

# Interest-Driven Creator Course in a Blended Setting to Develop Chinese College Students' Adaptive Learning Skills

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*The aim of this study is to improve the adaptive learning skills outcomes of undergraduate students in bachelor's degree by designing a compulsory interest-driven creator (IDC)-based English course in blended setting. A total of 210 Chinese college students participated in a quasi-experimental intervention. The research was conducted for 16 lessons over 16 weeks at a private college in China. The performance of the experimental group (EG) and the control group (CG) was assessed by adaptive learning skills survey as a pre-test and a post-test to investigate proficiency. The results in EG showed a better outcome on the test than the CG. The result is especially worth implementing since its main components are the formation of individuals' adaptive learning skills and ability to master specific learning outcomes. Therefore, the value of the IDC courses in higher education based on a blended setting augmented the effectiveness of learning outcomes with flexible and dynamic adaptive learning skills.*

*Keywords: interest-driven creator course, blended setting, adaptive learning skills, learning outcome*

## INTRODUCTION

Chinese students are currently in Chinese higher education institutions (HEI) learning English as a second language/English as a Foreign language (ESL/EFL) as representative of the digital age (Madbouly et al., 2020), in which learners can benefit from competence-based learning by being continually exposed to digital content (Athoillah, 2022; Zhou & Luo, 2018) in a flexible blended setting due to the rapid development of technology. After a recent assessment of mobile English learning in HEI, Metruk (2020) proposed the need of further research of innovative language learning in a blended setting, including the ability to enhance contemporary students' adaptive learning skills for a better learning outcome. Hence, there is a need for a specific project that includes pedagogical objectives, learning materials, and a suitable learning approach in a blended setting that can improve students' adaptive learning skills (Brown et al., 2020) in order to sustain Chinese HEI professionalism.

The focus of the research was the optimisation of the ability of Chinese college students to develop their adaptive learning skills based on increasing their motivation (Daniel, 2020) and making problem-solving skills their main learning objective after the instruction of adaptive learning (Danielsen & Valaker, 2021). The novel instructional design (Wong et al., 2020b) to improve students' adaptive learning skills in

a blended setting in HEIs approved by Chinese policy (NACENGLISHT, 2021) in the English Bachelor Guidance Outline via an experimental study.

The increased usage of technology in education highlighted in the EDUCAUSE report (Pelletier et al., 2021) has led to the expansion of typical cases of educational technology and innovation in higher education (Plass & Pawar, 2020) driving Chinese HEIs to the forefront of innovative instructional design. Therefore, the purpose of this study is to develop an innovative English course based on the interest-driven creator theory to improve Chinese college students' adaptive learning ability (Wong et al., 2020a). The research questions are as follows.

- A. What are adaptive learning skills based on IDC in a Chinese college?
- B. How can an IDC course be effectively applied to enhance Chinese college students' adaptive learning skills?
- C. Are Chinese college students' adaptive learning skills better enhanced by an IDC intervention than those of students who are taught by traditional teaching methods?

## LITERATURE REVIEW

### Interest-Driven Creator Theory

The core of the IDC (Chen et al., 2020) is the progression of interest in learning via the formation and maintenance of habits in three progressive loops: the 'interest loop,' 'the driven loop for learning creation,' and the 'creation loop for learning habits'. The IDC theory is composed of evolving and deeply rooted instinctive self-learning skills (Pachuashvili & Khabeishvili, 2022) that demand a potential outgoing personality and imagination that individuals commit to delivering continuous improvement.

The interest loop should include specific contemporary research characteristics (Zheng, 2021), while challenging ability-based related aspects and designs in the learning environment, thereby effectively contributing to the growth of individuals' knowledge (Latifah et al., 2022). Then, individuals should be able to create meaningful work or even contribute to society based on the utilisation of that knowledge. Lower cognitive skills, such as an elastic memory and an understanding of learning (Torabi et al., 2019) are required for the driven loop. It is essential to emphasise these when there is an unusual occurrence in the recreation process because they enable students to emulate, replicate and create it (Liu et al., 2018). Finally, positive adaptive learning is formed in the 'creation loop for learning habits. Adaptive learners' frequent and continuous staging of sustained initiatives contribute to the learning culture, and they assert their personality (Durall et al., 2019) to acquire an identity to enhance their accomplishment in the subsequent positive adaptive learning loop (Otobo & Watila, 2020).

### Adaptive Learning Skills

For a course to improve contemporary students' adaptive learning skills (Kukulska-Hulme & Viberg, 2018), it should be grounded on technology and the kind of learning strategies from students' acquisition of digital skills (Ben et al., 2022) that can enhance their interest and engagement. These skills enable students to develop persistent learning behaviour by more efficiently based on a flexible pattern and personal learning style and intelligently cultivating a habitual interest in an IDC course in a normal semester. On the other hand, fewer mandatory conditions govern the acquisition of adaptive learning skills (Sulistyanto et al., 2022; Yuliati & Lestari (2018) because they are interest-based learning and social skills.

Since adaptive learning is flexible and relies on a pattern of outcome-based thinking (Narvaez & Reyes, 2022), in which facts and concepts are connected, manipulated, categorised and combined with invention, and information and intellect are combined to provide new answers to old issues in an appropriate environment (Ichsan et al., 2019; Zhang et al., 2022). Technology acceptance (Balyer, 2018; Lu et al., 2021) is also detrimental effect because the information found online is not necessarily valid. This adaptability enables individual students to modify the density and pace of their learning (Nielit & Thanuskodi, 2020). They are able to adjust their response patterns according to their learning objectives using their adaptive learning skill and can assess their level of learning and progress throughout the study in real time (Al-Rahmi

et al., 2022;). Therefore, flexible, and dynamic learning skills (Li-Hong, 2019; Lim et al., 2019) have been proved to be reliable alternatives to personalised training components.

