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The Effectiveness of a Generative AI-Based Literature Module on Motivation and Self-Efficacy among Higher Vocational Students: A Quasi-Experimental Study

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Abstract: This study focuses on applying generative AI technology in literature teaching in higher vocational colleges. It aims to explore its impact on students' motivation and self-efficacy. Using a quasi-experimental research method, 120 students from higher vocational colleges participated in the study. The experimental group received instruction through a generative AI–based module, while the control group followed a traditional teaching model for 10 weeks. Data analysis showed that the experimental group achieved significantly greater improvements in motivation and self-efficacy than the control group ($p < 0.05$), and also outperformed their own pretest results ($p < 0.05$). These findings indicate that a literature module based on generative AI can effectively stimulate the motivation of higher vocational students and enhance their self-efficacy, providing new ideas and a practical basis for reforming literature teaching in higher vocational colleges.

Keywords: generative AI; literature module; higher vocational students; motivation; self-efficacy; quasi-experimental study

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1. Introduction

As a key component of the vocational education system in China, higher vocational education plays an essential role in cultivating large numbers of highly qualified technical and skilled personnel for society [1]. With the adjustment of the economic structure and the acceleration of industrial upgrading, higher requirements have been placed on the comprehensive quality and professional competence of higher vocational students. They must not only master solid professional skills but also develop strong humanistic qualities, communication skills, and innovative capabilities to meet the ever-changing demands of society and the workplace [2]. Literature, as a foundational cultural course in higher vocational education, holds unique educational value. It not only enhances students' language proficiency—including reading, writing, and oral expression—but also cultivates their humanistic qualities, aesthetic appreciation, and overall professional competence [3]. By studying classic literary works, students gain insights into the cultural backgrounds and ideologies of different eras, broaden their horizons, and strengthen their artistic confidence. In addition, the training in writing and oral expression within literature courses helps improve students' written and spoken communication skills.

At the moment, generative AI technology is developing quickly and has become one of the most discussed innovations in the field of artificial intelligence. ChatGPT and other generative AI systems have proven to be highly effective in understanding natural language, generating coherent texts, and responding accurately to knowledge queries [4]. Based on user input, generative AI can automatically produce high-quality textual content, closely mimicking human communication patterns and providing individualized services and assistance in real time [5]. Beyond text generation, this technology demonstrates the

capacity to support interactive dialogue, adapt to different user needs, and deliver context-sensitive outputs, which makes it particularly versatile. Generative AI technology therefore holds great promise in the field of education [6]. For instance, it can equip educators with advanced teaching support tools to design personalized lesson plans, create supplementary learning resources, and grade assignments and examinations more efficiently. Such applications not only reduce teachers' workload but also enable them to focus more on guiding students' critical thinking and creativity, thereby enhancing overall teaching effectiveness.

The efficiency of Chinese literature instruction in vocational colleges is now hampered by a number of persistent issues. Traditional teaching approaches remain largely limited to teacher-centered, lecture-based strategies, which often result in low levels of student engagement and insufficient classroom interaction [7]. These methods not only reduce opportunities for active participation but also fail to spark genuine interest among students. Moreover, the instructional content is frequently restricted to textbooks, with little connection to professional practice or real-world applications, making it difficult to capture students' attention or demonstrate the practical value of literature. Another challenge lies in the evaluation system, where test scores serve as the primary criterion for assessment. Such an outcome-oriented approach places undue emphasis on final results while neglecting individual differences and the learning process itself. Consequently, this narrow focus hinders the development of students' holistic qualities, such as creativity, cultural appreciation, and critical thinking skills [8,9].

In this context, generative AI technology presents a novel and practical method for addressing the challenges of Chinese literature instruction in vocational colleges. By leveraging this technology, educators can design personalized instructional modules that offer a wide variety of resources and activities tailored to the specific learning needs, interests, and characteristics of students. Such individualized learning pathways have the potential to enhance motivation and increase classroom participation. In addition, the intelligent tutoring functions of generative AI can deliver real-time feedback, targeted guidance, and adaptive support, helping students to overcome learning difficulties more effectively. These timely interventions not only boost students' confidence but also strengthen their sense of achievement, thereby improving self-efficacy and fostering a more positive attitude toward literature learning. Ultimately, the integration of generative AI into literature teaching offers a promising avenue for improving teaching quality and cultivating well-rounded students equipped with both professional competence and humanistic qualities.

