Statistical Approach To Optimizing Kirkpatrick's Model For English Performance Evaluation In Higher Vocational Education

*Xiaoya Zhou and Fwu-Yuan Weng**

International College, Krirk University, Bangkok, Thailand

Abstract: With the increasing process of economic globalization and the integration of the world economy, society has put forward new requirements for English. Learning English well is very important and necessary for the development of future graduates of higher vocational colleges and universities themselves and even for the development of the country. In this paper, we will build an optimized English performance evaluation model, which is based on a statistical approach, for higher vocational education from the Kirkpatrick model and evaluate its effect. The main use of the questionnaire survey method and data analysis tools (e.g., Excel, SPSS, and RStudio) to analyze the data, and according to the results of the analysis of the learners to give the next stage of learning advice, to help them quickly find their own shortcomings, to improve the learning performance and sense of acquisition.

1 Introduction

With the technique of financial globalization and integration of the world financial system is accelerating, for China's accession to the WTO after the increasing diploma of openness of the country, greater and extra overseas enterprises, multinational firms will come to our u . s . to construct factories and investment, and a massive element of China's agencies will be out of the united states to the world. Globally, this has led to nearer verbal exchange between humans of distinct cultures, so that many college graduates, particularly graduates of greater vocational schools and universities educated for these enterprises, will face extra overseas work opportunities, and for this reason studying English nicely is very essential and integral for the future improvement of graduates of greater vocational faculties and universities and even for the improvement of the country[1]. At the same time, society has put forward new requirements for English teaching. Especially the higher vocational colleges and universities cultivate application-oriented talents, and the purpose of their learning English is to utilize it after graduation. However, the status quo of English education in higher vocational colleges and universities is not optimistic at the present stage, the reasons for which include the deviation of the schooling philosophy, the utilitarian education model and the influence of social customs, as well as the influence of many factors such as gender, age, personality traits, learning environment, linguistic competence, learning attitudes, motivation, emotional factors, cognitive styles, and learning strategies, and so on.

After getting to know English in junior and senior excessive school, most college students have a significant degree of language knowledge, however there are many troubles in listening and speaking, specifically in communication, such as mastering English for ten years however now not being capable to speak efficiently with foreigners and the occurrence of "deaf and dumb English", which to a positive extent restrict college students from speaking and speaking with foreigners. These are to a certain extent prohibiting students from communicating and exchanging with foreigners. Therefore, it is an important issue to find out how to improve the English learning performance of higher vocational students from the performance evaluation of higher vocational English[2-4].

To summarize, the problems in English teaching in higher vocational institutions have affected and restricted the development of higher vocational education to a certain extent. Problems such as the relatively weak foundation of English of students in higher vocational colleges and universities, students' psychological fear of English learning, high psychological pressure, poor oral expression ability, traditional indoctrination teaching method and boring English teaching

---

*Corresponding author e-mail: fyweng1959@gmail.com

environment have seriously affected the quality of teaching English in higher vocational colleges and the cultivation of higher vocational technical talents[3-6]. It is worthwhile to study how to establish an effective performance evaluation model for higher vocational English and use it to improve the level of higher vocational English teaching and students' sense of acquisition.

2 Literature review

Kirkpatrick's Model Research Status

Kirk's four-layer model was proposed by American scholar Kirkpatrick in 1959, aiming to guide the training of enterprise managers. After Kirkpatrick's model was proposed, many scholars have studied it, but most of them focus on the reaction layer and learning layer, and there are less research and application on the behavioral layer and result layer. In 2005 Kirkpatrick explained the use of the behavioral and outcome layers in practice in his book Transferring Learningto Behavior, elevating the importance of the behavioral and outcome layers[7-9]. In the subsequent development process, scholars have improved the content and method of evaluation of each level of Kirkpatrick's model to a certain extent according to the purpose of training. Jack Phillips added a fifth level, ROI, to the four levels of Kirkpatrick model to better evaluate the actual returns of enterprises, and Kaufman introduced a social contribution level to evaluate the impact of training on society. Both scholars have improved Kirkpatrick model to some extent, but both are more difficult to apply in practice[10].

Kirkpatrick model was initially applied to the evaluation of corporate training effectiveness, and then with the development of research, scholars gradually applied it to the fields of medical health and educational evaluation, which enriched the application of Kirkpatrick model[11]. Chrysafiadi based on Kirkpatrick model evaluated the online learning effectiveness of students in terms of student satisfaction, performance progress, behavior and status. Kvan evaluated the nursing professional learning environment using Kirkpatrick model. Edinger used Kirkpatrick model to assess the professional development of online faculty, which facilitated the enhancement of online faculty's competencies in content organization, teaching practice, and other areas[12]. Oh evaluated the effectiveness of flipped classroom learning in an undergraduate nursing informatics course in terms of student satisfaction, self-perception, and course achievement based on Kirkpatrick model.

