statements and Declarations

We declare no conflict of interest regarding the research reported here.

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