### **Components of Adaptive Learning Skills**

Midgley et al. (1998) and Hoi et al. (2021) list the components of adaptive learning as perceived usefulness, perceived ease of use, teacher support, behavioural intention, mastery goal orientation, performance avoidance goal orientation, academic self-handicap strategies and academic efficacy. Therefore, teachers are facilitators and, as such, they should focus on delivering information about the technological resources, promoting the active use of technology and digital transformation, and assisting learners to effectively take an interest in the perceived usefulness of these resources and strive for future success based on self-achievement (Godwin-Jones, 2019b).

In this context, the interaction between learners' preferences, course resources and teacher support are beneficial for linking the adaptive characteristic of perceived ease of use (Minn, 2022) to the goals and objectives of this learning system and its conceptual curriculum. Adaptive learning objectives (Jeong, 2022) can provide a more precise theoretical base for students' adaptive perceived ease of use and can lead to the formation of default higher-order thinking skills (Walkington & Bernacki, 2020) due to advanced digital and technological tools for learning (Zhou & Luo, 2018) on their behavioural intention. Behavioural intention also involves the use of interactive ecological and practical learning to develop individuals' personal orientation to achieve their goals.

Previous researchers (Han et al., 2022; Xie et al., 2019) have indicated a change in teachers' position in the classroom whereby they are less dominant now that students are using digital and technological resources in a self-directed, self-initiated learning setting. The adaptive environment (Chatterjee, 2022) facilitates learners to self-regulate their learning and enable them to enhance their affective, psychological, cognitive and social development by learning to master their performance orientation and academic self-handicap strategies. Their acceptance of the utility of technology should enhance their academic efficacy, personal achievement, goal orientation, academic-related perceptions, beliefs, and strategies (Roschelle & Burke, 2019; Strekalova-Hughes et al., 2021).

### **Measurement of Adaptive Learning Skills**

The purpose of this study was to produce a corresponding and responsible system to evaluate adaptive learning skills based on a quantitative measure of empirical patterns (Iyer et al., 2022) to enable students to identify their personal learning objectives and assess their progress (Bolsinova et al., 2022; Katsumata, 2021).

The design of the new system included the four TAM variables of perceived usefulness, perceived ease of use, teacher support and behavioural intention (Hoi & Mu, 2020), as well as the five PAL variables of mastery, goal orientation, performance avoidance goal orientation, academic self-handicap strategies and academic efficacy (Midgley et al, 1998), which entailed the provision of appropriate technological resources for a qualitative academic experience (Shemshack & Spector, 2021).

The TAM and the PAL were used in this research to develop mature domestic digital tools (Ali et al., 2018; Dziuban et al., 2018; Li & Lan, 2022) that could enable the learners to identify adequate resources in a digital environment based on 23 items: ( $\chi^2/df < 3$ ;  $p < .05$ ; CFI  $> 0.90$ ; TLI  $> 0.90$ ; SRMR  $< 0.08$ ; RMSEA  $< 0.07$ ) in TAM and 25 items in PAL ( $\chi^2/df < 3$ ;  $p < .05$ ; CFI  $> 0.85$ ; TLI  $> 0.90$ ; SRMR  $< 0.08$ ; RMSEA  $< 0.07$ ).

As an effective IDC pedagogical management tool, the PAL provides affective, psychological and cognitive resources to support learners (Zhou & Wang, 2019). Adaptive interaction, which is the fundamental basis of this pedagogy, is extremely beneficial for learners (Zhang et al., 2022). Therefore, an adequate level of PAL's reliability of Cronbach's Alpha ( $> .85$ ) and validity of KMO ( $> .80$ ) (Midgley et al, 1998) was used in this study.

Likewise, the relevant adaptable learning behaviour and strategies based on the TAM (Hu & McGeown, 2020) should match each other (Tawafak et al., 2019) to achieve a successful evaluation that represents learners' specific characteristics with a sufficiently positive performance due to an interest in learning

(Almarshadi et al., 2019). Therefore, the TAM (Bozkurt & Sharma, 2022; Leshchenko et al., 2021) was used to enable learners to individualise their learning (Kem, 2022); hence, the TAM's overall efficiency (Hoi & Mu, 2020) was based on the reliability of Cronbach's Alpha (>.78) and validity of KMO (>.80).

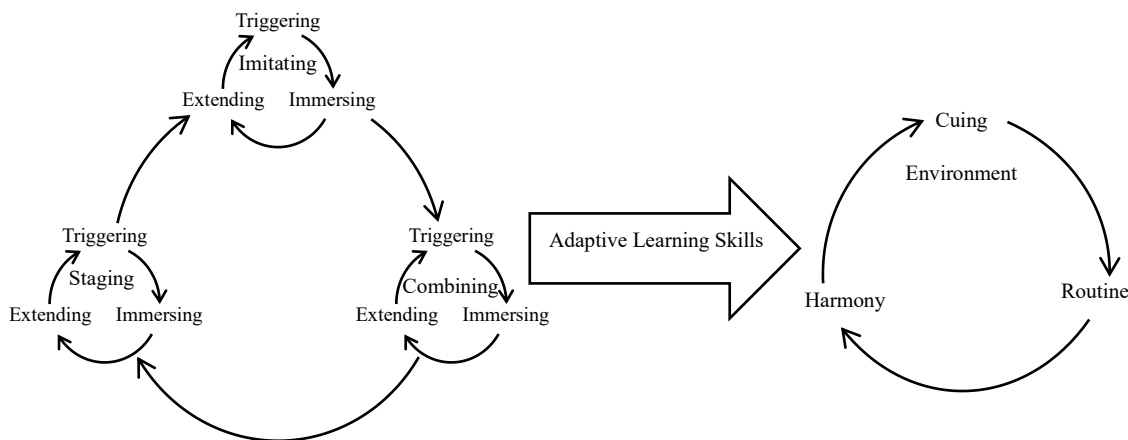
### Blended Learning (BL) Setting

The online and offline e-learning provided to HEI students consists of supplementary resources and instructional materials. The online resources and activities (Shi et al., 2017; Orji et al., 2021) include tasks and discussions designed to increase students' problem-solving, rational, analytical skills, and critical thinking (Halomoan et al., 2022; Mulyadi et al., 2022). The flexible blended learning setting provides an instructional environment, resources, and approaches that can improve HEI students' problem-solving, rational, analytical, and critical thinking skills in English learning (Xu & Qiu, 2023). On the other hand, teachers can provide students with prompt, unbiased corrective feedback (Lim & Graham, 2021; Kefalaki et al., 2021).

