Construction and Application of a Dynamic Assessment Model for College English Writing Based on CSE Empowered by Digital Intelligence

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Abstract: Aiming at the problems existing in current college English writing assessment, such as ambiguous dimensions, delayed feedback, inaccurate competence positioning, and excessive subjectivity, this study constructs a digital-intelligent empowered dynamic assessment model for college English writing based on the *China's Standards of English Language Ability* (CSE), integrating the requirements of CSE and the trend of digital-intelligent education reform. The model fuses digital-intelligent technologies including Natural Language Processing (NLP) and big data analysis, with CSE's writing proficiency grading standards as the core, to achieve quantitative assessment dimensions, dynamic assessment processes, personalized feedback, and precise interventions. A one-year teaching experiment was conducted in the experimental class, comparing writing scores, competence improvement rates, and learning satisfaction between the experimental group and the control group to verify the model's effectiveness and practicality. The results show that the model can significantly improve students' core literacy in English writing, optimize teachers' assessment efficiency, standardize assessment standards, and provide theoretical support and practical paths for the reform of college English writing teaching and digital-intelligent assessment practice in institutions of higher education.

Keywords: digital intelligence empowerment; CSE; college English writing; dynamic assessment; model construction

1. Introduction

1.1 Research Background

With the in-depth progression of digital-intelligent transformation in higher education and the comprehensive implementation of China's Standards of English Language Ability (CSE), college English writing instruction has encountered both unprecedented development opportunities and formidable challenges. Writing, as a fundamental English language output skill, serves as a pivotal indicator for assessing students' comprehensive English proficiency and constitutes a critical yet challenging aspect of college English teaching reform.

At present, the predominant mode of college English writing assessment in China adheres to the traditional paradigm of "summative assessment coupled with single-teacher scoring." Despite its operational simplicity, this model is fraught with notable deficiencies.

Traditional college English writing assessment in China is plagued by a range of interrelated deficiencies: it adopts a notably narrow assessment scope, focusing predominantly on basic errors like grammar and spelling while overlooking critical dimensions such as discourse logic, cultural adaptability, and pragmatic norms that are integral to the CSE grading criteria; it employs a static evaluation mechanism, basing scores solely on the final output of a single writing task and thus failing to dynamically monitor students' writing ability progression or identify their latent developmental potential; it suffers from delayed feedback provision, with students typically waiting 1-2 weeks for teacher feedback that often centers on scores rather than offering specific, targeted improvement suggestions, thereby impeding timely error correction; and it is characterized by a subjective scoring process, where a single teacher's scoring is influenced by personal teaching experience and evaluation standards, leading to low scoring consistency and posing significant challenges to ensuring the objectivity and fairness of assessment outcomes.

1.2 Research Significance

The "Opinions of the Ministry of Education on Accelerating the Construction of High-Level Undergraduate Education and Comprehensively Improving Talent Training Capacity" explicitly advocates for the profound integration of information technology into educational practices, the establishment of smart classrooms and campuses, and the enhancement of teaching quality. The rapid advancement of digital-intelligent technologies provides a viable technical foundation for addressing the predicaments inherent in traditional writing assessment methodologies. As China's inaugural English proficiency grading standard, the CSE delineates explicit writing ability requirements across various proficiency levels, thereby offering a scientific theoretical framework and grading basis for writing assessment.

Against this backdrop, this study is firmly grounded in the actual context of college English teaching, aiming to construct a dynamic assessment model through the deep integration of digital-intelligent technologies with CSE grading standards. By leveraging intelligent tools, the model endeavors to realize a closed loop of "assessment-feedback-intervention" within the writing assessment process, thereby resolving the issues of staticity, subjectivity, and laggingness in traditional assessment approaches. It assists students in enhancing their writing abilities in alignment with CSE requirements and fosters the digital-intelligent reform and high-quality development of college English writing instruction.

