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Optimization of AI-Enhanced Project-Based Practical Teaching Path for Applied English Major in Vocational Colleges

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Abstract: This paper conducts research on the project-based practical teaching of Applied English major in higher vocational colleges based on AI enhancement. During the research process, the application of AI in constructing task scenarios, teaching evaluation, and AI-based evaluation was elaborated in detail, revealing the problems currently faced in practice, such as the lack of data, the increase in teachers' workload, and the rigidity of project evaluation standards. In response to these phenomena, a comprehensive project practice process mechanism with data as the main direction is presented. Establish a normative system for AI-based educational design; Adopt multi-disciplinary project evaluation schemes with AI elements and other solutions. It is expected to provide operational ideas and references for the optimization of practical teaching in the Applied English project in higher vocational education.

Keywords: AI enhancement; Project-based practical teaching; Applied English major in higher vocational education

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1. Introduction

With the application of artificial intelligence technology in higher vocational education, the ways of "teaching" and "learning" in the Applied English major of higher vocational colleges are undergoing profound changes quietly. Project-based practical teaching can connect with real working scenarios and promote the comprehensive application and development of language skills as well as the cultivation of professional abilities. However, the deep integration with AI technology has not yet solved some practical problems. Firstly, the goals are disconnected from the application of technology. The task settings of the project are not fully based on data, and teachers also face dual pressures of knowledge and time during the process of developing the intelligent platform. Secondly, most of its related research merely introduces technical functions or single-case studies, and systematic exploration is still insufficient. This paper takes the Applied English major in higher vocational colleges as the experimental object, analyzes the AI-enhanced intervention mechanism from the perspective of practical difficulties, and proposes operational path optimization ideas.

2. The role of AI Enhancement in the practical teaching of Applied English major projects in higher vocational colleges

By enhancing the project-based practical teaching of the Applied English major in higher vocational colleges through artificial intelligence technology, the information data of the teaching and learning activities both inside and outside the field no longer rely on the experience of teachers and students. By using learning analysis and tracking of learning process data, the weaknesses in students' language application process can be identified, assisting teachers in designing targeted project situation arrangements and implementing precise task assignments[1]. Automatic assessment tools provide multi-faceted feedback on students' oral expression, writing creation, and teamwork activities, which helps reduce teachers' marking burden and enhance the objectivity and fairness of marking. The situational conversations, simulated work scenarios, and data promotion of AI technology broaden the stage for students to practice hands-on operations and further enhance their learning and mastery of communication skills in professional contexts. The data generated from these project practice processes will continuously accumulate and be clearly presented, providing basis information for optimizing the selection of learning materials, adjusting the difficulty of tasks, monitoring the quality of courses, and improving talent cultivation plans, promoting the regular and refined management of practical teaching in applied English majors in higher vocational colleges.

3. The practical predicament of artificial intelligence-enhanced project-based practical teaching in the Applied English major of higher vocational colleges

3.1. The practical process lacks data support

In the process of promoting the project-based practical teaching of artificial intelligence enhancement for the applied English major in higher vocational colleges, the basic practical data foundation is relatively weak. Most of the teaching content remains at the level of post-class feelings and experience descriptions. There is no corresponding tracking process for the learning behavior, the execution effect of tasks, and the changes in language ability. Some teachers do not have a deep understanding of the content of the learning and analysis. At the beginning of the project design, they did not fully utilize the previous relevant materials for quantitative diagnosis. During the execution process, they did not apply effective process data collection tools. In the evaluation stage, there were no data samples for horizontal comparison. Due to reasons such as inconsistent data collection standards and non-standard indicators, this leads to significant differences in the standards of one course and one class from another. Some students may also have errors in their online diaries, offline records, and personal self-reports, resulting in "fragmented data". Some teachers are unable to accurately understand the data content presented in the system reports or identify outliers. Additionally, some students are reluctant to fill in complete data out of fear of personal privacy leakage or the complexity of filling it out, resulting in the loss of important behavioral data. As a result, the function of AI diagnosis is difficult to be maximized, and the quality monitoring of practical teaching is also hard to carry out.