### Implementation of IDC Course for Adaptive Learning Skills

Mobile-assisted language learning requires an interpersonal search for information (Burston & Arispe, 2022). This has a positive effect on the learning outcomes, and many researchers have examined its viability in a sustainable context, such as an IDC course (Elmahdi et al., 2018). Instructors can create highly compelling scenarios that can improve college students' adaptive learning skills using mobile-assisted language learning (Yang, 2022) in an IDC English course. In contrast, target learners can also make use of the numerous advantages and practical skills provided by mobile-assisted language learning with appropriate teacher support (Burston & Giannakou, 2022) as shown in Figure 1.

**FIGURE 1**  
**ADAPTIVE LEARNING PATTERN OF AN IDC COURSE**



Adaptive learning skills are becoming an essential platform for instruction in HEIs (Ahmad & Khan, 2021) due to specific factors that increase learners' situational interest in learning (Buabeng-Andoh, 2021). Therefore, the positive effect on interest, attitude and initiative (Yang et al., 2021) is critical to form the 'interest loop' in an IDC course. Then, teachers can maximise information technology acceptance as part of their role as facilitators of college students' adaptive learning skills (Pei & Wu, 2019) and search for the necessary adaptive learning resources for a "learn, play, do" model. Both students and lecturers in HEIs concur that a smartphone is potentially a constructivist tool for ESL/EFL learning to access 'the driven loop for learning creation' (Chan et al., 2019) in speaking.

Finally, the formation of the 'creator loop for learning habits' in a mobile-assisted language learning course to enhance the adaptive learning skills of Chinese ESL/EFL learners parallels the findings of

Rajendran and Yunus (2021) in other regions of the world that digital interest-based language learning applications improve monolingual language abilities due to adaptive learning skills-based repetition under the ‘learn, play, do’ model (Okoye, 2022).

## METHODS

The purpose of this study is to implement an IDC English course in a blended setting in an HEI and conduct a quasi-experiment to determine whether or not it improves the adaptive learning skills of Chinese students. A mixed-method approach was used for the study with TAM and PAL surveys and semi-structured interviews being conducted at the research site from September to December 2022.

### Participants

The location of the research was Yunnan, China, and 210 college students from six administrative classes were the participants. 27 of them were male and 183 females, and their average age was between 19 and 21. Hence, the ratio of men to women was approximately 1.3 to 8.7, and they were all freshman at the college. 106 were assigned to the IDC-based English course intervention as the experimental group (EG), and the remaining 104 were assigned to the control group (CG). Both groups participated in standard English classes with different instructional approaches. The students in the EG were subjected to IDC-based training, whereas those in the CG were subjected to lecture-based instruction.

### Experiments

The quasi-experimental design, the intervention of IDC English course was conducted in the EG. The course used the identical technological resources and mobile-assisted language learning with each lesson in 2 hours, such as platforms like WeChat, Dingtalks, and social media in Table 1.

**TABLE 1**  
**THE COMPARISON OF EXPERIMENTAL AND CONTROL GROUP**

Pedagogy	Experimental Group	Control Group
Intervention	IDC pedagogy	Traditional pedagogy
Teaching objectives	Adaptive learning skills;	Adaptive learning skills;
Teaching methods	IDC, presentation; roleplay	Regular, presentation; roleplay
Teaching resources	WeChat, Dingtalks, notebooks, SM	WeChat, Dingtalks, notebooks, SM
Lecture role	Facilitator, provider, coordinator	Teacher-centred
Students' role	Active learner in building interests and habits.	Receiver, passive learners

*Note.* This research collocates the intervention.

The active control in the CG with the aim of investigating progress in terms of the placebo effect (Chen & Chang, 2021). The initial core for teachers in IDC: interest engagement was to be a processor by contemplating questions. Such as: what would the teacher or researcher require the college students to perform to spark their interests? How do they maintain immersion in their learning progress, and have these learning immersions been extended? What extracurricular materials and activities will be included in the course, and what may be necessary to develop and generate interest in the habit?

The second step was to develop the student's interest range with blended setting (Salih, 2019; Zain et al., 2021). Then enhance the opportunities for the learners to participate in interest practice by boosting their adaptive learning skills, forming “the driven loop for learning creation”. However, errors and flaws were tolerated at this stage to improve the learning experience in blended settings (Alenezi, 2021).

As the final level of adaptive learning skills, the habits were nourished to maturity in a cuing environment (Chan et al., 2019) in blended l settings (Daniel, 2020). After the course, college students

comprehend their overall performance (Taylor et al., 2021), class discussions, provide feedback on the course to trained teacher and principal researcher, and appreciation expressed throughout the semester to generate a ‘creator loop for learning habit’.

### **Pre-Test and Post-Test**

The measurements of a pretest and a posttest were a survey of adaptive learning skills and an interview to students. The survey was conducted before and after the teaching experiment, and the interview was implemented afterward.