China's research on Kirkpatrick model began in 2006, and since then the number of studies has generally been on the rise, and after 2013, the number of related studies has increased dramatically[13-14]. Domestic research on Kirkpatrick model mainly focuses on training effect evaluation, and in addition to the field of corporate training, research in the field of medicine and health is also increasing. In recent years, some scholars have also introduced it into learning performance evaluation, opening up new ideas and methods for educational evaluation[15]. Huang used Kirkpatrick model to assess the effectiveness of Chinese medicine nursing training by using tests, questionnaires, and interviews . Liu applied Kirkpatrick model to the evaluation system of new nurse training and determined the weights of the indicators using the expert consultation method and hierarchical analysis[16]. There are fewer studies applying Kirkpatrick model to the field of education, and Tao used Kirkpatrick model to evaluate the learning effect of undergraduate flipped classroom. Jia constructed the evaluation index system of innovation and entrepreneurship education in colleges and universities using the Koch model. Zhang used Kirkpatrick model to evaluate the effectiveness of teacher training and further analyzed the role of teacher participation on training effectiveness[17].

On the whole, China's research on Kirkpatrick model is mainly concentrated in the fields of industry and commerce, medical industry, etc., with less research in the field of education, and the research content is still dominated by the evaluation of training effect[18-20]. In terms of research methodology, most scholars tend to use the construction of evaluation index system, determine the weights of indicators and other methods to carry out assessment. Although the number of studies on Kirkpatrick model has gradually increased in China, it is still mainly a theoretical study, with fewer application studies at the practical level.

Research on Performance Appraisal

Ngereja divides "performance assessment" into two parts: performance and evaluation, performance is about the future and evaluation is about the past, that is to say, performance assessment is the use of data collected in the past to predict the future, he measured learner performance in a Norwegian university using a project-based learning methodology, which included learning, motivation, and performance[21-25]. Dingle explored the relationship between peer assessment and academic performance in a collaborative learning course and found that students who performed better academically also had higher peer evaluations. Scrivens used the term 'performance assessment' for the evaluation of online learning in a European school, using a research tool developed mainly on the basis of course content[26-28]. Phillips developed a questionnaire based on constructivism to assess learning performance in higher vocational education, including a two-way survey of teachers and students. Shi assessed the learning performance of the problem-based network collaborative

knowledge construction approach through the 360 performance evaluation method, a traditional method of corporate performance evaluation, and divided the evaluation into two dimensions: self-assessment and other-assessment, in which other-assessment includes evaluation from peers, teachers and parents. Drawing on Zhang's related research on the classification and evaluation of blended learning activities, Liu constructed a blended course performance evaluation index system with two first-level indicators for online learning and face-to-face learning, and sixteen second-level indicators for online course objectives, course content, and communication and interaction[29-32].

This study tries to evaluate students through their learning inputs and outputs in the learning process under the support of theory, and guide students to find a suitable learning style for themselves. Learning performance assessment focuses on students' learning process and learning outcomes, which is a dynamic, continuous and developmental process, and the evaluation process will be carried out throughout the whole teaching process, focusing not only on the application of students' knowledge, but also on the development of students' abilities[33].

3 Methodology

Research Subjects

In order to verify the effectiveness of the application of the English performance assessment model in higher vocational education, 80 higher vocational students majoring in English were selected in this study for the application of the learning performance assessment model, including 36 male students and 44 female students.

Research Process

This scan lasted for a complete of 15 weeks, for the duration of the path of the course, the English direction enter and path output facts had been amassed in conjunction with the on line mastering platform and the usage of the questionnaire survey method, and the information evaluation equipment (Excel, SPSS and RStudio, etc.) have been used for the pre-processing of the data, the primary statistical analysis, and the evaluation of the studying performance. The important points are proven in Figure 3.1.
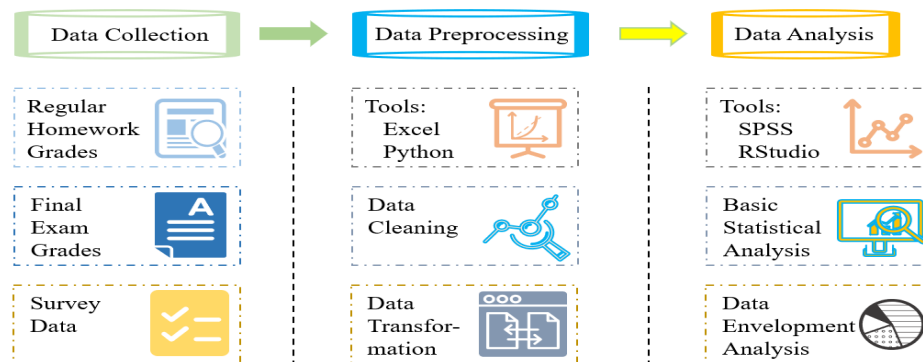

Fig. 3.1 Data Processing Workflow

Theoretical basis of the study

1) Kirkpatrick's Model

Kirk's four-layer model was proposed by American scholar Kirkpatrick, the essence of which is the interpretation of the training objectives, aimed at guiding the training of corporate managers, and is a world-recognized standard for the evaluation of corporate training[34]. Kirkpatrick's model around the trainee will be the effect of training is divided into reaction layer, learning layer, behavior layer, results layer four levels. The specific content is shown in Figure 3.2.

