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Exploring the Path of Digital Intelligence Empowering Reflective Practice of Foreign Language Teachers

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Abstract

Against the background of the further advancement of Education Informatization 2.0, digital intelligence technologies provide new possibilities for the innovative transformation of foreign language teachers' reflective practice. Aiming at the dilemmas in traditional reflective practice, such as insufficient datafication of teaching behavior reflection, lack of processuality and personalization in learning effect reflection, and backward digitization of reflection forms and achievements, this paper adopts a literature research method and theoretical analysis method to explore the empowerment paths of digital intelligence technologies. It proposes constructing a multimodal intelligent collection system and a multi-dimensional teaching discourse analysis tool to solve the problems of subjective data collection and single analysis dimension; building a dynamic language competence tracking platform and a personalized learning diagnosis system to improve the process of learning effect evaluation; and using a data sharing platform and visualization technology to enhance the efficiency of collective reflection. The study concludes that digital intelligence technologies can promote foreign language teachers' reflection from experience-orientation to data-orientation, realize the two-way empowerment of teaching quality and professional development, and provide a theoretical reference for foreign language education innovation under the background of education informatization.

Keywords

Digital Intelligence Empowerment; Teacher Professional Development; Reflective Practice; Foreign Language Teachers; Data-driven Reflection

1. Introduction

Teacher professionalism refers to the professional growth process in which teachers gradually acquire the knowledge and skills of education through special training and lifelong learning throughout their careers, and continuously improve their teaching quality in educational professional practice, so as to become educational

professionals. There are many ways to promote teachers' professional growth, among which carrying out "reflective practice" activities has been continuously emphasized and is considered as a key factor to promote teachers' professional growth and an important criterion to measure excellent teachers [1]. Reflective practice is a process in which teachers take their own teaching activity process as the object of thinking, and examine and analyze their own behaviors, decisions and the resulting outcomes. It is the core factor of teachers' professional development and self-growth.

Many scholars at home and abroad have studied the effect of teaching reflection of foreign language teachers. American scholar Schon formally put forward the concept of reflective practice. He believed that teachers generate some understandings from teaching practice, and these understandings are reflection [2]. Calderhead discussed the conceptual origin of reflective teaching and believed that research on teacher cognition, teacher knowledge and teaching and learning background is helpful to the understanding of teachers' reflective ability [3]. Domestic scholars have also studied reflective practice from multiple perspectives. Meng Chunguo investigated the reflective concepts and behaviors of 402 foreign language teachers in 24 universities across the country, and believed that re-understanding the connotation and role of reflective teaching and reflecting on the gap between reflective teaching concepts and behaviors would help teachers better practice reflective teaching [4]. Li Banban and Xu Jinfen constructed a reflection scale for college English teachers with Chinese characteristics by combining the research on teacher reflection by experts and scholars at home and abroad [5]. Liu Yuemiao and Wang Qian investigated college English teachers and found that effective teaching reflection models are helpful to teaching quality and their own professional skills [6].

With the continuous development of digital technologies, the education field is undergoing profound changes. The Education Informatization 2.0 Action Plan clearly puts forward the need to promote the transformation of education informatization from integrated application to innovative development, and build a new talent training model under the "Internet +" condition. In this context, foreign language teaching is also constantly innovating. Digital intelligence technologies such as intelligent teaching platforms, learning analysis tools and virtual simulation technologies are widely used in foreign language teaching, providing new perspectives and methods for teachers' teaching and reflection.

However, there are still deficiencies in the current digital intelligence empowering teachers' reflective practice, and there are few specific discussions on the reflective practice of English teachers. Based on the above background, this paper aims to explore the specific problems existing in the process of digital intelligence empowering English teachers' reflective practice, and put forward optimization paths from multiple levels, so as to provide reference for foreign language teachers

to use digital intelligence to improve their reflective practice ability.

2. Practical Dilemmas of Foreign Language Teachers' Reflective Practice

2.1. Lack of Dataization in Teaching Reflection

2.1.1. Subjective Bias in Classroom Behavior Recording

Teachers' individual experience and teaching records are important carriers and basis for teaching reflection. The reflective teaching approaches for English teachers mainly include classroom teaching observation method, teaching audio and video recording method, reflection diary method, action research method, etc. However, in the traditional teaching reflection practice, due to the limited quantity, scope and type of data collection, it is difficult for teachers to carry out effective analysis and application of data, resulting in teachers' reflection mainly based on experience.