#### *Adaptive Learning Skills Survey*

A survey was undertaken to determine if the technology acceptance (TAM) model (Hoi & Mu, 2021) and patterns of adaptive learning (PAL) could be practically utilised in a blended adaptive learning setting (Midgley et al., 1998). In terms of the use of including the TAM in mobile-assisted language learning (Hoi & Mu, 2021) the students were required to base their answers on a 6-point Likert scale. Previous results (Hoi & Mu, 2021) have demonstrated a relatively good model fit ( $X^2/DF = 5.98$ ,  $p = 0$ ;  $SRMR = 0.04$ ;  $CFI = 0.97$ ;  $TLI = 0.90$ ;  $RMSEA = 0.13$ ,  $CI [0.08; 0.19]$ ), which supports the use of the Extended TAM as an appropriate means to examine the effect of adaptive learning on mobile-assisted language learning.

The PAL (Midgley et al., 1998) is deemed to be a reliable tool to validate college students’ personalised learning performance. According to Suprayogi et al. (2019), the latest empirical evidence shows that the overall Cronbach’s Alpha value of the PAL was  $MGO = 0.78$ ,  $P_{Approach} = 0.79$ , and  $P_{Avoid} = 0.59$ .

The adaptive learning skills survey was used in this study as a pre-test and post-test of the adaptive learning outcomes of the students in the EG and CG. The survey was conducted as a blind test of students in the fifteenth week on-site as a 15-minute activity. The procedure and results were first examined by trained teachers and then by the lead researcher. The pre-blind test was administered in the second week and the post-blind test in the fifteenth week. The data from these two tests was retrieved, combined, and collated in weeks 15-16.

#### *Semi-Structured Interviews*

The 16 students in the EG were invited to participate in online semi-structured interviews after the post-test in the fall semester of 2022. This qualitative tool was used to investigate their perspective of the learning outcomes as a dimension of the IDC intervention by answering 7 questions. The anonymous expert reviews of the kappa results revealed that the values were all within 0.80 to 1. The interview questions were approved by eight professional practitioners, from full-time instructors to administrative staff in the field of English in Chinese HEIs, with occupational experience of more than 15 years. The questions are shown below.

1. Please describe your adaptive learning experience of the course this semester using 1 or 2 Keywords.
2. What did you expect to learn from this course? Did it reach your expectation?
3. How will you use the adaptive learning skills outside the classroom after learning them in this course?
4. In what kind of environment will you use these skills?
5. How has this course improved your adaptive learning skills?
6. What adaptive learning skills or habits have you learned from this course that actually works for you?
7. What further comments do you have about the course?

## **RESULTS**

The 210 students participated in the pre-and post-tests, and the adaptive learning skills outcomes were measured using onsite tests and interviews. The collected data was subjected to a statistical analysis using

independent t-tests, paired sample t-tests, an ANCOVA, and Nvivo was used to conduct a qualitative analysis.

### Quantitative Results

An independent sample t-test was initially applied to examine the learners' adaptive learning skills to gain insight into the details of their performance. The means and standard deviations of the EG and CG shown in Table 3 are based on the analytical results of the independent sample t-test and adaptive learning skills outcome is the highlighted variable. TAM and PAL surveys were used for the pre-test and post-test to examine the proficiency of the EG and CG students to ascertain their English learning progress at the beginning and end of the intervention in the quasi-experimental design.

The means and standard deviation of the pre-test for adaptive learning skills are shown in Table 2. All the analytical results are based on eight variables: perceived usefulness, perceived ease of use, teacher support, behavioural intention, mastery goal orientation, performance avoidance goal orientation, academic self-handicapping strategies, and academic efficacy.

**TABLE 2**  
**RESULTS OF THE INDEPENDENT SAMPLE TEST OF THE PRE-TEST FOR ADAPTIVE LEARNING SKILLS**

Variables	Groups	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Perceived Usefulness	EG	3.103	0.701	0.563	0.608
	CG	3.014	0.723		
Perceived Ease of Use	EG	3.002	1.003	0.784	0.704
	CG	3.003	1.444		
Teacher Support	EG	3.202	0.811	0.832	0.669
	CG	3.201	0.842		
Behavioural Intention	EG	3.004	0.903	0.871	0.709
	CG	3.024	0.917		
Mastery Goal Orientation	EG	2.411	1.201	0.387	0.764
	CG	2.413	1.044		
Performance Avoidance Goal Orientation	EG	2.903	1.103	0.285	0.554
	CG	2.911	1.142		
Academic Self-handicapping Strategies	EG	2.204	1.101	0.653	0.672
	CG	2.242	1.123		
Academic Efficacy	EG	2.502	1.403	0.672	0.866
	CG	2.513	1.141		

*Note.* *n*=47. EG= Experimental Group; CG= Control Group. *M* = Mean, *SD* = Standard Deviation.

The results of the independent sample test used to pre-test the adaptive learning skills of the students in the EG and CG indicated that all the variables were homogenous (Misra, 2012): perceived usefulness ( $t=0.536$ ,  $p=0.628$ ), perceived ease of use ( $t=0.784$ ,  $p=0.704$ ), teacher support ( $t=0.832$ ,  $p=0.669$ ), behavioural intention ( $t=0.871$ ,  $p=0.709$ ), mastery goal orientation ( $t=0.3384$ ,  $p=0.764$ ), performance avoidance goal orientation ( $t=0.285$ ,  $p=0.554$ ), academic self-handicapping strategies ( $t=0.653$ ,  $p=0.672$ ), and academic efficacy ( $t=0.672$ ,  $p=0.866$ ). Hence, the overall outcomes of the adaptive learning skills of both the students in the EG and CG passed the pre-test requirement of homogeneity ( $p>.05$ ) by indicating that EG and CG students' adaptive learning skills were equal at the beginning of the experiment.