Fig.3.2 Kirkpatrick Four-Level Model

2) Input Learning Theory

Mosher first introduced the concept of learning engagement in 1985, and he believed that learning engagement is a complex perceptual or psychological state. Skinner, on the other hand, believed that learning engagement is accompanied by a passionate emotional state and belongs to a kind of continuous learning behavior, which is caused by motivational factors such as autonomy, interest and self-efficacy of students in learning. Kuh[35] considering from the perspective of the school, believed that learning engagement is a means for the school to attract students to participate in learning. In order to develop new skills and acquire new knowledge, learners must consciously mobilize and engage their bodies and minds (i.e., cognitively, emotionally) to involve themselves in the learning situation. Bomia considers learning engagement as the willingness, need, and desire of students to personally succeed when they are involved in the learning process[36].

The Construction of Performance Evaluation Indicator System and Model of Higher Vocational English Language

This study adopts a bottom-up approach to determine the learning performance assessment index system of higher vocational English, extracts the indicators for evaluating learning inputs and learning outputs from previous literature, and determines the learning input and learning output indicators according to the specific situation of this study, and finally determines the elements of the learning performance assessment model of higher vocational English.

First of all, learning input, this study adopts the three-dimensional method of learning input for the construction of assessment indicators. After collating and analyzing the indicators of current scholars' assessment of learning input in the process of online and offline learning, the "three-dimensional and nine-degree" learning input indicators were determined, as shown in Table 3.1 below.

Table 3.1 Observational Indicators of Learner Engagement in English course

Primary Indicators	Secondary Indicators	Observation Metrics
Behavioral Engagement	Participation	Classroom Discussions, Online Platform Posts, Resource Browsing, Learning Activities
	Persistence	Persistence in Learning, Regularity
	Interaction	Interaction with Peers, Interaction with Teachers
	Focus	Classroom Attention, Learning Attention
Cognitive Engagement	Cognitive Strategies	Learning Methods, Information Processing Methods
	Metacognitive Strategies	Reflection on Learning, Learning Planning
	Management Strategies	Resource Management, Emotion Management, Time Management
Emotional Engagement	Interest	Interest in the Course, Teachers, and Instructional Content
	Identification	Identification with Learning Content

Secondly, based on Kirkpatrick model, learning output assessment indicators are constructed from four dimensions, namely, reaction layer, learning layer, behavior layer and result layer, as shown in Table 3.2 below.

Table 3.2 Observation Indicators of Learning Outcomes in English course

	Explanation	Assessment Metrics	Observation Metrics
Reaction Level	Learner Satisfaction with English course	Course Satisfaction	Course Content, Course Resources, Course Objectives
		Teacher Satisfaction	Professionalism, Teaching Attitude
Learning Level	Learner's Understanding and Mastery of Knowledge	Proficiency in Subject Knowledge	Understanding and Mastery of Knowledge
		Proficiency in Professional Skills	Mastery and Practical Application of Professional Skills
		Self-Efficacy	Perception of Own Learning Process and

Primary Indicators	Description	Secondary Indicators	Outcomes
		Perception	Outcomes
		Behavioral Changes	Changes in Learning Engagement
Behavior Level	Improvements in Behaviors as a Result of Learning	Attitude Changes	Changes in Attitudes Towards Course Content and Teachers
		Application of Knowledge	The application of knowledge
Results Level	Impact on Oneself After Learning	Academic Performance	Regular Grades, Final Grades
		Skill Enhancement	Enhancement of Collaborative Learning, Self-Directed Learning, and Communication Skills

And determine the higher vocational English performance evaluation model index weight value and higher vocational English performance evaluation index system as shown in Table 3.3 and Figure 3.3.

Table 3.3 Weighted Indicators in the Learning Performance Assessment Model for English course

	Primary Indicators	Weight for Primary Indicators	Secondary Indicators	Weight for Secondary Indicators	Overall Weight
Learning Engagement	Behavioral Engagement	0.4	Engagement	0.27	0.11
			Persistence	0.29	0.12
			Interaction	0.24	0.10
			Focus	0.20	0.08
	Cognitive Engagement	0.4	Cognitive Strategies	0.30	0.12
			Metacognitive Strategies	0.45	0.18
			Management Strategies	0.25	0.10
	Emotional Engagement	0.2	Interest	0.61	0.12
			Identification	0.39	0.08
Learning Outcomes	Reaction Level	0.15	Course Satisfaction	0.69	0.10
			Teacher Satisfaction	0.31	0.05
	Learning Level	0.30	Subject Knowledge	0.29	0.08
			Professional Skills	0.39	0.11
			Self-Efficacy Perception	0.32	0.09
	Behavior Level	0.30	Behavioral Changes	0.38	0.11
			Attitude Changes	0.40	0.12
			Application of Knowledge	0.22	0.07
	Results Level	0.25	Academic Performance	0.22	0.06
			Skill Enhancement	0.78	0.21

	Primary Indicators	Weight for Primary Indicators	Secondary Indicators	Weight for Secondary Indicators	Overall Weight
Learning Engagement	Behavioral Engagement	0.4	Engagement	0.27	0.11
			Persistence	0.29	0.12
			Interaction	0.24	0.10