In the recording part, teachers often rely on instant notes or recall. This recording method based on individual cognition naturally has selective bias - teachers tend to focus on teaching segments that conform to their own presuppositions, but may unconsciously filter out the implicit details in classroom interaction. Taking the oral English class as an example, teachers' judgment on students' participation often stays at the fuzzy cognitive level of, such as "part of the students are active", and it is difficult to detect the structural imbalance behind the frequency of speeches; the reflection on the quality of students' answers is also mostly based on instant feelings, lacking systematic combing of details, resulting in classroom behavior records becoming a fragmented impression collection rather than an objective data carrier for analysis. This subjective recording method will directly lead to teaching reflection falling into empiricism, unable to find the design defects hidden behind subjective judgment, making the recording results difficult to support the in-depth deconstruction of classroom interaction patterns.

2.1.2. Single Analysis Dimension of Teaching Speech

In the Course in General Linguistics, Saussure divided language into language and parole. Language is a symbol system and a common expression medium for social members. Parole, on the other hand, is the language activity of individuals in specific situations. Saussure believed that language is homogeneous, while parole activity is complex and uncertain [7]. The language behavior in foreign language teaching should have been a complex system containing multiple observation perspectives, covering the core dimensions such as the formal characteristics of teachers' language use, the proportion of interactive discourse types, and the effect of language feedback. However, in traditional teaching reflection, teachers' analysis perspective often presents a significant planar tendency, focusing too much on the combing of teaching processes, but ignoring the other dimension of language teaching behaviors.

Taking the reading class as an example, the reflection content of some teachers often stays at the level of speech expression when arranging teaching activities and the language use of encouragement or error correction feedback, and lacks in-depth excavation of the hidden language education value in the teacher-student discourse interaction. For example, teachers may carefully record the question-and-answer process in the reflection log, but do not realize that the high proportion of memory questions may limit the development of students' high-order thinking; or pay attention to the frequency of students' speeches in the text discussion, but ignore the key indicators such as the grammatical accuracy and vocabulary richness of their language output. This observation of teaching behaviors only stays at the process judgment of "whether it is completed" rather than the dimension analysis of "how to optimize", resulting in teachers being unable to identify the real needs of students' language development through multi-dimensional behavior analysis, making teaching reflection difficult to form effective guidance for the improvement of language teaching.

2.2. Insufficiency in Reflecting on Learning Effects

2.2.1. Lack of Tracking Mechanism for Language Ability Development

In traditional foreign language teaching, teachers' reflection on learning effects relies on the quantitative results of periodic tests, that is, the scores of daily tests. In the usual unit tests, the test questions are more focused on the theme of this unit, and the coverage is narrow, so it is difficult to test the overall ability level of students. For large-scale exams, such as city-wide unified exams, mid-term exams or final exams, although the test questions are designed more scientifically and can test students' language ability, the understanding of students' language ability is too general, and it is difficult to see the changes in specific dimensions. For example, in the reflection on students' writing ability, teachers often only pay attention to the ups and downs of the final composition score, but rarely deeply track the development track of students' specific dimensions such as the proficiency of text cohesion strategy application and the accuracy of target language expression in the long-term learning process. This reflection mode focusing on summative evaluation makes it difficult for teachers to capture the subtle progress and potential problems in students' language ability development, and unable to provide targeted support for follow-up teaching.

At the same time, due to the lack of monitoring of specific abilities, the dynamic process evaluation of ability development is also missing. For example, the vocabulary micro-level abilities will be covered up by general vocabulary test data due to the lack of continuous tracking. When students repeatedly have Chinese-English collocations in writing or semantic misjudgment due to cultural

loaded word obstacles in listening comprehension, teachers often attribute it to temporary negligence rather than vocabulary ability defects, missing the best opportunity for intervention.

2.2.2. Insufficient Ability to Diagnose Individual Learning Needs

In foreign language learning, students have significant differences in multiple dimensions such as cognitive style, learning strategy and motivation type, which requires teachers to have the ability of refined needs diagnosis. However, the traditional reflection lacks in the individual analysis of students. Teachers often stay at the macro cognitive level that students' levels are uneven, but it is difficult to identify the unique needs hidden behind learning behaviors, for example, the preference of visual learners for visualized grammar explanation, the dependence of field-dependent students on interactive learning environment, etc. These key factors affecting learning efficiency are often simplified into general expressions of learning habit differences in traditional reflection.