The results of the paired-sample test of the adaptive learning skills of the EG are shown in Table 3. The mean and standard deviation of the variables in EG showed a significant increase in the post-test compared to the pre-test: perceived usefulness ( $M=3.722$ ,  $SD=1.303$ ), perceived ease of use ( $M=3.613$ ,  $SD=1.524$ ),

teacher support ( $M=3.541$ ,  $SD=1.043$ ), behavioural intention ( $M=3.528$ ,  $SD=1.411$ ), mastery goal orientation ( $M=3.843$ ,  $SD=1.643$ ), performance-avoidance goal orientation ( $M=3.558$ ,  $SD=1.241$ ), academic self-handicapping strategies ( $M=3.525$ ,  $SD=1.531$ ) and academic efficacy ( $M=3.537$ ,  $SD=1.424$ ). Therefore, according to the results of the post-test, the adaptive learning skills of the students in the EG had improved with the IDC intervention.

**TABLE 3**  
**RESULTS OF PAIRED-SAMPLE T-TEST OF THE EG'S ADAPTIVE LEARNING SKILLS**

Variable	$M (SD)$	$M (SD)$	<i>t</i>
	Pre-test	Post-test	
Perceived Usefulness	3.103 (0.701)	3.722 (1.303)	4.144***
Perceived Ease of Use	3.002 (1.003)	3.613 (1.524)	5.312***
Teacher Support	3.202 (0.811)	3.541 (1.043)	1.613**
Behavioural Intention	3.004 (0.903)	3.528 (1.411)	1.830***
Mastery Goal Orientation	2.411 (1.201)	3.843 (1.643)	8.731***
Performance Avoidance Goal Orientation	2.903 (1.103)	3.558 (1.241)	4.762***
Academic Self-handicap Strategies	2.204 (1.101)	3.525 (1.531)	5.781***
Academic Efficacy	2.502 (1.403)	3.537 (1.242)	8.754***

Note.  $n=106$ . EG= Experimental Group.  $p<0.05$ .  $p<0.001$ .  $M$  = Mean,  $SD$  = Standard Deviation.

The above results represent a significant improvement of the adaptive learning skills of the EG students from the pre- to the post-test. The variables that improved the most were perceived usefulness ( $M=3.722$ ,  $SD=1.303$ ), perceived ease of use ( $M=3.613$ ,  $SD=1.524$ ), behavioural intention ( $M=3.528$ ,  $SD=1.411$ ), mastery goal orientation ( $M=3.843$ ,  $SD=1.643$ ), performance avoidance goal orientation ( $M=3.558$ ,  $SD=1.241$ ), academic self-handicap strategies ( $M=3.525$ ,  $SD=1.531$ ), and academic efficacy ( $M=3.537$ ,  $SD=1.242$ ). At the same time, teacher support had only slightly improved ( $M=3.613$ ,  $SD=1.524$ ). Furthermore, there was less significant difference between the adaptive learning skills of the students in the CG in the pre-and post-tests, as shown in Table 4.

**TABLE 4**  
**RESULTS OF PAIRED-SAMPLE T-TEST OF THE CG'S ADAPTIVE LEARNING SKILLS**

Variable	$M (SD)$	$M (SD)$	<i>t</i>
	Pre-test	Post-test	
Perceived Usefulness	3.104 (0.723)	3.220 (0.847)	2.336*
Perceived Ease of Use	3.003 (1.444)	3.303 (1.633)	2.163*
Teacher Support	3.201 (0.842)	3.321 (1.041)	1.391
Behavioural Intention	3.024 (0.917)	3.122 (1.208)	1.380
Mastery Goal Orientation	2.413 (1.044)	3.118 (1.706)	6.732*
Performance Avoidance Goal Orientation	2.911 (1.142)	2.947 (1.051)	1.306
Academic Self-handicap Strategies	2.242 (1.123)	2.536 (1.504)	1.049*
Academic Efficacy	2.513 (1.415)	2.941 (1.642)	3.525*

Note.  $n=104$ . CG= Control Group.  $p<0.5$ .  $M$  = Mean,  $SD$  = Standard Deviation.

Compared to the EG, there was just a minor increase in the adaptive learning skills of the students in the CG in the post-test compared to the pre-test in terms of the variables: perceived usefulness ( $M=3.220$ ,  $SD=.847$ ), perceived ease of use ( $M=3.303$ ,  $SD=1.633$ ), mastery goal orientation ( $M=3.118$ ,  $SD=1.706$ ),



academic self-handicapping strategies ( $M=2.536$ ,  $SD=1.504$ ) and academic efficacy ( $M=2.941$ ,  $SD=1.642$ ). There was no difference in the variables of teacher support ( $M=3.321$ ,  $SD=1.041$ ), behavioural intention ( $M=3.122$ ,  $SD=1.208$ ), and performance-avoidance goal orientation ( $M=2.947$ ,  $SD=1.051$ ) between the pre- and post-test. In addition, compared to the EG, the above results reveal that CG students' adaptive learning skills only partially increased in the post-test without the IDC intervention, with minimal positive changes in the variables of perceived usefulness, perceived ease of use, mastery goal orientation, academic self-handicap strategies and academic efficacy.

The results of the paired-sample *t*-test (Marsden & Torgerson, 2012) generally indicate that the students in the EG had further significantly improved their adaptive learning skills than those in the CG, which means that the results from the pre-test to the post-test reached the criteria to prove that the IDC intervention would become increasingly significant for the students in the EG after they finished the study because it was evident that their adaptive learning skills had greatly improved.

After controlling for the pre-test scores, a one-way ANCOVA was used to identify any statistically significant differences between the experimental and control groups in the post-test. The results indicated that the IDC course intervention had enhanced the adaptive learning skills abilities of the EG students. The ANCOVA results of their listening ( $F=685.132$ ,  $p<.001$ ) and speaking ( $F=889.322$ ,  $p<.001$ ) abilities are shown in Table 5. These findings are statistically significant and size related (Brydges, 2019).