2. Literature Review
2.1 Researches abroad
Foreign research on second language writing assessment began early and now has a fairly well-developed system. It mainly centers on two key areas: creating intelligent assessment tools and applying dynamic assessment theories, offering valuable insights for this study.[1]When it comes to intelligent writing assessment tools, foreign experts have created notable automated systems using cutting-edge tech. The e-rater system by ETS stands out. It uses NLP and large English language databases to automatically grade writing tasks in tests like TOEFL and GRE. [2]It evaluates factors such as vocabulary variety, grammar correctness, and text organization, with an accuracy rate over 85%, and is widely adopted in standardized tests.As for dynamic assessment theory, foreign studies mainly focus on the "interactive dynamic assessment" model. Put forward by scholars like Lantolf, this model stresses uncovering students' hidden writing abilities through teacher-student and peer interactions, and offers tailored support to aid students' progress. Yet, most foreign research in this field is theoretical or involves small-scale trials, lacking in-depth integration with digital-intelligent technologies.[3]
2.2 Researches at home
Domestic research on college English writing assessment began later but has advanced quickly in recent years, thanks to the introduction of CSE and digital-intelligent education reforms. It focuses on three main areas, yet still has many shortcomings.In combining CSE with writing assessment, scholars mainly explore CSE writing ability definitions and build assessment indicator systems. Some have proposed frameworks or defined core constructs, but these systems are mostly manual, inefficient, and lack digital integration, resulting in low scoring consistency. For intelligent writing assessment tools, domestic scholars have created tools like JuKu PiGai Wang and iWrite for Chinese students. [4]These can accurately spot basic errors and offer simple fixes, but most fail to align with CSE standards or track student progress dynamically, hindering personalized assessment.In applying dynamic assessment theories, most research remains theoretical or involves small trials. Some have looked into its feasibility in teaching, but these efforts are mainly manual, lack digital integration, and overlook CSE's guiding role.[3]
2.3 Innovations of this study
This study's innovations are reflected in three aspects: first, theoretical innovation, deeply integrating CSE grading standards with dynamic assessment theories to build a closed-loop assessment framework of "competence dimension decomposition-level precise matching-dynamic tracking and intervention", breaking the limitations of traditional assessment; second, technical innovation, developing an intelligent assessment module integrating digital-intelligent technologies and CSE, optimizing NLP algorithms to realize quantitative assessment of abstract dimensions like discourse logic, solving the problems of single dimensions and insufficient accuracy of existing tools; third, practical innovation, creating a teaching model of "digital-intelligent tool automatic assessment+teacher targeted intervention+student autonomous improvement", realizing personalized learning path recommendation through a dynamic competence tracking database, adapting to large-class teaching needs.

3. Research Methods and Research Design
This study aims to construct a digital - intelligent empowered dynamic assessment model for college English writing based on China's Standards of English Language Ability (CSE) and verify its effectiveness and practicality through teaching practice. The specific objectives encompass building a CSE - based dynamic assessment indicator system for college English writing to precisely connect with CSE standards and clarify quantitative criteria; integrating digital - intelligent technologies to develop an intelligent assessment module and a dynamic tracking database for real - time, precise, and dynamic writing assessment; verifying the model's impact on improving students' writing ability, optimizing teachers' assessment efficiency, and standardizing assessment standards via teaching experiments; and optimizing the model and tools to form a complete practical plan to support college English writing teaching reform.

In terms of research objects, 160 non - English major freshmen from Jiamusi University were randomly divided into an experimental group and a control group (80 students each). Both groups had similar average English scores in the college entrance examination, received the same basic college English writing teaching after enrollment, and showed no significant difference (P > 0.05), ensuring the experiment's fairness and effectiveness. The experimental group adopted the constructed dynamic assessment model for writing teaching and assessment, while the control group used the traditional "summative assessment + single teacher scoring" model. The two groups had the same teaching content, progress, and teachers over a one - year experimental cycle.

To ensure scientificity and rigor, multiple research methods were employed. The literature research method systematically sorted out domestic and foreign literature in areas such as CSE application, college English writing assessment, digital - intelligent education technology, and dynamic assessment theory, providing theoretical support and method reference for model construction. The action research method took "design - implementation - observation - reflection" as a cycle to dynamically optimize the assessment model and intelligent tools in teaching practice, adjusting assessment indicators, algorithms, and feedback mechanisms based on student and teacher feedback. The experimental comparison method

verified the model's effectiveness through a comparative experiment, including baseline and summative writing tests and statistical analysis

The core research tools included a CSE - based digital - intelligent empowered dynamic assessment system for college English writing with functions like an intelligent assessment module, a dynamic tracking database, and a personalized feedback module; writing test papers (baseline and summative) of the same difficulty designed according to CSE Level 4 - 5 writing requirements and covering common genres; satisfaction questionnaires (student and teacher versions); and interview outlines for semi - structured interviews with students and teachers.

4. Construction of the Digital-Intelligent Empowered Dynamic Assessment Model for College English Writing Based on CSE

The constructed model took CSE writing proficiency grading standards as the core, digital - intelligent technologies as the support, and the "assessment - feedback - intervention" closed loop as the goal. It consisted of four core levels: the indicator system layer, digital - intelligent technology layer, dynamic assessment layer, and feedback intervention layer, which were interrelated and synergistic to achieve precise, dynamic, and personalized writing assessment. The basic principles of model construction included the CSE Standard Compliance Principle, ensuring assessment dimensions and quantitative standards strictly followed CSE requirements; the Digital - Intelligent Integration Principle, leveraging digital - intelligent technologies for automatic data collection, analysis, and feedback; the Dynamic and Developmental Principle, focusing on tracking students' writing ability changes and adjusting assessment data and suggestions; and the Comprehensiveness and Targeted Principle, covering core CSE dimensions and providing personalized feedback and intervention. The core structure and functions of the model included the CSE - Based Dynamic Assessment Indicator System for Writing at the indicator system layer, an intelligent assessment and data processing support layer integrating technologies like NLP, big data analysis, and artificial intelligence, and an integrated "Process - Oriented + Summative" Assessment layer that combined real - time process - oriented assessment with periodic summative assessment.