2. Literature Review

2.1. Applications of Generative AI

Some studies employ generative AI to develop intelligent teaching systems that generate individualized learning content and exercises based on students' performance [10]. For example, intelligent math tutoring systems can detect knowledge gaps from students' responses and deliver targeted exercises and explanations, resulting in more personalized education. Generative AI can also create virtual learning environments, offering students immersive and intuitive learning experiences [11]. In language learning, for instance, it can simulate real-world communication scenarios, engage students in conversational practice, and enhance their language proficiency. Moreover, generative AI can produce a variety of educational resources, such as digital courseware, instructional videos, and supplementary materials, to enrich teaching content [12]. It can further integrate and categorize large volumes of educational information automatically, enabling teachers and students to retrieve resources efficiently and thus improving teaching and learning effectiveness.

Existing research on the impact of generative AI on motivation and self-efficacy among higher vocational students presents several limitations. First, most studies focus

on primary and secondary school students or students from regular universities, while research specifically focusing on higher vocational students remains scarce. Second, research methods are often limited to theoretical discussions or small-scale case studies, with a lack of large-sample empirical investigations that could provide more generalizable evidence. Third, the research content tends to emphasize the technical applications of generative AI, while insufficient attention has been given to exploring the mechanisms through which it influences students' psychological factors and learning behaviors. To address these gaps, the present study examines the effects of a generative AI-based literature module on higher vocational students' motivation and self-efficacy. By employing a quasi-experimental research method, this study seeks to gain deeper insights into the mechanisms of impact, thereby providing empirical evidence to complement and extend existing research [13].

3. Research Methods

3.1. Research Design

This study adopted a quasi-experimental research design. Quasi-experimental research seeks to approximate the conditions of a true experiment as closely as possible when it is not feasible to fully control all extraneous variables. It typically involves pretest and posttest comparisons between experimental and control groups to assess the effects of an intervention. In this study, 120 students from higher vocational colleges were selected as participants and were randomly assigned to either the experimental group or the control group, with 60 students in each group. The experimental group received instruction through a literature module designed with generative AI, whereas the control group was taught using a traditional teaching model. The instructional period for both groups lasted for 12 weeks.

3.2. Teaching Materials

3.2.1. Experimental Group

The experimental group used a literature module developed with generative AI technology. This module included the following functions:

Intelligent Text Explanation: The system could generate detailed explanations of the text content, including vocabulary definitions, sentence translations, and literary appreciation, and present them to students in vivid and engaging forms such as animations, videos, and audio materials.

Personalized Writing Tutoring: The module provided individualized writing guidance and suggestions based on students' writing abilities and needs. Students' essays were corrected in real time, with grammatical errors, logical issues, and stylistic problems identified. Revision plans and exemplary writing samples were also offered for reference.

Poetry Appreciation Interaction: Generative AI technology created interactive scenarios for poetry appreciation. Students could engage in simulated conversations with virtual poets, gain deeper insights into the creative background and artistic conception of poems, and thus improve their knowledge and appreciation of poetry [14].

Learning Progress Tracking and Feedback: The module allowed real-time monitoring of students' learning progress and status. It generated detailed reports and feedback, enabling students to understand their strengths and weaknesses and adjust their learning strategies in a timely manner.

3.2.2. The Control Group

The control group received instruction using traditional university Chinese textbooks and conventional teaching methods. Teachers mainly conducted lectures based on the textbook content, including activities such as reading aloud, vocabulary explanation, and article analysis [15]. Writing tasks were assigned as homework, which teachers sub-

sequently graded and returned with basic feedback. In addition, the control group followed a fixed schedule of classroom discussions and teacher-led explanations, with learning outcomes primarily evaluated through periodic quizzes and final examinations. This approach emphasized knowledge acquisition through memorization and teacher instruction, offering limited opportunities for interactive learning or individualized support.