In order to analyse the homogeneity of the adaptive learning skills, the pre-test scores were firstly considered as independent variables, and the pre-test and group interactions were examined (Ateş et al., 2020). The findings below fit ( $p>.05$ ) for the additional algorithms employed by the ANCOVA.

The interactions between the pre-test and groups were found to be insignificant: perceived usefulness ( $F=2.142$ ,  $p=.188>.05$ ), perceived ease of use ( $F=1.031$ ,  $p=.151>.05$ ), teacher support ( $F=5.354$ ,  $p=.461>.05$ ), behavioural intention ( $F=.823$ ,  $p=.165>.05$ ), mastery goal orientation ( $F=2.883$ ,  $p=.155>.05$ ), performance avoidance goal orientation ( $F=1.191$ ,  $p=.167>.05$ ), academic self-handicapping strategies ( $F=.059$ ,  $p=.058>.05$ ) and academic efficacy ( $F=.808$ ,  $p=.137>.05$ ). Hence, the ANCOVA of adaptive learning skills could proceed.

The next step was to compare the variance and interactive effect between the EG and CG using an ANCOVA to evaluate the outcomes of their adaptive learning ability. The adjusted mean and standard deviation determined which group was affected more than the other. The results of the analysis of the two classes' adaptive learning skills, included perceived usefulness, perceived ease of use, teacher support, behavioural intention, mastery goal orientation, performance avoidance goal orientation, academic self-handicap strategies, and academic efficacy for an ANCOVA.

After the homogeneity of the regression coefficient of adaptive learning skills, the ANCOVA results were perceived usefulness ( $F=22.513$ ,  $p<.001$ ) perceived ease of use ( $F=18.530$ ,  $p<.001$ ), teacher support ( $F=14.652$ ,  $p<.001$ ), behavioural intention ( $F=24.660$ ,  $p<.001$ ), mastery goal orientation ( $F=24.303$ ,  $p<.001$ ), performance avoidance goal orientation ( $F=22.887$ ,  $p<.001$ ), academic self-handicap strategies ( $F=25.405$ ,  $p<.001$ ) and academic efficacy ( $F=28.511$ ,  $p<.001$ ). The ANCOVA results of the adaptive learning skills shown in Table 5 are statistically significant and substantial (Brydges, 2019).

The results shown in Table 4 demonstrate a considerable impact on both groups' adaptive learning ability. The variables of perceived usefulness, perceived ease of use, teacher support, behavioural intention, mastery goal orientation, performance avoidance goal orientation, academic self-handicap strategies, and academic efficacy were found to have significantly increased the adaptive learning ability of the students in the EG and the CG after the quasi-experimental IDC intervention.

**TABLE 5**  
**RESULTS OF ONE-WAY ANCOVA OF THE ADAPTIVE LEARNING SKILLS**

Variable	Source	SS	df	MS	F	p
Perceived Usefulness	pre-test	14.195	1	14.195	4.547	.104
	Group	107.647	1	107.647	22.513	.000
	Error	386.065	201	38.015		
	Total	2531.830	209			
Perceived Ease of Use	pre-test	15.258	1	15.258	5.308	.061
	Group	108.577	1	108.577	18.530	.000
	Error	380.012	201	34.801		
	Total	2672.034	209			
Teacher Support	pre-test	13.473	1	13.473	5.082	.107
	Group	106.332	1	106.332	14.652	.000
	Error	372.044	201	34.177		
	Total	2528.284	209			
Behavioural Intention	pre-test	17.228	1	17.228	5.722	.047
	Group	112.721	1	112.721	24.660	.000
	Error	386.065	201	36.106		
	Total	2662.137	209			
Mastery Goal Orientation	pre-test	15.572	1	15.572	5.647	.029
	Group	113.733	1	113.733	24.303	.000
	Error	389.011	201	38.805		
	Total	2656.185	209			
Performance Avoidance Goal Orientation	pre-test	14.553	1	14.553	5.840	.103
	Group	108.005	1	108.005	22.887	.000
	Error	386.065	201	35.43		
	Total	2574.502	209			
Academic Self-handicap Strategies	pre-test	15.785	1	15.785	6.770	.015
	Group	107.647	1	107.647	25.405	.000
	Error	379.023	201	32.61		
	Total	2650.115	209			
Academic Efficacy	pre-test	15.198	1	15.198	5.011	.003
	Group	110.055	1	110.055	28.511	.000
	Error	384.788	201	36.771		
	Total	2706.453	209			

Note.  $n=210$ .  $p=.000 < .001$

The next step was to determine if the EG had improved more significantly than the CG. The mean and the standard deviation of adaptive learning skills scores are shown in Table 5 to demonstrate the constraints of the pre-test's influence on the post-test. In terms of specific variables, the IDC course also improved the students' adaptive learning abilities in all variables of perceived usefulness on EG ( $M=3.722$ ,  $SD=1.103$ ) and CG ( $M=3.220$ ,  $SD=.778$ ), perceived ease of use on EG ( $M=3.613$ ,  $SD=1.442$ ) and CG ( $M=3.303$ ,  $SD=1.066$ ), teacher support on EG ( $M=3.541$ ,  $SD=1.304$ ) and CG ( $M=3.321$ ,  $SD=1.040$ ), behavioural intention on EG ( $M=3.528$ ,  $SD=1.041$ ) and CG ( $M=3.122$ ,  $SD=1.008$ ), mastery goal orientation on EG ( $M=3.843$ ,  $SD=1.533$ ) and CG ( $M=3.122$ ,  $SD=1.501$ ), performance avoidance goal orientation on EG ( $M=3.558$ ,  $SD=1.042$ ) and CG ( $M=2.947$ ,  $SD=1.554$ ), academic self-handicap strategies on EG ( $M=3.525$ ,  $SD=1.033$ ) and CG ( $M=2.536$ ,  $SD=1.055$ ), and academic efficacy on EG ( $M=3.537$ ,  $SD=1.204$ ) and CG ( $M=2.941$ ,  $SD=1.604$ ) of ANCOVA analysis, when EG was more significant than CG. These results show that the EG students' adaptive learning skills were enhanced more by the IDC intervention than conventional blended courses.

