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Construction and Practical Exploration of Learner Self-Evaluation System Based on AIGC Environment

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Abstract: With the large-scale application of AIGC in the education field, traditional learners' self-evaluation is difficult to adapt to digital learning needs due to fixed standards, missing data, and lagging feedback. This article is based on the Guiding Opinions of the Ministry of Education on Strengthening the Digitization of Education in the New Era in 2023, combined with AIGC's natural language processing and data mining capabilities, and using literature research and teaching practice summary as methods, to explore the logic and path of constructing a self-evaluation system in the AIGC environment. Clarify the core connotation of "data-driven+self reflection", analyze the four dilemmas of traditional evaluation standards, data, feedback, and subjectivity, propose a five in one framework, design tool selection to process implementation, and propose optimization directions based on teaching feedback. AIGC can automatically collect data throughout the entire process and generate personalized feedback in real-time, improving the objectivity and timeliness of evaluation, providing practical solutions for the digital reform of educational evaluation, and also providing reference for the practice of independent evaluation in primary and secondary schools and universities.

Keywords: AIGC, Learner self-evaluation, digitalization of education, data-driven evaluation, and construction of evaluation system.

1. Introduction

The Guiding Opinions on Strengthening the Digitization of Education in the New Era, issued by the Ministry of Education in 2023, explicitly proposes the use of artificial intelligence technology to build a personalized education evaluation system, providing policy support for the integration of AIGC and education evaluation. Currently, ChatGPT、 AIGC tools such as iFlytek Spark and Chaoxing Learning Intelligent Analysis Module have been implemented in knowledge point assessment and learning behavior tracking scenarios, creating conditions for solving traditional self-evaluation problems.

Self evaluation by learners is a core component of self-directed learning, and its scientific nature directly affects the adjustment of learning strategies and the cultivation of core competencies. However, the traditional model has shortcomings: evaluation criteria are uniformly formulated by teachers, ignoring differences in cognitive styles; Relying on subjective memory, lacking classroom interaction and homework process data support; Feedback is mostly at the end of the semester, making it difficult to correct deviations in a timely manner; Learners passively participate and their subjectivity is not fully utilized.

In the digital learning scenario, learners' online answering questions, discussing and speaking, and creating mind maps generate massive amounts of data. AIGC can quantitatively analyze unstructured data and generate objective evaluation criteria. With the help of natural language processing technology, AIGC can automatically identify writing logic loopholes and knowledge blind spots, providing reference for self-evaluation. This article is based on the constructivist learning theory (emphasizing active knowledge construction) and the theory of multiple intelligences (focusing on individual differences), combined with the practice of public courses in universities and information technology courses in primary and secondary schools, to systematically explore the construction of a self-evaluation system in the AIGC environment [1]. The research aims to address the issues of "how to use AIGC to achieve precise evaluation data" and "how to balance technical assistance and learner subjectivity", providing replicable solutions for educators and helping learners form a learning loop of self reflection and continuous improvement.

2. The Connotation and Characteristics of Learner Self Evaluation in AIGC Environment

2.1. Definition of Core Connotation

Self evaluation of learners in the AIGC environment is a dynamic process in which learners combine their personal learning goals, collect pre class, in class, and post class learning data through AIGC, combine intelligent analysis results with self reflection, evaluate knowledge, skills, and thinking development, and adjust learning strategies. There are three core differences from the traditional model: technically, it realizes automatic data collection and analysis, replacing "paper records+subjective summaries"; On the main body, learners take the lead in formulating evaluation criteria and applying results, while AIGC only serves as a "data support provider"; Focus on "process improvement" as the goal, such as tracking knowledge points through AIGC to master and address vulnerabilities [2].

This connotation needs to clarify three boundaries: firstly, AIGC does not replace reflection, for example, after intelligent tools analyze writing defects, learners need to judge the root cause; Secondly, data collection complies with the Personal Information Protection Law, only collecting evaluation related learning behavior data and does not involve privacy; Thirdly, the evaluation dimensions cover cognition, skills, and emotions, avoiding a single score oriented approach.