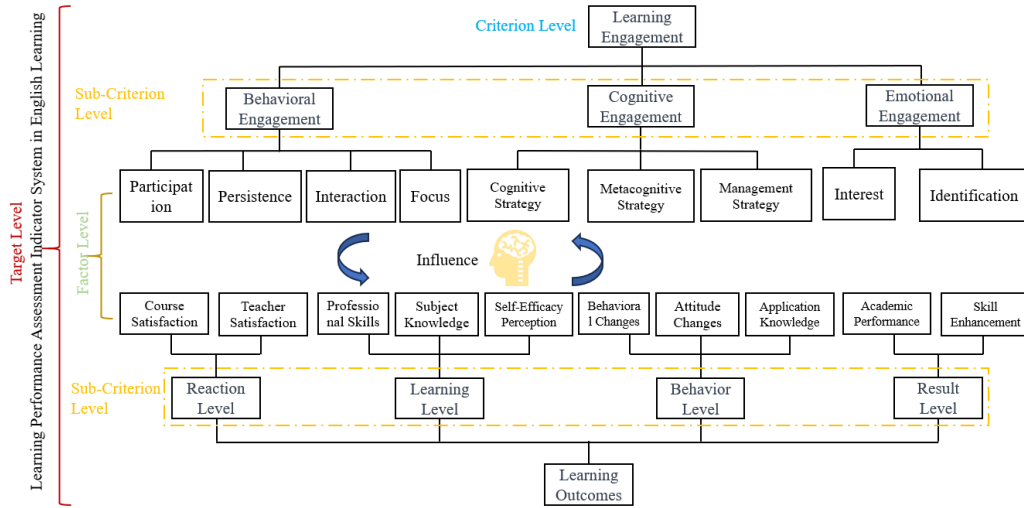| Learning Outcomes				
	Cognitive Engagement	0.4	Focus	0.20	0.08
			Cognitive Strategies	0.30	0.12
			Metacognitive Strategies	0.45	0.18
			Management Strategies	0.25	0.10
	Emotional Engagement	0.2	Interest	0.61	0.12
			Identification	0.39	0.08
	Reaction Level	0.15	Course Satisfaction	0.69	0.10
			Teacher Satisfaction	0.31	0.05
	Learning Level	0.30	Subject Knowledge	0.29	0.08
			Professional Skills	0.39	0.11
			Self-Efficacy Perception	0.32	0.09
	Behavior Level	0.30	Behavioral Changes	0.38	0.11
			Attitude Changes	0.40	0.12
			Application of Knowledge	0.22	0.07
	Results Level	0.25	Academic Performance	0.22	0.06
			Skill Enhancement	0.78	0.21

Fig.3.3 Learning Performance Assessment Indicator System in English Course

The data sources of the learning performance assessment model in this study are mainly obtained from the following two channels: first, the webpage data left by learners in the online learning platform, such as the number of postings in the discussion forum, the number of views of the learning materials in the platform, and the grades of homework submission. Second, other learning data of learners are collected through questionnaires, such as learners' offline learning input, self-

perception, self-efficacy and other relatively subjective learning data. Meanwhile, in order to more accurately assess students' learning performance, the output-based variable scale efficiency super-efficiency model is adopted for learning performance assessment, and the specific assessment model is shown in Figure 3.4.
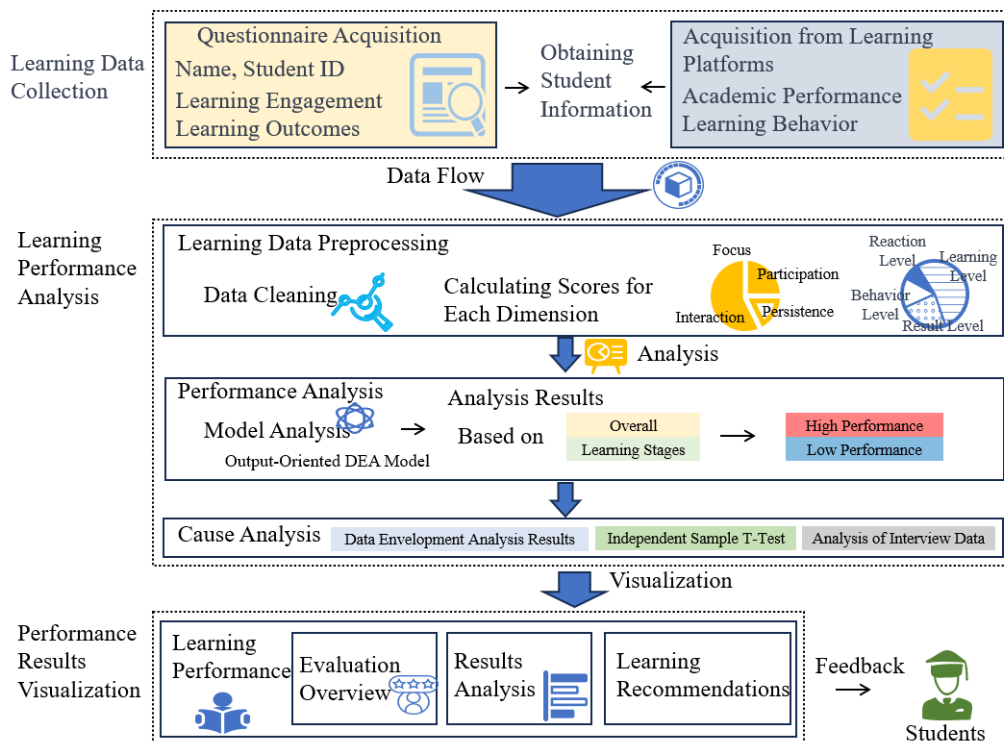

Fig. 3.4 The learning performance evaluation model of college students in English courses

4 Results and discussion

1. Overall Learning Performance Analysis

First, starting from the whole, the data of 80 learners were analyzed for learning performance as a whole. It was once determined that a whole of fifty six of the eighty newcomers had a excessive overall performance getting to know result and 24 had a low overall performance gaining knowledge of outcome. In order to in addition evaluate the full-size distinction in studying inputs and outputs between excessive overall performance inexperienced persons and low overall performance learners, an unbiased samples t-test used to be performed and the effects are proven in Table 4.1.