The results also suggest that the IDC intervention enabled the students in the EG to dynamically and systematically implement adaptive learning skills in the variables of perceived usefulness, perceived ease of use, teacher support, behavioural intention, mastery goal orientation, performance avoidance goal orientation, academic self-handicap strategies, and academic efficacy, which was different from the incomplete, partial application and slow progress of the students in the CG.

**TABLE 6**  
**SUMMARY OF ONE-WAY ANCOVA OF THE ADAPTIVE LEARNING SKILLS**

Variable	Group	Adj. <i>M</i>	Adj. <i>SD</i>	<i>n</i>
Perceived Usefulness	EG	3.722	1.103	106
	CG	3.220	0.778	104
Perceived Ease of Use	EG	3.613	1.442	106
	CG	3.303	1.066	104
Teacher Support	EG	3.541	1.304	106
	CG	3.321	1.040	104
Behavioural Intention	EG	3.528	1.041	106
	CG	3.122	1.008	104
Mastery Goal Orientation	EG	3.843	1.533	106
	CG	3.118	1.501	104
Performance Avoidance Goal Orientation	EG	3.558	1.042	106
	CG	2.947	1.544	104
Academic Self-handicap Strategies	EG	3.525	1.033	106
	CG	2.536	1.055	104
Academic Efficacy	EG	3.537	1.204	106
	CG	2.941	1.604	104

*Note.* *n*=210. EG= Experimental Group; CG= Control Group. *M* = Mean. *SD* = Standard Deviation.

According to Table 6, the adaptive learning skills of the students in the EG were better than those in the CG in the adjusted scores. The IDC intervention had a positive and significant effect on the adaptive learning ability of the students in the EG in the variables of perceived usefulness, perceived ease of use, teacher support, behavioural intention, mastery goal orientation, performance avoidance goal orientation, and academic self-handicapping. These results also predicted a significant improvement of the overall adaptive learning ability of the EG students due to the IDC intervention.

### Qualitative Analysis

The main objective of the semi-structured interviews was to collect thematic feedback (Bernard et al., 2016) on the impact of the IDC intervention on student's perception of their adaptive learning proficiency. The interview questions covered the main dimensions of the research from the experts' reviews (Gumbheer et al., 2022). The specific components of the themed analysis were interest creation, driven to create learning, creation of learning habits for listening, and speaking learning outcomes.

It was found that mobile-assisted language learning made learning a language positive and convenient and it was able to sustain individuals' learning habits. This evidence correlates with the study's objective, which was to grow learners as hosts of learning integration (Tonekaboni, 2019) rather than performers of learning tasks given to them in HEIs. Interest was found to help the students to improve their adaptive learning performance using adaptive learning skills. Besides, they greatly appreciated the combination of interest and learning activities in adaptive learning skills. The development of these characteristics (Smørvik & Vespstad, 2020) enabled them to achieve a better level of language proficiency by being immersed in adaptive learning skills and specifying the learning challenges and solutions.

### *Extract 1*

As I'm studying in general, I'm making full use of a series of software in my mobile phone to solve my problems. I think it has helped me more in my studies, so I think it is useful. (Participant 1, student, second interview)

Developing adaptive learning skills in the IDC course could also have the potential to be beneficial for sharing the learning objectives of cross-disciplinary subjects. When implementing the learning strategies and habits in this study (Ghazali, 2022) the technological connection with peers and teachers will increase the interest in learning (Mahdi & Al-Khateeb, 2019). According to the participants' discussion, Chinese college students majoring in English are aware that they need to develop sufficient and constant work on their adaptive learning techniques to ensure that they have learned what they were supposed to learn. They believe that it is essential to invest adequate time and engagement in integrating the blended class content with adaptive learning materials that correspond to the learning objectives, teacher support, and teaching resources with college life (Rahmawati, 2022).

### *Extract 2*

I am used to using translation software (electronic dictionaries and English learning resource apps) and then learning software to help me in my normal life, but I still go to the classroom to learn because if I don't know some words or understand some sentences, I can access them immediately. Different kinds of knowledge points can also be researched, which can help me to constantly accumulate and improve my language knowledge. (Participant 2, student, second interview)

The following statement matches the purpose of the IDC course design in terms of the role of the teacher in students' habit to become life-long learners. The establishment of interest and creation loops in the IDC course, which is crucial for individuals' development (Zhang et al., 2022) relies on the use of dynamic and adaptive skills and resources to plan and implement personal learning habits in extracurricular activities (Marks et al., 2021).

### *Extract 3*

I'm still a little bit interested; for example, I can speak fluently, I'm still quite happy and have a sense of achievement, but I think it's more to do with study habits, because I'm a serious person and strive for perfection. So, every time I do adaptive learning skills, I focus on quality and quantity. (Participant 16, student, second interview).

## **DISCUSSION**

To answer the first research question, the IDC curriculum improved the students' adaptive learning capability in the 16-week intervention. Therefore, adaptive learning skills can be successfully acquired by integrating the IDC approach, and by learning using adaptive learning skills, EG students could make learning a lifelong pursuit (Fischer et al., 2023) and a habitual practice. Long-term learning should be emphasised when cultivating the adaptive learning skills of students in HEIs in second-and third-tier cities in China to reshape the lifelong competitive mindset (Durall et al., 2019) they developed using the IDC curriculum, even throughout the epidemic. The IDC course design also enabled students who had never been exposed to professional EFL classes to swiftly obtain essential and extended knowledge in the field in 16 weeks; for instance, by learning to instantly comprehend the course requirements and relevant performance in ordinary circumstances without hesitation or explanation using their mother tongue.