3.2. The pressure on teachers' practical teaching has increased

When introducing AI-based project-based teaching into English courses in higher vocational colleges, the practical teaching pressure on teachers has gradually increased. Firstly, to achieve effective project design, it is necessary to comprehensively consider language goals, professional scenarios and technical compatibility, which greatly increases the previewing time. Moreover, daily teaching, project implementation and platform maintenance interact with each other, making the teaching process tight and prone to causing anxiety due to excessive work tension. Secondly, teachers' digital literacy is insufficient. They invest less practical effort in the selection of digital resources, the setting of parameters, and the interpretation of model outputs. Due to a lack of technical understanding, the responsiveness of the technical system is not ideal. When teachers encounter AI misjudgments or platform issues, their anxiety intensifies. Thirdly, after the introduction of AI, the school's evaluation mechanism takes the usage, innovation and presentation results of AI as the assessment criteria. As a result, teachers not only have to undertake research, management and competition guidance tasks, but also must keep the usage of technology traceable, leading to fragmented work. Fourth, the classroom organization form after the introduction of AI requires real-time monitoring of changes in platform data, the situation of students' activities, and the completion of tasks. This puts forward higher requirements for classroom control and personalized guidance, thus reducing the opportunities for self-reflection and improvement, and thus forming a practical pressure loop. The fifth issue is that the growth of the internal support system within the school has been sluggish. The boundaries of responsibilities for technical supply and educational management are unclear. There are numerous tasks related to the maintenance of technical equipment and data support. Junior teachers are burdened with a large amount of human and material resources. Many teachers are played as "subject experts", "technicians", or "project leaders" in different fields. The continuous exhaustion has led to an increasing risk of job burnout and resignation.

3.3. The evaluation methods for project-based practical teaching are monotonous

In the promotion of artificial intelligence-enhanced project-based practical teaching for applied English majors in higher vocational colleges, the evaluation methods still tend to focus on final written tests and single achievement presentations, while neglecting the task process and the value of learning data. Most courses lack evaluation criteria in aspects such as language proficiency, professional skills, collaboration ability, and problem-solving ability. In contrast, artificial intelligence mainly focuses on grading assignments and oral presentations, with the same evaluation indicators as traditional ones, and thus fails to reflect students' all-round performance. Evaluators have insufficient understanding of continuous evaluation. The observation records in classroom teaching and online logs are disconnected. There are no unified standards for on-the-job tutoring in enterprises and guidance in schools, which makes the evaluation results messy and loose. Coupled with the error rate of human voice recognition and the misjudgment rate of vocabulary in artificial intelligence tests, the test results are not genuine and trustworthy. Moreover, the feedback cycle for evaluation is long, which makes it impossible for students to understand their own strengths and weaknesses. When evaluating teachers'analyze reports, they are unable to adjust teaching plans and projects in combination with the reports due to the lack of technical support.

4. The optimization path of project-based practical teaching based on AI Enhancement for the Applied English major in Higher Vocational colleges

4.1. Establish a data-driven, project-based practice full-process system

In the project-based practical teaching link, due to the relatively weak data foundation, it is necessary to build a "data-driven" full-process system covering the early diagnosis, process monitoring and result evaluation of the project. The main body of teaching management relies on the learning analysis framework to clearly define key indicators such as learning engagement, language performance and professional ability, and pre-sets quantifiable observation points in the curriculum standards and project task books[2]. The learning engagement index can be defined:

$$SI=\frac{(w_1*T+w_2*F+w_3*Q)}{(w_1+w_2+w_3)} \quad (1)$$

Here, T represents the on-time submission rate of tasks, F represents the frequency of learning interaction, Q represents the proportion of high-quality speeches, and w1, w2, and w3 are the corresponding weight coefficients. Build a capability improvement index based on the test scores before and after the project:

$$\Delta P=\frac{(P_{post}-P_{pre})}{P_{pre}} \quad (2)$$

Among them, Ppre and Ppost are respectively recorded as the pre-test and post-test scores. The difference in the average scores between the project group and the reference group in the control experiment can be determined by the difference effect index:

$$E_g=P_g-P_{ref} \quad (3)$$

Pg and Pref respectively represent the average scores of the project group and the reference group. By collecting information such as task completion time, interaction quantity, and oral training path through learning platforms, mobile apps, and classroom sensors, as well as teacher observation records and student self-reports, a project progress process database that can be tracked is formed, providing support for subsequent model research and educational strategy research.

For instance, when a certain vocational college was conducting overseas cross-border e-commerce project teaching, it adopted the “big data + task archive” model to establish a network profile based on the results of the freshmen’s entrance examination, oral proficiency test and learning method survey, in order to complete the arrangement of group and project tasks. Among the 120 student samples, the task completion rate was approximately 93%. The average score Ppre in the pre-test of the project was 72.4 points, and the average score Ppost in the post-test was 91.2 points. These scores can be obtained by substituting them into the formula:

$$\Delta P\approx\frac{(91.2-72.4)}{72.4}\approx 0.26 \quad (4)$$

After setting up reference classes in the same period, the Pg value of the project’s later performance was recorded to be approximately 90.3 points, while the Pref of the control group was close to 78.1 points, with a difference Eg of approximately 12.2 points. Record the participation level and performance of each stage such as negotiation simulation, product promotional video arrangement, and cross-cultural communication dialogue activities in the document, and use them as the benchmark for horizontal comparison. The core indicator comparison is shown in **Table 1**.

Table 1. Comparison Table of Key Indicators before and after the project and between groups Indicator notation value

Indicator	Mark	Numerical value
The number of student samples	N	120
Task completion rate (%)	—	93.0
The average score of the pre-test	Ppre	72.4
Post-test average score	Ppost	91.2
Capacity Enhancement Index	ΔP	0.26
The average score of the project team in the post-test	Pg	90.3
The average score of the post-test of the reference group	Pref	78.1
Difference effect index	Eg	12.2

4.2. Improve the guidance mechanism for teachers' instructional design based on AI

In the process of promoting AI-enhanced practical project-based teaching for English majors in higher vocational colleges, an AI-based teacher teaching design guidance system can be constructed, and quantitative load and intelligent recommendation assistance methods can be adopted to alleviate practical pressure[3]. The teacher practice load index can be set:

$$TPFI = \frac{(a \cdot T_{prep} + b \cdot T_{maint} + c \cdot T_{support})}{(a + b + c)} \quad (5)$$

Among them, TPFI represents the comprehensive lesson preparation load index, Tprep represents the lesson preparation duration, Tmaint represents the technical debugging time, Tsupport represents the platform maintenance duration, and a, b, and c are the weight coefficients of the three types of time in different course scenarios. By continuously recording various time data and calculating the TPFI value, the teaching management entity can quantitatively grasp the work intensity in the project course design stage, providing a basis for the subsequent allocation of teaching support resources and mechanism optimization.

For instance, a certain vocational college conducted an experiment on the application of AI in teaching design guidance for English majors, selecting 24 teachers to participate and comparing the practical data before and after one semester. The results show that the average weekly project lesson preparation time per person has dropped from 6.2 hours to 4.1 hours, the number of class interruptions due to improper platform Settings has decreased from an average of 3.0 times per semester to 1.1 times, and the number of teachers who self-assess themselves as being in a "high-pressure state" has decreased from 12 to 5. The key indicators of the pilot courses are shown in **Figure 1**.