Table 4.1 Independent Sample T-Test Results for Overall Learning Engagement

	Mean		T-Score	p-Value
	High-Performing Learners	**Low-Performing Learners**		
Participation	3.629	3.459	0.946	0.349
Persistence	3.761	3.637	0.839	0.418
Interaction	3.651	3.482	1.181	0.256
Focus	3.623	3.369	1.361	0.200
Cognitive Strategies	3.790	3.614	1.144	0.266
Metacognitive Strategies	3.426	2.919	2.510	0.020*
Management Strategies	3.764	3.582	0.853	0.385
Interest	3.524	3.153	1.907	0.056
Identification	3.760	3.548	1.077	0.298

Note: * Represents $p<0.05$, ** Represents $p<0.01$, and so on.

From the above table, we can see that in the secondary indications of gaining knowledge of engagement, excessive overall performance freshmen and low overall performance newbies have $p=0.02<0.05$, i.e., tremendous distinction at 95% level, in the dimension of metacognitive strategies, and there is no considerable distinction in different aspects. It shows that

excessive overall performance beginners are greater adept at the use of metacognitive techniques to enhance their learning.

Table 4.2 Independent Sample T-Test Results for Overall Learning Outcomes

	Mean		T-Score	p-Value
	High-Performing Learners	Low-Performing Learners		
Course Satisfaction	3.800	3.712	0.439	0.663
Teacher Satisfaction	4.317	3.963	2.533	0.014*
Subject Knowledge	3.741	3.697	0.030	0.981
Professional Skills	3.587	3.518	0.369	0.709
Self-Efficacy Perception	3.600	3.532	0.715	0.473
Behavioral Changes	3.661	3.516	1.106	0.269
Attitude Changes	3.877	3.693	1.127	0.238
Application of Knowledge	3.985	3.822	1.021	0.312
Academic Performance	3.986	3.981	0.066	0.948
Skill Enhancement	4.125	3.981	0.681	0.500

The equal unbiased samples t-test used to be performed on the secondary indications of gaining knowledge of output and the outcomes are proven in Table 4.2. We observed that excessive performing freshmen and low performing newcomers are drastically distinct in the dimension of instructor delight at p=0.015<0.05, i.e., at the 95% level, and no longer notably specific in other areas. Teacher pleasure of excessive performing newcomers is substantially greater than that of low performing learners.

2. Learning performance analysis based on learning stages

1) Learning performance analysis at the initial stage of the course

From the Table 4.3, it can be seen that in the initial stage of the course, there are significant differences between high-performing learners and low-performing learners in seven indicators: participation dimension, interaction dimension, concentration dimension, cognitive strategy dimension, metacognitive strategy dimension, management strategy and interest dimension, which almost include all learning input indicators. No significant differences were found in any of the indicators related to learning output. This result is in line with our normal cognition, because at the beginning of the course, learners have not experienced much learning, and therefore do not show significant differences in learning outputs. However, each student will put in a different level of learning input due to personal factors and other reasons, and often the difference in the final learning outcome is reflected in this aspect.

Table 4.3 Independent Sample T-Test Results for Course Initial Stage

Course Initial Stage	Mean		T-Score	p-Value
	High-Performing Learners	Low-Performing Learners		
Participation	3.559	3.115	2.102	0.038*
Persistence	3.738	3.681	0.418	0.677
Interaction	3.658	3.220	2.459	0.02*
Focus	3.517	3.064	2.632	0.01**
Cognitive Strategies	3.820	3.194	3.651	0**
Metacognitive Strategies	3.358	2.836	2.228	0.033*
Management Strategies	3.879	3.331	2.607	0.009*
Interest	3.526	2.984	2.199	0.034*
Identification	3.657	3.546	0.474	0.637
Course Satisfaction	3.649	3.600	0.167	0.875
Teacher Satisfaction	4.048	4.122	-0.540	0.600
Subject Knowledge	3.711	3.691	0.079	0.939
Professional Skills	3.328	3.343	-0.132	0.903
Application of Knowledge	3.320	3.342	-0.134	0.898

2) Learning performance analysis in the middle stage of the course

The effects of the impartial samples t-tests for the high-performing novices and low-performing newbies in the center stage of the route are proven in Table 4.4. High-performing rookies and low-performing newcomers had substantially fewer indications of importance inside this stage than in the initial stage. There were significant differences from the low performing learners in the persistence dimension, teacher satisfaction and self-efficacy dimensions. "Persistence" characterizes learners' self-discipline and faith in learning, indicating that learners' strength of will and faith are vital

elements affecting their gaining knowledge of overall performance in the center stage of the course. In addition, "self-efficacy" is the motivation for continuous learning, and a greater experience of self-efficacy can assist freshmen to enhance their beliefs and self-discipline in learning, which in flip promotes their "persistence" in learning.