2.2. Main Characteristics Presentation

Data driven objectivity: AIGC collects knowledge point mastery rate and learning behavior characteristics (such as online testing accuracy and video pause times), and quantifies them through algorithms to reduce subjective bias. In college English writing, the iFlytek Spark model quantifies scores based on "grammar 30%, logic 40%, and depth 30%" to provide specific support and avoid vague expressions.

Personalized dynamic adaptation: AIGC adjusts evaluation criteria based on learners' cognitive level: those with weak foundations focus on knowledge memory (such as formula dictation), while those with strong abilities focus on innovative thinking (such as problem-solving methods). In primary and secondary school mathematics, Chaoxing Learning Platform adjusts the difficulty level based on the previous answer, and learners can also independently add the dimension of "learning focus" (AIGC statistics of distraction times) to achieve "one person, one standard".

Continuity of real-time feedback: Traditional evaluations are mostly based on end of semester summaries, while AIGC supports a real-time closed loop of "learning evaluation feedback". After completing the physics problem, the tool immediately points out "missing support force in force analysis" and pushes similar questions; In classroom discussions, tools can identify knowledge misconceptions in real time and remind students to supplement concepts.

Participatory two-way interaction: AIGC allows learners to participate in evaluation design, such as setting the goal of "mastering 3 mathematical formulas this month", and the system automatically generates indicators; Doubts about the evaluation results can be questioned (such as "why the logical coherence score is low"), and tools combined with text fragments can help learners transition from "passive acceptance" to "active design".

3. The Dilemma of Traditional Learners' Self-Evaluation and The Empowering Value of AIGC

3.1. The Core Dilemma of Traditional Learners' Self-Evaluation

The evaluation criteria are single and fixed: teachers have unified standards (homework completion, exam scores), ignoring individual differences. Chinese reading is judged based on "conforming to standard answers", lacking unique interpretation and critical thinking; Programming learning still focuses on homework accuracy and neglects the ability to optimize code.

Fragmentation of evaluation data: relying on subjective recall, without data on accuracy of knowledge points, types of wrong questions, etc; The quality of classroom speeches is only recorded by teachers, which can easily lead to omissions and deviations, and evaluations become mere formalities, making it difficult to pinpoint problems.

Delayed and inefficient evaluation feedback: Feedback is often conducted after the end of the stage (such as the end of the semester), missing the opportunity to make up for it; The feedback is vague (such as' need to strengthen English writing '), without clear direction, making it difficult for learners to implement measures.

Weakening of learner subjectivity: Evaluation is led by teachers, learners are passive in execution, and have no autonomy in design. Forced to summarize according to a fixed framework, difficult to incorporate dimensions such as learning interest and collaboration ability, and lack of initiative [3].

3.2. The Key Value of AIGC Empowering Learners' Self Evaluation

Cracking standard solidification: generating personalized indicators: AIGC combines goals and capabilities to generate dynamic standards. The goal of the computer course is to master Python crawlers, with intelligent tools generating indicators for code integrity (40%), crawling efficiency (30%), and exception handling ability (30%); When turning to "data analysis", adjust the indicators to "data cleaning quality, visualization effect".

Addressing data gaps: Building a comprehensive data system for the entire process: AIGC multi tool linkage collects data throughout the entire process: pre class notes on "difficult points", in class statistics on answering speed and accuracy, and post class analysis of the root causes of errors. Integrate data on "difficult previews, classroom mistakes, and homework omissions" into junior high school chemistry classes and generate files for reference.

Solve feedback lag: achieve real-time and accurate guidance: AIGC generates feedback in real time: after completing the history question, the tool points out that "the timeline is chaotic (need to make up for the relationship between the Opium War and the Westernization Movement)" and promotes micro courses; Grammarly marks errors in real-time during writing and suggests vocabulary optimization.

Strengthening the dominant position: supporting self-designed evaluation: AIGC allows customization of evaluation dimensions and weights (such as adding "communication frequency, task contribution" for group cooperation, and setting "cooperation ability accounts for 40%"); Optional tools (mind maps or intelligent scoring systems) can be used to transition from passive to active.