5. Model Practice Verification and Result Analysis

5.1 Experimental Process

Before the experiment (Week 1), a baseline writing test (300-word argumentative essay) was conducted, with no significant difference in initial scores between the two groups (P>0.05). During the experiment (Weeks 2-52), the experimental group used the dynamic assessment model for real-time feedback, autonomous revision, and monthly group tutoring, while the control group adopted traditional manual assessment with semester-based process tests. After the experiment (Week 53), a summative test was carried out, and satisfaction questionnaires and semi-structured interviews were conducted.

5.2 Experimental Result Analysis

1. Comparative Analysis of Writing Scores

After the experiment, statistical analysis was conducted on the baseline test scores and summative test scores of students in both groups. The specific data are shown in the following table:

Group	Sample Size	Baseline Test Average Score (Points)	Summative Test Average Score (Points)	Average Score Improvement (Points)	Improvement Rate (%)	Standard Deviation of Summative Test Scores
Experimental Group	80	62.3	78.6	16.3	26.2	5.8
Control Group	80	61.8	68.9	7.1	11.5	6.3

Table1: Comparative Analysis of writing scores of the baseline test and summative test

An independent samples t-test was performed on the summative test scores of the two groups using SPSS 26.0. The results showed that $t=9.236$ and $P<0.05$, indicating a statistically significant difference between the two groups. This demonstrates that the improvement in writing scores of students in the experimental group was significantly higher than that in the control group, verifying the effectiveness of the model in enhancing students' writing ability.

In terms of CSE level distribution, the changes in the level distribution of students in both groups before and after the experiment are shown in the following table:

CSE Level	Experimental Group (Pre-Experiment)	Experimental Group (Post-Experiment)	Control Group (Pre-Experiment)	Control Group (Post-Experiment)
Level 3 and Below	8 students (10%)	2 students (2.5%)	7 students (8.75%)	12 students (15%)
Level 4	52 students (65%)	14 students (17.5%)	51 students (63.75%)	34 students (42.5%)
Level 5	16 students (20%)	48 students (60%)	18 students (22.5%)	29 students (36.25%)
Level 6	4 students (5%)	12 students (15%)	4 students (5%)	2 students (2.5%)
Proportion of Level 4 and Below	75%	20%	73%	58%
Proportion	25%	80%	27%	42%

CSE Level	Experimental Group (Pre-Experiment)	Experimental Group (Post-Experiment)	Control Group (Pre-Experiment)	Control Group (Post-Experiment)
of Level 5 and Above				

<div align="center">Table2: CSE level distribution of students in pre-experiment and post-experiment</div>

2. Comparative Analysis of Assessment Efficiency
A comparison of the assessment time spent by teachers in the two groups yielded the following specific data:

Assessment Link	Time Spent by Teachers in the Experimental Group	Time Spent by Teachers in the Control Group	Efficiency Improvement Rate (%)
Time per Writing Task Correction (minutes/piece)	5	20	75
Total Monthly Time for Assessment and Tutoring (hours)	8	32	75
Total Semester Time for Summative Test Correction (hours)	4	16	75
Total Annual Time for Assessment and Tutoring (hours)	40	160	75

<div align="center">Table 3: Comparative Analysis of Assessment Efficiency</div>

The data shows that the average time spent by teachers in the experimental group to correct one student's writing task was only 1/4 of that in the control group, and the total monthly time spent was also 1/4 of that in the control group, with an assessment efficiency improvement of over 75%. This indicates that the model can significantly optimize teachers' assessment efficiency, reduce their workload, and allow teachers to devote more time to teaching and tutoring.

3. Satisfaction Survey and Interview Analysis
(1) Student Satisfaction Survey Data
The satisfaction survey results of 80 students in the experimental group are shown in the following table:

Survey Dimension	Very Satisfied (%)	Satisfied (%)	Average (%)	Dissatisfied (%)	Overall Satisfaction (Very Satisfied + Satisfied) (%)
Timeliness of Assessment Feedback	85	13	2	0	98
Targeted Nature of Assessment Feedback	82	15	2	1	97
Effectiveness in Identifying Ability Shortcomings	78	19	3	0	97
Practicality of Dynamic Tracking Function	75	20	4	1	95
Help with CSE Level Alignment	82	16	2	0	98
Overall User Experience	80	18	2	0	98

<div align="center">Table 4: Student Satisfaction Survey Data</div>

The results of the student satisfaction survey showed that 80% of the students in the experimental group were "very satisfied" with the overall user experience of the model, 18% were "satisfied", with an overall satisfaction rate of 98%; 78% of the students believed that the personalized feedback of the model could effectively help them identify their writing shortcomings, 75% of the students thought that the dynamic tracking function could clearly show the process of their ability improvement, and 82% of the students believed that the model could help them better improve their writing ability in line with the CSE level requirements.