In terms of teaching attribution, when facing students whose learning effects do not meet expectations, teachers are prone to fall into empirical attribution traps such as "insufficient effort" and "bad learning attitude", but ignore individual difference factors such as cognitive strategy mismatch and motivation matching imbalance. That can neither activate the learning potential of students with different personalities nor build a support system adapted to multiple needs, resulting in the personalized learning support being out of touch with students' real needs at the diagnostic source.

2.3. Lagging Digitization of Reflection Forms and Achievements

2.3.1. Lack of Data Sharing Mechanism for Collective Reflection

In teaching and research activities, the classroom behavior records and student performance accumulated by individual teachers often exist in the form of fragmentation, or are scattered in personal teaching logs, lacking a unified data collection standard and integration platform, resulting in teaching evidence across teachers and classrooms being difficult to form a dialogue foundation. For example, in the reading teaching discussion, the judgment basis of different teachers on students' text interpretation obstacles may come from different observation dimensions, some based on classroom instant records, some relying on homework error or analysis, but due to problems such as incompatible data formats and inconsistent observation dimensions, it is impossible to build a comparable evidence chain at the collective level, making the reflection discussion always stay at the parallel listing of subjective experiences rather than the problem deconstruction based on the common data system.

From the perspective of technology empowerment, the lack of data sharing is

more manifested in the lack of supporting tools. Although some schools try to establish a teaching reflection database, it is mostly a simple file storage system, which not only lacks the intelligent analysis function of classroom language data, but also cannot realize the correlation analysis of different data sources. This phenomenon of "data islands" makes it difficult for teachers to call cross-time and space teaching data to form a reference system when conducting collective reflection - they can neither find the common shortcomings of different classes in the effectiveness of problem design through horizontal comparison, nor identify the effects of a certain teaching strategy in long-term implementation. This finally reduces collective reflection to the discrete expression of individual experiences rather than collaborative inquiry based on databases, which seriously restricts the professional community effectiveness of teachers in teaching improvement.

2.3.2. Lack of Visual Presentation of Reflection Achievements

The reflection achievements of traditional foreign language teachers have obvious technical empowerment lag in the presentation dimension, and their carrier forms have long been limited to text-based experience summaries, which is difficult to transform complex teaching phenomena into intuitively recognizable information. The reflection report often relies on linear text to describe classroom interaction or student behavior, but cannot use visualization means such as charts, heat maps and dynamic models to three-dimensionally present the deep laws such as the space-time characteristics of teacher-student discourse distribution and the multi-dimensional track of learning progress. For example, when describing the optimization of teacher-student interaction, the traditional expression can only provide fuzzy conclusions such as "the interaction frequency is improved" and "the student participation is enhanced", but it is difficult to use tools such as dialogue turn distribution maps and discourse power transfer matrices to accurately reveal the dynamic changes of classroom structure or the participation differences of different groups, resulting in the cognitive value of reflection achievements staying at the phenomenon description level rather than the law discovery level. Finally, the practical transformation efficiency of reflection achievements is seriously weakened, and they cannot really play their evidence support and reference value for teaching improvement.

3. Realization Paths for Digital Intelligence Empowering Foreign Language Teachers' Reflective Practice

3.1. Solving the Lack of Datafication in Teaching Behavior Reflection

3.1.1. Constructing a Multimodal Classroom Behavior Intelligent Collection and Analysis System

Aiming at the problem of subjective bias in classroom behavior recording, an integrated system integrating multimodal data collection and intelligent analysis can be constructed, and the transformation of teaching behavior recording from "experience-driven" to "data-driven" can be realized through technology empowerment. The system takes 4K high-definition panoramic cameras, voice acquisition equipment and student terminal behavior tracking software as the hardware foundation, and combines computer vision, natural language processing (NLP)[8] and sensor fusion technologies to capture multi-dimensional data such as language expression, facial expression, body posture and operation behavior in classroom interaction in real time.