3.3. Research Process

Before the intervention began, students in both the experimental and control groups were administered the Motivation and Self-Efficacy Scales. Before the test, the purpose and requirements were explained to ensure that students completed the questions carefully. The test lasted 30 minutes. After completion, the scales were promptly collected, and the data were compiled and entered.

Experimental Group: Teachers in the university Chinese course guided students in learning using the generative AI-based module. At the beginning of the course, teachers introduced the module's functions and usage to familiarize students with the interface. Throughout the course, teachers guided students through various module features (e.g., intelligent text explanation and personalized writing tutoring) according to the teaching schedule and students' learning progress. Additionally, teachers monitored students' learning through the module's backend system and provided timely guidance and assistance.

Control Group: Teachers taught according to the traditional teaching model, using textbooks and blackboards, assigning and grading homework, and conducting regular exams. Teachers focused on delivering and explaining knowledge, guiding students in classroom discussion and reflection.

3.4. Data Collection and Analysis

Data from both the pretest and posttest were compiled, coded, and analyzed using SPSS 28.0. Descriptive statistics were first employed to summarize students' overall performance on the Motivation and Self-Efficacy Scales. Paired-sample t-tests were conducted to compare pretest and posttest results within each group, while independent-sample t-tests were used to examine differences between the experimental and control groups. Statistical significance was set at $p < 0.05$. This combination of descriptive and inferential analyses ensured a comprehensive evaluation of the effects of the generative AI-based literature module on students' motivation and self-efficacy.

4. Research Results

4.1. Descriptive Statistics

As shown in Figure 1, regarding motivation, the experimental group's mean score on the pretest was 3.11, which increased to 3.55 on the posttest. In contrast, the control group's mean score was 3.28 on the pretest and 3.27 on the posttest, showing almost no change. Regarding self-efficacy, the experimental group's pretest mean was 3.21, which increased to 3.71 on the posttest. The control group's pretest mean was 3.30, increasing only slightly to 3.42 on the posttest.

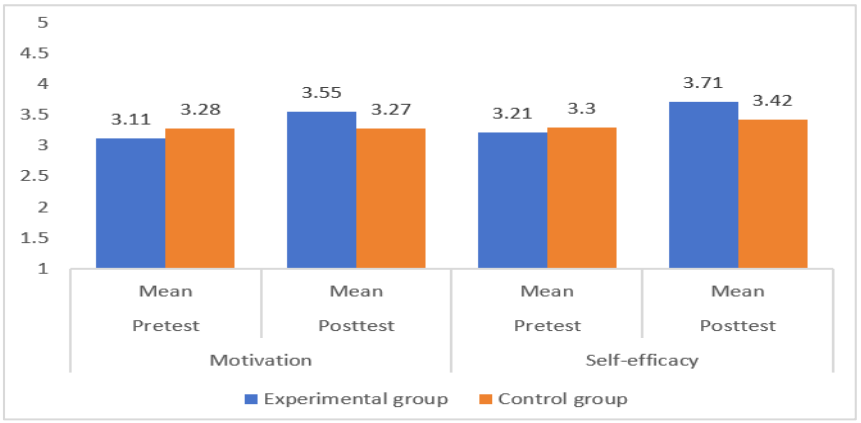

Figure 1. Descriptive Analysis of Motivation and Self-Efficacy.

4.2. Pretest Difference Test

Figure 2 shows that, for motivation, $t = 1.835$, $p > 0.05$, and for self-efficacy, $t = 0.911$, $p > 0.05$. These results indicate that there was no significant difference between the two groups in the pretest.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Motivation Pretest	Equal variances assumed	1.098	.297	1.835	117	.069	.17395	.09477	-.01374	.36165
	Equal variances not assumed			1.838	115.143	.069	.17395	.09466	-.01354	.36145
Self-Efficacy Pretest	Equal variances assumed	.126	.724	.911	117	.364	.08637	.09475	-.10129	.27402
	Equal variances not assumed			.911	116.273	.364	.08637	.09480	-.10140	.27413

Figure 2. Independent Samples Test of Pretest.