(2) Teacher Satisfaction Survey Data
The satisfaction survey results of the 2 participating teachers are shown in the following table:

Survey Dimension	Very Satisfied (%)	Satisfied (%)	Average (%)	Dissatisfied (%)
Improvement in Assessment Efficiency	100	0	0	0

Standardization of Assessment Criteria	100	0	0	0
Objectivity of Assessment Results	100	0	0	0
Support for Personalized Teaching	100	0	0	0
Ease of System Operation	90	10	0	0
Overall Application Effect	100	0	0	0

Table 5:Teacher Satisfaction Survey Data

The results of the teacher satisfaction survey and interviews showed that both participating teachers were "very satisfied" with the overall application effect of the model. They believed that the model not only improved the assessment efficiency but also accurately reflected the changes in students' writing ability, providing strong support for personalized teaching; at the same time, the teachers believed that the intelligent assessment module of the model could effectively reduce the subjective errors of manual assessment, standardize the assessment criteria, and improve the objectivity and consistency of the assessment results.

During the interviews, a range of insightful perspectives emerged from both students and teachers, which hold significant implications for the refinement of the digital - intelligent empowered dynamic assessment model for college English writing.Some students brought to light that the intelligent assessment system, while demonstrating considerable potential, still faces challenges in accurately identifying pragmatic errors. Pragmatics, by its very nature, delves into the complex interplay between language and context, encompassing aspects such as speech acts, implicature, and politeness principles. In the realm of English writing, students may inadvertently commit pragmatic errors due to the influence of their native language culture or a lack of in - depth understanding of English - speaking cultures. For instance, they might use overly direct expressions that are considered impolite in English communication, even though the grammar of the sentences is correct. The current intelligent assessment system, despite its advanced algorithms, may struggle to fully grasp these subtle cultural and contextual nuances, resulting in inaccurate identification of pragmatic errors. This limitation can potentially mislead students, as they may receive incorrect feedback on their writing, hindering their ability to improve their pragmatic competence in English writing.

Moreover, students expressed the desire for more specific personalized feedback suggestions. Personalized feedback is crucial for effective learning as it addresses the individual needs and weaknesses of each student. However, the existing system may provide rather general feedback, such as "improve your pragmatic expressions" without offering detailed guidance on how to do so. For example, if a student has difficulty in using appropriate politeness markers in formal writing, the system should not only point out this issue but also provide specific examples of correct usage and suggest relevant learning resources. The lack of specificity in feedback can make it challenging for students to take targeted actions to enhance their writing skills, thereby limiting the overall effectiveness of the assessment model.

6. Research Conclusions

The constructed model realizes the deep integration of CSE standards and digital-intelligent technologies, effectively solving the problems of traditional assessment and achieving precise, dynamic, and personalized assessment. The model significantly improves students' core English writing literacy and CSE levels, with greater score and level improvement in the experimental group. The model optimizes teachers' assessment efficiency, reduces workload, standardizes standards, and supports personalized teaching, improving teaching quality. The model is practical and operable, suitable for large-scale promotion in Jiamusi University and similar colleges in Heilongjiang Province.

REFERENCES

[1]. Ministry of Education. China Standards of English Ability [M]. Beijing: Higher Education Press, 2018.
[2]. Ministry of Education. Opinions of the Ministry of Education on Accelerating the Construction of High-Level Undergraduate Education and Comprehensively Improving Talent Training Capacity [Z]. 2018.

[3]. Deng J, Deng H. A Study on the Writing Strategy Framework Based on the China Standards of English [J]. Foreign Language Teaching Theory and Practice, 2017(3): 1-7.

[4]. Zou S Y, Pan M W. The Definition of the Construct of Writing Ability in the China Standards of English [J]. Foreign Language World, 2018(2): 2-9.

[5]. Li, L., & Gao, X. Y. (2023). A study on the intervention model of introduction writing in academic papers for master's students in English education from the perspective of dynamic assessment. Journal of PLA University of Foreign Languages, (3), 26-34.

[6]. Zhu, X. C., & Liu, H. N. (2024). Research on the application path of ChatGPT in foreign language process-genre writing teaching. Technology Enhanced Foreign Language Education, (6), 30-36, 109.