Adaptive learning skills focus on a series of responsible learning outcomes, learning creation, and learning habits to enhance students' adaptive learning competency.

In answer to the second research question, adaptive learning skills enhance the creation and mastery of learning in a specific real-time environment (Auerbach et al., 2020). In the EFL context, students should experience adaptive learning skills by creating and mastering learning content and transferring it to an extracurricular setting because HEI students' experience of EFL learning characteristics is that they are complex and slow based on conventional teacher support and course design. It is indicated by important usage-based qualitative research (Hall, 2019) that the problems with mastering learning outcomes in an EFL pedagogical design should be paired with the learner's creation of learning by experience, and that every learning creation should be valued; therefore, the design should be practical, and the difficulty should be comparable to learners' real-life situations. Ariffin et al. (2021) found that, when teachers in Malaysia universally provided associative support for learning to master goals, students' learning outcomes were blocked by confusion and pressure between their interest and adaptive learning skills. Bourekache and Kazar (2020) found further evidence that teachers should provide students with digital learning systems or platforms as a means of teacher support to enable the correlation between interest and adaptive learning skills in English learning to continue to grow outside the classroom. The role of the teacher is to digitally support students to harness systems or platforms for ease of use and positive learning outcomes.

The answer to the third research question reflected the emphasis of the IDC curriculum on brainstorming, role-play, cooperative learning, personalised learning, problem-based learning, hands-on inquiry-based learning, and group discussions (Beça & Aresta, 2022; Ross, 2020) as the primary experimental activities. The IDC was demonstrated to be a complete pedagogy consisting of adaptive learning, which supports the emergence of long-term EFL habits. The current EFL interdisciplinary researchers (Panagiotidis, 2022) have found that learners prefer increased adaptive learning content and learning creation outcomes in the adaptive learning classroom, which can be practiced and verified in a blended setting, thereby enabling adaptive learning to increase their practical adaptive learning proficiency. Claussenius-Kalman et al. (2021) also issued a reminder that the current EFL courses should further enable and respect students' ability to create learning using adaptive learning skills and practical improvement experience based on their individual differences.

## CONCLUSION

The IDC course designed in this study was combined with experimental research to determine its ability to improve Chinese students' adaptive learning skills in a blended setting in an HEI English course. The pedagogical intervention to enhance the effectiveness of Chinese students' flexible and dynamic adaptive learning skills was completed over 16 lessons in 2022. The IDC (Chan et al., 2018; Wong et al., 2020a) was found to motivate learners to fulfil their basic physiological impulses, such as curiosity, engagement, and passion before expanding their adaptive learning skills (Lestari & Syafryadin, 2022). Having experienced adaptive learning, individuals are able to achieve stability accompanied by a growing desire to pursue lifelong learning to sustain them in their everyday lives (Chan et al., 2019, Wong et al., 2020b).

This study was based on the integration of an IDC curriculum in English education to increase Chinese students' sustainable adaptive learning skills. Students were guided to reorganise, reshape, and reinforce their learning habits until they could brainstorm, problem-solve, make hands-on inquiries and extracurricular conversations using adaptive learning skills (Cox & Sanz, 2023), and then integrate them based on their interest and create learning in the learning process in a blended setting.

With adaptive learning skills (Looi et al., 2023) students could generate a sense of fulfilment, accomplishment, and personal development as a result of respect and affection. When learners adaptive learning outcomes continue to strengthen their practical skills, they set greater goals for themselves, such as public speaking or being a role model. The pursuit of their aspiration (Chen et al., 2020) in adaptive learning helps their self-actualisation by assisting them to realise their potential and attain a feeling of purpose and meaning in life.

## IMPLICATIONS OF THE STUDY

Chinese HEIs are recommended to improve students' IDC-related adaptive learning skills (Chan et al., 2018; Chan et al., 2019; Chen et al., 2020; Wong et al., 2020) to enable them to achieve a lifelong educational goal. Sustainability research has begun to include digitalised lifetime learning in EFL and similar fields (Papageorgiou et al., 2022). Apart from a blended setting, IDC courses designed with appropriate teacher support have become significant means for young talents to acquire adaptive self-learning skills in an environment that encourages them to continue to learn beyond the classroom (Silva et al., 2018).

The HEI curriculum should be redesigned to include a focus on digital and multimodal literacy, with a particular emphasis on the use of adaptive learning skills and authentic visual and audio resources to prove the specific EFL learning outcome of sustainable education (Shemshack & Spector, 2021; Strelakova-Hughes et al., 2021). The EFL curriculum should enable students to explore a common authentic adaptive environment using adaptive learning skills, making it easy to find commonality and personalise it immediately from multimodal texts (Begunova & Xu, 2021). It would also be useful for HEIs to make a decision to include a self-assessment system in a digital curriculum (Vial, 2019). EFL teachers in Chinese HEIs should base their English curriculum on the independent development of adaptive learning skills, particularly in the analysis and evaluation of multimodal texts (Narvaez & Reyes, 2022). Therefore, the curriculum should be redesigned to include activities that promote higher-order thinking (Godwin-Jones, 2019a), such as discussions and the creation of learning, and teachers should be professional supporters of such learning creation until it becomes a habit for learners (Ismail, 2023; Ismail et al., 2022; Sulistyanto et al., 2022).

Adaptive learning skills play a role in numerous domains, such as HEIs' social psychology (Hernandez et al., 2023), digital behavioural fields (Tang & Hew, 2022), skill enhancement in educational services (Nantha, 2022) and individual self-help professional training (Mackett, 2022). Although the IDC theory has been developed and broadened over time, it remains vital to explain humans' universal behaviour and thought patterns (Hashim et al., 2021). Also, IDC courses with appropriate teacher support have become significant means for young talents to acquire adaptive (self-learning) skills in an environment that encourages them to continue learning in a blended context (Muhria et al., 2022).

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