4. Principles and Framework for Building a Learner Self Evaluation System Based on AIGC

4.1. Core Principles of System Construction

Subjectivity principle: Adhere to the core position of learners and ensure their leadership in the entire evaluation process. AIGC only provides data and analysis tools and does not replace reflection and decision-making. Key aspects such as adjusting evaluation criteria and applying feedback are guided by learners' needs, avoiding technology dominance.

Ethical and security principles: Strictly follow the Interim Measures for the Management of Generative Artificial Intelligence Services and the Personal Information Protection Law. Data collection must be authorized by learners and only includes learning behavior data such as answer records and course participation, without involving privacy; Data encryption storage, only for self-evaluation, not shared with third parties.

Practicality principle: Adapt to different stages and disciplinary characteristics. Primary and secondary schools focus on simple operations and visual feedback, while universities emphasize in-depth analysis and academic support. Priority should be given to selecting popular platforms such as Chaoxing Learning Platform for tool selection, reducing the threshold for use and avoiding

complex operations that may affect efficiency.

Developmental principle: Focus on long-term ability improvement, not only paying attention to current learning outcomes, but also tracking the trend of ability development. The evaluation dimensions cover core competencies such as critical thinking and self-directed learning ability, guiding learners to grow comprehensively.

4.2. "Five in One" System Framework

Build a five in one framework of "target data technology feedback guarantee", with collaborative support from various dimensions to evaluate and operate:

Target layer: Based on the core competencies of the subject and personal goals, the evaluation dimensions and weights are determined, and learners can adjust them as needed. The target layer needs to be dynamically updated according to learning progress.

Data layer: Collect full process data before, during, and after class using AIGC tools, form structured files, and use data cleaning techniques to ensure accuracy and provide a reliable foundation for analysis.

Technical layer: Build a support system that includes three types of tools: data collection (Chaoxing Learning Platform, Tencent Education Smart Service), analysis (iFlytek Spark Big Model, Grammarly), and display (data visualization platform), to achieve tool linkage and intuitive information presentation.

Feedback layer: Build a two-way interactive loop of "quantitative results+qualitative suggestions+resource recommendations", where learners can ask for feedback or propose optimization suggestions to promote the continuous improvement of the system [4].

Guarantee layer: Improve three types of guarantee mechanisms: system (establish usage standards), technology (tool maintenance), and training (teacher and learner operation guidance), to avoid technical barriers affecting the progress of evaluation.

5. Practical Path of Learner Self Evaluation System Based on AIGC

5.1. Implementation Steps of The Entire Process

Preparation in advance: Conduct demand research and tool selection questionnaire, interview research on learning situation, clarify learners' cognitive level, goals, and evaluation needs. For example, in public English in universities, most hope to "evaluate writing logic" and "real-time grammar feedback", while in mathematics in primary and secondary schools, there is a preference for "visual display". Tool selection suitable for scenarios: data collection using on campus platforms such as Chaoxing Learning Platform and DingTalk Classroom; Match analysis tools with disciplines, choose Grammarly for English writing, CNKI for Chinese study, and LeetCode intelligent module for programming; Display using Excel visualization, Tencent document charts, etc., synchronously test compatibility, and avoid data silos [5].

Mid term implementation: Implement the evaluation criteria at the beginning of the semester in stages, and learners can refer to the subject core competency template generated by AIGC under the guidance of teachers (such as "knowledge mastery, experimental operation, and thinking development" in junior high school biology). They can customize and add dimensions (such as "environmental awareness", AIGC statistics of speech frequency) and set weights, and use the standard input tool. Collect and analyze data during the semester, AIGC automatically collects data from the entire process, and generates weekly learning reports (such as statistics on code submissions, error types, and optimization times for Python courses in universities). Learners reflect on their weaknesses based on the reports. Monthly feedback adjustment, AIGC generates personalized feedback (such as "low accuracy of English reading comprehension questions") and recommends resources, learners develop plans, tools track execution, and if the results are not satisfactory, interactive reanalysis can be conducted to identify the root cause.

5.2. Effect Verification and System Optimization

Multi dimensional effect evaluation evaluates the effectiveness through data comparison (changes in mastery rate of knowledge points), learner interviews (whether they help locate problems), and teacher observation (frequency of autonomous adjustment). For example, the majority of learners provide feedback on "clear improvement direction", and the proportion of autonomous adjustment plans significantly increases, verifying the effectiveness.