Table 4.4 Independent Sample T-Test Results for Mid-Course Stage

Mid-Course Stage	Mean		T-Score	p-Value
	High-Performing Learners	Low-Performing Learners		
Participation	3.728	3.514	0.825	0.408
Persistence	3.781	3.184	2.811	0.01**
Interaction	3.608	3.371	1.001	0.325
Focus	3.578	3.537	0.283	0.785
Cognitive Strategies	3.794	3.576	1.292	0.199
Metacognitive Strategies	3.394	2.950	1.590	0.117
Management Strategies	3.772	3.543	1.018	0.315
Interest	3.322	3.225	0.347	0.731
Identification	3.832	3.541	1.091	0.276
Course Satisfaction	3.792	3.989	1.130	0.271
Teacher Satisfaction	4.461	4.084	2.190	0.026*
Subject Knowledge	3.739	3.642	0.439	0.659
Professional Skills	3.436	3.878	-1.615	0.105
Self-Efficacy Perception	3.526	3.208	2.233	0.03*
Behavioral Changes	3.657	3.522	0.647	0.517
Attitude Changes	3.526	3.622	0.330	0.753
Application of Knowledge	344.017	3.912	-1.616	0.108
Academic Performance	3.777	3.494	0.284	0.779
Skill Enhancement	4.051	4.171	-0.797	0.430

3) Learning performance analysis at the end stage of the course

Table 4.5 shows the results of the independent samples t-test for the high performance learners and low performance learners at the end stage of the course. All the significant difference indicators between high-performing learners and low-performing learners in this stage are under the learning output dimension, indicating that by the end of the course stage, the gap between the learning input level of learners is no longer significant, and the learning output results generated by the previous learning inputs begin to show significant differences. Significant differences in the dimensions of "professional skills," "knowledge application," and "competence enhancement" correspond to just three of the three-dimensional learning goals, indicating that high-performing learners This indicates that high performance learners have basically accomplished the learning objectives. At the equal time, we can additionally locate that the imply fee of the mastering enter ratings of high-performance newcomers at the cease of the direction is decrease than that of low-performance learners, which confirms the necessity of excessive getting to know enter at the preliminary stage of the course, or else greater gaining knowledge of enter at the quit of the route may additionally now not obtain greater mastering performance.

Table 4.5 Independent Sample T-Test Results for Mid-Course Stage

Mid-Course Stage	Mean		T-Score	p-Value
	High-Performing Learners	Low-Performing Learners		
Participation	3.538	3.703	-0.964	0.337

Persistence	3.665	3.955	-1.360	0.176
Interaction	3.555	3.809	-1.088	0.281
Focus	3.716	3.592	0.658	0.512
Cognitive Strategies	3.706	3.950	-1.204	0.243
Metacognitive Strategies	3.277	3.234	0.196	0.843
Management Strategies	3.583	3.717	-0.719	0.479
Interest	3.447	3.546	-0.511	0.607
Identification	3.686	3.776	-0.582	0.568
Course Satisfaction	3.748	3.904	-1.037	0.297
Teacher Satisfaction	3.967	4.367	-2.714	0.01**
Subject Knowledge	3.692	3.909	-1.318	0.187
Professional Skills	4.101	3.420	2.665	0.01**
Self-Efficacy Perception	3.691	3.598	0.433	0.645
Behavioral Changes	3.690	3.498	1.628	0.112
Attitude Changes	3.579	3.564	0.613	0.535
Application of Knowledge	4.210	3.332	2.651	0.01**
Academic Performance	4.022	3.824	0.970	0.343
Skill Enhancement	4.256	3.887	2.405	0.02*

In summary, we discover that in the preliminary stage of the course, most of the warning signs with full-size variations between high-performing freshmen and low-performing novices belong to getting to know inputs, whilst in the stop stage of the course, the indications with full-size variations have all end up mastering outputs. This suggests that properly studying enter habits at the opening of the direction immediately have an effect on the degree of gaining knowledge of output at the give up of the course. High-performance learners' getting to know enter degree in the total studying technique is first excessive and then slowly leveled off, while the getting to know enter stage of low-performance newbies is first low and then slowly increased, and this type of slow-heating gaining knowledge of enter might also be an vital purpose for their decrease gaining knowledge of overall performance level.

5 Conclusions

This study constructed a performance assessment model of English for higher vocational education with learning data collection and learning performance analysis as the main body, assessed the English course learning performance of 80 higher vocational students through questionnaire survey method and data analysis method, sorted out and explored the salient factors affecting the level of their performance, and put forward practical suggestions on how to improve the learning performance and sense of acquisition of higher vocational students in English courses. The precise effects are as follows:

1) In the overall-based studying overall performance assessment, there is a sizable distinction between high-performing beginners and low-performing freshmen in the metacognitive method dimension, and the metacognitive method ratings of high-performing inexperienced persons are notably greater than these of low-performing learners.

2) In the preliminary stage of the course, high-performing novices scored drastically greater than low-performing novices in seven indicators, consisting of the engagement dimension, interplay dimension, attention dimension, cognitive method dimension, metacognitive approach dimension, administration approach dimension, and hobby dimension, and all of these seven warning signs are subordinate to the symptoms of gaining knowledge of engagement.