At the data collection level, the classroom video system can record the teacher-student interaction scene synchronously through multi-angle cameras, use the human body posture recognition to automatically mark the action tracks of students raising hands, standing and writing, and analyze the emotional states such as students' concentration and confusion degree by combining the facial action coding system (FACS) [9]. For example, when the system detects that a student has continuous 3 times of actions such as looking away from the podium and bowing his head, it will automatically generate an "attention dispersion warning" and locate it to the specific teaching period. The speech recognition module can real-time transcribe the classroom dialogue into text, analyze the syntactic complexity of the teacher's command language and the logical coherence of the students' answers through NLP technology, and at the same time identify the emotional tendency in the dialogue, such as the proportion of encouraging feedback and the frequency of questions.

3.1.2. Developing Intelligent Analysis Tools for Teaching Speech

Aiming at the problem of single analysis dimension of teaching speech, an intelligent analysis model based on natural language processing (NLP) technology can be constructed to realize the three-dimensional deconstruction and in-depth diagnosis of classroom discourse. The teaching laws and thinking training gaps hidden in speech activities are revealed through multi-level semantic analysis. First, the classroom speech text is structurally processed through NLP technologies such as word segmentation, syntactic analysis and semantic role labeling. Taking question type recognition as an example, the system can automatically distinguish memory questions and critical questions through keyword matching and syntactic structure analysis, and count the proportion of the two types of questions in the total discourse. The feedback mode analysis further refines the semantic characteristics of error correction feedback and encouragement feedback, identifies the supportive tone intensity in the feedback through the emotional analysis. The analysis of the discourse interaction structure automatically marks the alternating frequency and duration distribution of teacher-student speeches, and draws the "dynamic

transfer map of discourse power".

The core value of this tool is to break through the limitations of traditional reflection by transforming classroom speech into quantifiable multi-dimensional visualization results. This transformation from "empirical language reflection" to "data-driven speech optimization" provides scientific support for foreign language teachers to improve the quality of discourse and build an interactive language learning environment.

3.2. Making up for the Insufficiency in Reflecting on Learning Effects

3.2.1. Building a Dynamic Language Ability Tracking and Early Warning Platform

In order to solve the problem of lack of tracking mechanism for language ability development, a dynamic evaluation platform integrating blockchain technology, machine learning and multi-source data integration can be constructed. The platform takes the distributed blockchain as the underlying architecture, and ensures the records by collecting data from students' daily homework, classroom interaction, unit tests, extracurricular learning and so on. At the same time, the collected results are divided into blocks. For example, each writing assignment submitted by students will be divided into dimensions such as text content, modification traces and completion time, which is different from the mechanical view in the classic thinking that "the whole is composed of independent parts", but reflects the characteristics of quantum thinking "integrity and dynamics" - regarding language ability as an organic system of multi-dimensional data entanglement [10].

3.2.2. Constructing a Data-Based Individualized Learning Need Diagnosis System

With the continuous deepening of education informatization, the learning needs of individual students show significant diversification characteristics. However, the traditional teaching mode is difficult to accurately diagnose the individual needs of students, resulting in a deviation between the teaching effect and the actual needs of students. Therefore, designing a student portrait analysis system is of great practical significance. The system relies on learning analysis tools to comprehensively collect multi-dimensional data such as students' cognitive style, learning strategy and motivation type, so as to provide strong support for realizing accurate personalized teaching.

In terms of cognitive style recognition, the system adopts a combination of scale testing and machine learning. The scale test includes a series of carefully designed questions, which are used to evaluate students' tendencies in information processing, problem-solving and other aspects, so as to initially judge whether they belong to field-dependent or field-independent cognitive styles. Field-dependent learners rely more on the external environment and

others' guidance in the learning process and are good at cooperating and communicating with others; field-independent learners have strong autonomous learning ability and can independently analyze and solve problems. For the analysis of students' learning motivation, the system can generate a detailed motivation matching degree report according to the data such as the completion efficiency and input degree of students for different types of learning tasks, and identify different types such as achievement-oriented motivators and social-oriented motivators. This enables teachers to have a deeper understanding of the characteristics and needs of each student, so as to formulate teaching plans and strategies that are more suitable for students' reality.

3.3. Breaking through the Defects of Non-visualization of Reflection Forms and Achievements

3.3.1. Establishing a Data Sharing Platform

In order to solve the problem of lack of data sharing mechanism in collective reflection, the data standards such as classroom observation indicators and student performance coding can be unified to form a digital language system with consistent dimensions, so as to realize the safe sharing and intelligent retrieval of teaching data. For example, teachers can get the multi-source data such as classroom videos and student homework analysis of different classes according to the label of "cultivating critical thinking in reading teaching".