The dynamic optimization system collects suggestions from teachers and students to adjust the framework and tools: if the feedback is "too many dimensions", it will be simplified to "3 cores+1 customization"; If the tool operation is complex, a "one-step data viewing" function will be added (click on "My Report" to display key data). Update the system at the end of each semester to adapt to changes in learning needs.

6. Practical Reflection and Optimization Strategies of Learner Self Evaluation System in AIGC Environment

6.1. Reflection on Core Issues in Practice

Insufficient technological adaptability: The information technology capabilities of primary and secondary school students are limited, making it impossible to independently view AIGC data reports; Elderly learners in universities are not familiar with the "interactive feedback" function, and the utilization rate of the tool is low. Some tools have compatibility issues, such as the inability to synchronize data from "Chaoxing Learning Pass" to "Grammarly", which affects analysis efficiency.

Learners overly rely on technology: A small number of learners treat AIGC evaluation results as the "final conclusion" and lack self reflection. The evaluation of the tool states that 'the steps of mathematical geometry proof are complete', but the learner did not consider 'whether there is a more concise method'; Partial neglect of dimensions such as "learning attitude" that have not been covered, resulting in one-sided evaluation.

The evaluation dimensions and disciplinary adaptability need to be improved: the dimensions of "creativity" and "expressiveness" in art and sports are difficult to accurately quantify in AIGC. In art courses, tools can only analyze techniques such as "color matching", and the evaluation of this key dimension still relies on subjective judgment, lacking data support [6].

6.2. Targeted Optimization Strategy

Layered adaptation technology and support provided: designing differentiated solutions according to school stages: simplifying tool functions for primary and secondary schools at lower levels (such as "one click view accuracy" and "animated report"), with teacher assisted interpretation; Elderly learners in universities are provided with graphic guides and online Q&A sessions, as well as regular tutoring. Promote developers to optimize compatibility and establish data interfaces for seamless synchronization.

Reinforcement learner reflection guidance: Use a "reflection template" to guide thinking, including "problems, root causes, adjustment strategies", etc. In English writing, learners need to record that the tool points out 'insufficient evidence' due to 'low reading volume', and plan to read one English article per week. Teachers conduct regular checks and provide individual guidance to those who are overly dependent, emphasizing that 'tool results are a reference and independent judgment is the core'.

Improve the subject adaptation evaluation plan: adopt the "AI assisted+subjective evaluation" model for difficult quantification dimensions: the art class uses AIGC to quantify the "rationality of color matching", and learners qualitatively evaluate the "creative expression"; AIGC statistics for physical education classes show 'standard of movement', while learners self evaluate 'endurance improvement'. Collaborate with teachers, students, and developers to develop specialized modules to enhance adaptability.

7. Conclusion

This article is based on the needs of AIGC technology and educational evaluation reform, and constructs and practices a five in one learner self-evaluation system of "goal data technology feedback guarantee". It clarifies the core logic of "data-driven+self reflection" and solves problems such as the solidification of traditional evaluation standards, data loss, and feedback lag.

Practice has shown that AIGC can improve the objectivity and timeliness of self-evaluation through full process data collection and personalized feedback: the mastery rate of learners' knowledge points in university courses has significantly increased, and more than 80% of learners in primary and secondary schools can adjust their learning strategies independently based on evaluation, verifying the feasibility and effectiveness of the system.

At the same time, research has found that issues such as technology adaptation, learner dependence, and disciplinary dimension adaptation need to be further optimized through layered technical support, reflective guidance, and disciplinary specific solutions. In the future, we can focus on two aspects: one is to explore the integration mode of AIGC with peer evaluation and teacher evaluation (such as "self+peer+intelligence" three-dimensional evaluation), and enhance the comprehensiveness of evaluation; The second is to develop more subject specific AIGC evaluation tools (such as music performance analysis tools) to solve the problem of non quantitative dimensional evaluation.

This system is not only a practice of educational digitization, but also a path to implement the "learner centered" concept. By combining technological empowerment with subject guidance, we help learners form a self-directed learning loop of "data reflection strategy adjustment ability enhancement", providing support for educational evaluation reform and core literacy cultivation.

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