3) In the center stage of the course, high-performing freshmen scored substantially greater than low-performing novices on persistence dimension, trainer pleasure and self-efficacy dimension.

4) At the quit of the course, high-performing freshmen scored substantially greater than low-performing newbies on the trainer pleasure dimension, the expert competencies dimension, the expertise software dimension, and the competence

enhancement dimension, and all 4 of these symptoms had been subordinate to the getting to know output indicators.

The findings of this study can be applied to a wider range of scenarios to a certain extent, but the limitation is that the experimental sample is small, and it is important for the generalization of the conclusions if the sample size can be further expanded to confirm the findings of this study.

Finally, this study puts forward the following three learning suggestions, which aim to help higher vocational students improve their English learning performance and enhance their learning effectiveness.

1) "Metacognition" is a buzzword in educational psychology, and we engage in metacognitive activities every day. Metacognition is a form of higher-order thinking that involves active control of cognitive processes in the learning process. Activities such as planning how to complete a given learning task, monitoring comprehension, and evaluating progress toward task completion are essentially metacognitive activities. These activity processes help learners regulate and monitor learning. The findings that people with strong metacognitive skills tend to be more successful in cognitive activities give us new ideas for blended instruction, i.e., providing learners with knowledge of metacognitive strategies is more effective than directly teaching the content of the knowledge. After assessing the English studying overall performance of senior vocational students, this find out about determined that there is a large impact of metacognitive techniques on students' studying overall performance after the usage of the excessive and low getting to know overall performance as a classification criterion, and this phenomenon is especially vast in the sizable impact of empirical freshmen and reflective learners. Based on this, instructors of English guides can synchronize the educating of metacognitive techniques with path content material to promote learners' self-reflection and enhance studying cognition, therefore enhancing getting to know performance.

2) In psychology, there is an effect called the "primacy effect", which is commonly known as the predominance effect, and similar results were found in this study. There are significant differences between high-performing learners and low-performing learners at the beginning of the course on several indicators of learning engagement, which suggests that it is important to increase learners' learning engagement at the beginning of the course. High mastering enter at the early stage of the direction can convey greater mastering expectations to students, prompting inexperienced persons to acquire greater mastering output and mastering overall performance at the later stage of the course. Even though no distinction can be considered in the mastering output at the early stage of the course, college students with excessive enter at the preliminary stage of the path are extra probably to show off the mastering traits of high-performance studying in subsequent getting to know due to the basis and paving position of the preliminary stage of the path for subsequent learning. Teachers can information college students to expand their dedication to gaining knowledge of and arouse their activity in learning, for this reason enhancing getting to know overall performance and gaining knowledge of outcomes. Focusing on attracting learners' activity at the starting of the direction stimulates learners' motivation, so that they are greater possibly to obtain higher mastering results in subsequent mastering if they are fantastically engaged at the starting of the course.

3) Bandura considered self-efficacy to be an individual's confidence in dealing with specific tasks, challenges, and environments, believing that "learners have the ability to produce a specific level of performance that will have an impact on the events that affect their lives." Many scholars view high self-efficacy as a meaningful challenge that motivates people to engage deeply with that challenge, while low self-efficacy leads to low ambition and a tendency to give up. Strengthening students' self-efficacy develops the trait of sustained learning and influences students' effort and affective attitudes in accomplishing learning tasks during the learning process . Most research results show that self-efficacy is positively related to learners' academic performance. In other words, a strong sense of self-efficacy can lead to better learning outcomes. Self-efficacy grew to be a vast distinction indicator between high-performing and low-performing newbies in the center stage of the route in this study, and this discovering is instructive for subsequent courses. The giant distinction between high-performing freshmen and low-performing newbies modified from universal gaining knowledge of engagement at the establishing of the direction to self-efficacy at the center stage, which suggests that self-efficacy has a facilitating impact on learners' non-stop learning, which in flip improves learners' mastering overall performance and feel of achievement. Teachers can give certain feedback to stimulate learners' self-efficacy during the course, such as giving more positive evaluations to students' stage assignments, discussions on online platforms, and questions in offline courses to guide students to establish a more positive sense of efficacy; meanwhile, in order to get a better course learning effect and learning experience, students can also carry out positive self-motivation and self-suggestion to create a good psychological expectation of blended course learning.

Conflicts of Interest Statement

The authors certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-

financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

References

[1] Alliger, G. M., & Janak, E. A. (1989). Kirkpatrick's levels of training criteria: Thirty years later. Personnel psychology, 42(2), 331-342.

[2] Bates, R. (2004). A critical analysis of evaluation practice: the Kirkpatrick model and the principle of beneficence. Evaluation and program planning, 27(3), 341-347.

[3] Chang, Y. H. E. (2010). An empirical study of Kirkpatrick's evaluation model in the hospitality industry. Florida International University.

[4] Thompson, J. E., Courtney, L., & Dickson, D. (2002). The effect of neurolinguistic programming on organisational and individual performance: a case study. Journal of European Industrial Training, 26(6), 292-298.

[5] Gumuseli, A. I., & Ergin, B. (2002). The manager's role in enhancing the transfer of training: A Turkish case study. International journal of training and development, 6(2), 80-97.

[6] Kaufman, R. (1996). What works and what doesn't: Evaluation beyond Kirkpatrick. Performance and instruction, 35(2), 8-12.