In addition, the platform can embed the AI-assisted discussion function to further improve the efficiency of teaching and research. Through the keyword extraction and opinion integration technology, the scattered speeches in the teaching and research records are classified and sorted into core issues, and a structured reflection report is generated. This platform architecture integrating data sharing, intelligent diagnosis and collaborative reflection can promote teachers to shift from experience-driven individual reflection to data-supported group collaboration, and improve the efficiency and depth of collective reflection.

3.3.2. Creating a Visual and Interactive Presentation System for Reflection Achievements

Aiming at the problem of lack of visualization of reflection achievements, the reflection report can be developed by integrating data visualization technology. Teachers can transform the teaching behavior analysis data, student ability development track, etc. into static analysis charts or dynamic charts, such as teacher-student discourse turn transfer matrix, vocabulary ability radar chart, etc., and transform the classroom video coding data, homework error classification statistics, test score fluctuation curve, etc. into dynamic visualization works through drag-and-drop operations. For example, when

describing the effect of interaction optimization, the dynamic heat map can be used to compare the distribution of classroom discourse power before and after the strategy implementation, and intuitively present the structural changes in student participation. The system can transform abstract teaching experience into transferable structured knowledge, and improve the practical transformation efficiency of reflection achievements in teaching improvement.

4. Conclusion

Digital intelligence technology has brought an opportunity for the reflective practice of foreign language teachers to transform from experience summary to data analysis. Through the construction of multimodal data collection and intelligent analysis system, the construction of dynamic ability tracking platform and the presentation of visualized reflection achievements, foreign language teachers can break through the data deficiency, insufficient system and low efficiency of achievement transformation in traditional reflection. This path not only promotes the upgrading of teaching reflection from individual experience combing to scientific inquiry based on evidence chains, but also helps to condense the collective wisdom of the professional community through the construction of data sharing and collaboration platforms.

However, the deep value of technology empowerment still needs to be gradually released in the multi-dimensional linkage of improving teachers' digital literacy, school system guarantee and social resource collaboration. In the future, with the deep integration of artificial intelligence and education and teaching, the reflective practice of foreign language teachers will develop in a more accurate, systematic and innovative direction, and finally achieve the two-way empowerment of teaching quality and teachers' professional development, providing development power for foreign language education innovation under the background of Education Informatization 2.0.

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References

[1] Wang, H. J. Reflective Practice Makes Teachers More Professional[J]. Educational Horizon, 2024, (38): 29-31.

[2] Schon, D. A. The Reflective Practitioner: How Professionals Think in Action[M]. New York: Basic Books Inc., 1983.

[3] Calderhead, J. Reflective Teaching and Teacher Education[J]. Teacher Education:

Professionalism, Social Justice, and Teacher Education, 2006, (1): 35.

[4] Meng, C. G. A Study on College Foreign Language Teachers' Conceptions and Behaviors of Reflective Teaching[J]. Journal of Foreign Languages, 2011, (4): 44-54.

[5] Li, B. B., & Xu, J. F. Constructing a Reflection Scale for College English Teachers in China[J]. Modern Foreign Languages, 2011, (4): 405-412.

[6] Liu, Y. M., & Wang, Q. A Survey and Analysis of Promoting Professional Development Through Effective Teaching Reflection Models[J]. Foreign Language Research, 2017, (5): 75-79.

[7] Zeng, J. The Pros and Cons of AI-Assisted Language Teaching: From the Perspective of Saussure's Linguistic Theory[J]. New West, 2025, (4): 189-194.

[8] Yang, L., Song, N. Q., & Xie, L. Primary Education Modernization from Teachers' Perspective: Core Concerns and Practical Dilemmas—An Analysis Based on Natural Language Processing (NLP)[J]. Education and Teaching Research, 2025, 39(6): 83-95.

[9] Hu, X. R., Lin, J. Y., Li, D., et al. Expression Generative Adversarial Network Based on Facial Action Coding System[J]. Computer Engineering and Applications, 2020, 56(18): 150-156.

[10] Dong, M. X. A Review of Language Competence from the Perspectives of Classical and Quantum Thinking and Its Implications for Foreign Language Assessment[J]. Foreign Language and Literature, 2025, 41(1): 140-150.