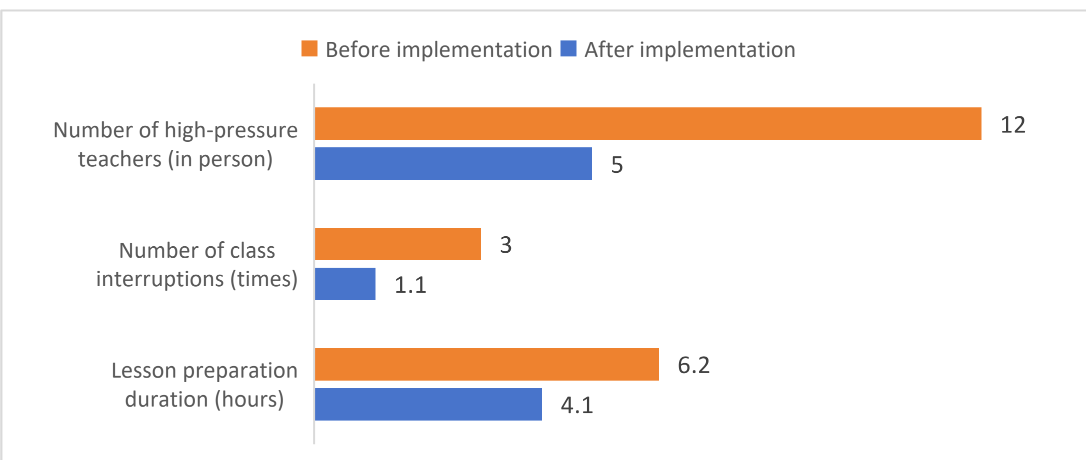


Figure 1. Key indicator Chart of the pilot course

As can be seen from **Figure 2**, with the support of the AI instructional design guidance framework, a series of issues such as teachers' course preparation, network operation management, and emotional stress have all been alleviated. Instructional design becomes more systematic and readable, and there is no need to be separately responsible for technical adjustments and data management, which is conducive to avoiding role conflicts and freeing up more time for thinking and improvement.

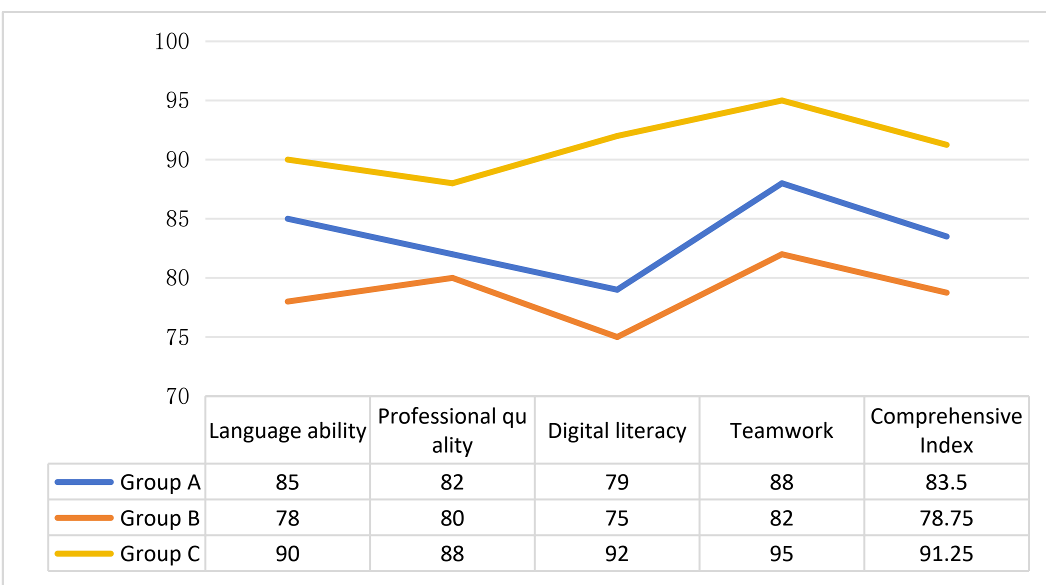
4.3. Implement a multi-disciplinary project evaluation system embedded with artificial intelligence