[7] Phillips, J. J. (1996). ROI: The search for best practices. Training & Development, 50(2), 42-48.

[8] Piburn, M., Sawada, D., Turley, J., Falconer, K., Benford, R., Bloom, I., & Judson, E. (2000). Reformed teaching observation protocol (RTOP) reference manual. Tempe, Arizona: Arizona Collaborative for Excellence in the Preparation of Teachers, 52.

[9] Rosenberg, M. J., & Foshay, R. (2002). E‐learning: Strategies for delivering knowledge in the digital age.

[10] Mairal, J., Bach, F., Ponce, J., & Sapiro, G. (2010). Online learning for matrix factorization and sparse coding. Journal of Machine Learning Research, 11(1).

[11] Frye, R. (1999). Assessment, accountability, and student learning outcomes.

[12] Cho, H., Gay, G., Davidson, B., & Ingraffea, A. (2007). Social networks, communication styles, and learning performance in a CSCL community. Computers & education, 49(2), 309-329.

[13] Wang, T. H. (2010). Web-based dynamic assessment: Taking assessment as teaching and learning strategy for improving students'e-Learning effectiveness. Computers & Education, 54(4), 1157-1166.

[14] Chen, C. M., & Sun, Y. C. (2012). Assessing the effects of different multimedia materials on emotions and learning performance for visual and verbal style learners. Computers & Education, 59(4), 1273-1285.

[15] Natek, S., & Zwilling, M. (2014). Student data mining solution–knowledge management system related to higher education institutions. Expert systems with applications, 41(14), 6400-6407.

[16] , F., & Nolan, J. (2017). Performance appraisal in Western and local banks in China: The influence of firm ownership on the perceived importance of guanxi. The International Journal of Human Resource Management, 28(10), 1433-1453.

[17] Ellington, J. K., & Wilson, M. A. (2017). The performance appraisal milieu: A multilevel analysis of context effects in performance ratings. Journal of Business and Psychology, 32, 87-100.

[18] Huang, L., Zhang, J., & Liu, Y. (2017). Antecedents of student MOOC revisit intention: Moderation effect of course difficulty. International Journal of Information Management, 37(2), 84-91.

[19] Leong, Y. T., Lee, J. Y., Tan, R. R., Foo, J. J., & Chew, I. M. L. (2017). Multi-objective optimization for resource network synthesis in eco-industrial parks using an integrated analytic hierarchy process. Journal of cleaner production, 143, 1268-1283.

[20] Kaufman, R. (1996). What works and what doesn't: Evaluation beyond Kirkpatrick. Performance and instruction, 35(2), 8-12.

[21] Kirkpatrick, J. (2007). The hidden power of Kirkpatrick's four levels. T AND D, 61(8), 34.

[22] Kirkpatrick, J. (2009). The Kirkpatrick model: Past, present and future. Chief Learning Officer, 8(11), 20-55.

[23] Spencer, K. J., & Schmelkin, L. P. (2002). Student perspectives on teaching and its evaluation. Assessment & Evaluation in Higher Education, 27(5), 397-409.

[24] Lombardi, M. M., & Oblinger, D. G. (2007). Authentic learning for the 21st century: An overview. Educause learning initiative, 1(2007), 1-12.

[25] Astin, A. W. (1970). The methodology of research on college impact, part one. Sociology of education, 223-254.

[26] Kuh, G. D. (2001). Assessing what really matters to student learning inside the national survey of student engagement. Change: The magazine of higher learning, 33(3), 10-17.

[27] Kearsley, G., & Shneiderman, B. (1998). Engagement theory: A framework for technology-based teaching and learning. Educational technology, 38(5), 20-23.

[28] Sung, Y. T., Chang, K. E., & Liu, T. C. (2016). The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis. Computers & Education, 94, 252-275.

[29] Halverson, L. R., & Graham, C. R. (2019). Learner engagement in blended learning environments: A conceptual framework. Online Learning, 23(2), 145-178.

[30] Moseley, D., Elliott, J., Gregson, M., & Higgins, S. (2005). Thinking skills frameworks for use in education and training. British educational research journal, 31(3), 367-390.

[31] Lerman, D. C., Tetreault, A., Hovanetz, A., Strobel, M., & Garro, J. (2008). Further evaluation of a brief, intensive teacher‐training model. Journal of Applied Behavior Analysis, 41(2), 243-248.

[32] Crookes, G., & Schmidt, R. W. (1991). Motivation: Reopening the research agenda. Language learning, 41(4), 469-512.

[33] Yu, T., & Jo, I. H. (2014, March). Educational technology approach toward learning analytics: Relationship between student online behavior and learning performance in higher education. In Proceedings of the fourth international conference on learning analytics and knowledge (pp. 269-270).

[34] Carver, L., Muhkerjee, K., & Lucio, R. (2017). Correlation between grades earned and time in online courses. Online Learning Journal, 21(4).

[35] Yueh, H. P., Liang, C., & Yi, L. (2018). Influences of learning competency and e-learning implementation on learning outcomes of engineering students. The International journal of engineering education, 34(4), 1376-1383.

[36] Quadir, B., Yang, J. C., & Chen, N. S. (2022). The effects of interaction types on learning outcomes in a blog-based interactive learning environment. Interactive Learning Environments, 30(2), 293-306.