4.3. Posttest Difference Test

Figure 3 shows that for motivation, $t = -3.465$, $p \leq 0.05$, and Cohen's $d = 0.64$; for self-efficacy, $t = -3.181$, $p \leq 0.05$, and Cohen's $d = 0.57$. This indicates that the posttest scores of the experimental group were significantly higher than those of the control group, and a moderate intervention effect was observed.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Motivation Posttest	Equal variances assumed	.010	.921	-3.465	117	.001	-.27805	.08024	-.43697	-.11913
	Equal variances not assumed			-3.465	116.887	.001	-.27805	.08025	-.43699	-.11911
Self-Efficacy Posttest	Equal variances assumed	.473	.493	-3.181	117	.002	-.29429	.09251	-.47751	-.11107
	Equal variances not assumed			-3.176	112.868	.002	-.29429	.09265	-.47785	-.11073

Figure 3. Independent-Samples t Test of Posttest.

4.4. Paired Samples T-Test

As shown in Figure 4, analyses were conducted on 59 paired cases per group due to incomplete responses; the experimental group exhibited a significant improvement in motivation ($t = -6.317$, $p < 0.05$, Cohen's $d = 0.89$), and pre- versus posttest self-efficacy also differed significantly ($t = -5.608$, $p < 0.05$, Cohen's $d = 0.91$). In contrast, the control group showed no significant differences in motivation scores ($t = 0.477$, $p > 0.05$) or in pre- and posttest self-efficacy scores ($t = -1.249$, $p > 0.05$). These findings further support the effectiveness of the generative AI-based literature module.

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Differences				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 Experimental Group Motivation Pretest – Posttest	-.43644	.53068	.06909	-.57474	-.29814	-6.317	58	.000
Pair 2 Experimental Group Self-Efficacy Pretest – Posttest	-.52102	.71357	.09290	-.70697	-.33506	-5.608	58	.000
Pair 3 Control Group Motivation Pretest – Posttest	.02034	.32736	.04262	-.06497	.10555	.477	58	.635
Pair 4 Control Group Self-Efficacy Pretest – Posttest	-.12068	.74202	.09660	-.31405	.07269	-1.249	58	.217

Figure 4. Paired-Samples t Tests for the Experimental and Control Groups.

5. Discussion

The findings suggest that generative AI can provide appropriate learning content and suggestions based on students' learning progress and characteristics, thereby satisfying their autonomous learning needs and stimulating their intrinsic motivation. In addition, intelligent feedback and interactive features enable students to understand their learning progress in a timely manner, gain successful learning experiences, enhance their competence, and improve their self-efficacy.

Compared with existing research, the results of this study are consistent with findings from studies on the impact of intelligent teaching systems on motivation and self-efficacy. However, by focusing on the application of generative AI in Chinese literature instruction at vocational colleges, this study provides more targeted and practical evidence. Furthermore, using a quasi-experimental design, this study partially controlled for confounding variables, strengthening the reliability and validity of the findings.

The results of this study have important practical implications for the reform of Chinese literature teaching in higher vocational colleges. First, schools and teachers should actively introduce generative AI technology and develop university Chinese literature teaching modules suitable for higher vocational students, providing them with more personalized and intelligent learning support. Second, teachers should fully leverage the auxiliary role of generative AI in the teaching process, guiding students to use teaching modules appropriately, closely monitoring students' feedback, adjusting teaching strategies, and improving teaching effectiveness. Finally, schools can conduct relevant teacher training activities to enhance teachers' ability to use generative AI technology in teaching.

6. Conclusion

Through a quasi-experimental study, the present research validated the effectiveness of a generative AI-based literature module in enhancing motivation and self-efficacy

among higher vocational students. It offers new insights and practical evidence for reforming Chinese literature teaching in higher vocational education. The findings suggest that institutions should introduce generative AI technology to optimize literature teaching models and improve students' learning outcomes and overall competence. Future research could further investigate application strategies and effects of generative AI in higher vocational education, providing additional theoretical support and practical guidance for the development of information-based and intelligent teaching in this context.

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