In view of the current single evaluation method of project-based teaching, a multi-disciplinary project evaluation system based on artificial intelligence technology can be designed, integrating elements such as language ability, professional quality, digital literacy and teamwork into a unified framework. A hierarchical scoring structure is constructed based on professional teaching objectives and job responsibilities. During the task design process, collectible data indicators, typical sample displays, and weighting factors are determined. A combined assessment and evaluation scheme of process evaluation and result evaluation is constructed through AI voice testing, text analysis, data analysis, and process recording, and a comprehensive evaluation index is set[4].

$$CI = \frac{(w_1*L + w_2*V + w_3*D + w_4*C)}{(w_1 + w_2 + w_3 + w_4)} \quad (6)$$

Here, L represents the language proficiency score, V represents the professional quality score, D represents the digital literacy score, C represents the teamwork score, and W1, W2, W3, and W4 are the corresponding weight coefficients. At the same time, an evaluation data mapping mechanism is established to convert students' performance in different projects and semesters into comparable indicators. The difference structure and progress trajectory are presented through visual boards, providing structured evidence for course iteration and path optimization. Hierarchical diagnosis is carried out based on the CI index distribution.

For instance, taking a small-scale assessment activity carried out in the evaluation section of the "English Communication + Business Decision-making + Data Presentation" part of an interdisciplinary integrated task in a certain vocational college as an example, three groups of students, totaling ninety students, received data on ability index values in four aspects: Group A's language proficiency score is L=85 points, professional quality score is V=82 points, digital literacy score is D=79 points, and teamwork score is C=88 points, corresponding to CI≈83.5. Group B: L=78 points, V=80 points, D=75 points, C=82 points, CI≈78.8; Group C: L=90 points, V=88 points, D=92 points, C=95 points, CI≈91.3. As shown in Figure 2.



	Language ability	Professional qu ality	Digital literacy	Teamwork	Comprehensive Index
Group A	85	82	79	88	83.5
Group B	78	80	75	82	78.75
Group C	90	88	92	95	91.25

Figure 2. shows the data graph of student project ability assessment

It can be found that the differences among the three groups in the dimensions of language ability and digital literacy are relatively small, while the differences in the dimension of teamwork are more prominent. The teaching team conducts a comprehensive assessment of language performance, professional judgment, digital application and cooperation ability based on the above-mentioned CI index and sub-item scores. At the same time, it combines the scoring data of enterprise mentors on the feasibility of the plan and industry logic to construct a cross-subject joint evaluation result. By comparing the differences among the three groups in terms of data utilization depth, language transfer ability and task strategy through learning and analysis models, this serves as the basis for optimizing the difficulty of later projects, the way of scene design, and personalized services for students, ensuring the formation of stable educational behaviors in the teaching process of vocational education.

5. Conclusion

This paper takes Applied English in higher vocational colleges as the research object. Through the learning, summary and reflection of the existing practical projects integrated with AI technology, problems such as the lack of sufficient data support for practical projects, increased burden on teachers, and single project evaluation have emerged. It indicates that relying solely on the original empirical learning methods and structured teaching in the classroom form cannot guarantee good learning outcomes. Propose the theory of an integrated project practice system driven by big data, and put forward the improvement method of teaching design using AI technology. Construct an AI evaluation model oriented to AI that combines multiple disciplines, and form a relatively complete solution[5]. Theoretically speaking, it can expand the understanding of "AI+ project-based practice" in higher vocational education and teaching, and provide a reliable tool for deeper exploration of quality development that enhances technological capabilities. From a practical perspective, it can serve as an effective reference for the construction of the teaching content system, the building of the teaching staff, and teaching management in higher vocational education. Subsequently, longitudinal tracking and empirical tests can be carried out in different institutions and course scenarios to further examine the applicable boundaries and effect differences of the path.

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