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Strategic Analysis of Enhancing Primary School Teachers' Course Teaching Leadership Based on Seewo Whiteboard Technology

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Abstract In the era of rapid development of modern information technology, the education sector is seeking to seamlessly integrate advanced technology with traditional teaching methods to create more efficient and interactive modern teaching environments. With the advancement of educational informatization, teaching tools such as electronic whiteboards have been widely adopted in schools. This paper combines Seewo Whiteboard technology to design classroom teaching application strategies and teaching action plans, implementing interactive classroom teaching based on Seewo Whiteboard technology through two action phases. A research hypothesis model was constructed, and hypothesis testing was conducted through multi-group validation. The standardized regression coefficient for the influence of teachers' digital literacy on teachers' leadership was 0.6698, with $P < 0.001$, indicating that teachers' digital literacy and teachers' leadership jointly play a chain-like mediating role between Seewo whiteboard technology and teachers' teaching strategies, thus validating the hypothesis. After the second action, the average scores of students in the experimental class and the control class were 83.1252 and 79.6531, respectively. The average score of the experimental class was 3.4721 points higher than that of the control class, indicating a significant difference in performance between the two classes. Further analysis using an independent samples t-test yielded a two-tailed p-value of 0.0348, which is less than 0.05, indicating that the use of Seewo Whiteboard technology in teaching is beneficial for improving student performance.

Index Terms Seewo Whiteboard technology, interactive classroom teaching, multi-group validation, hypothesis testing, teaching leadership

I. Introduction

As modern education continues to evolve, the notion that teachers are leaders has increasingly drawn attention. The new curriculum first proposed that teachers are developers and builders of the curriculum, thus teachers are no longer merely “teachers,” but rather leaders of the curriculum [1], [2]. Curriculum leadership is a form of curriculum practice, referring to the overall guidance and coordination of activities such as curriculum reform, curriculum development, curriculum experimentation, and curriculum evaluation. Its purpose is to influence the process and outcomes of curriculum reform and development, thereby achieving the goals of curriculum reform and development [3]-[5]. Berry [6] analyzed that due to the positive role of teacher leadership being recognized, the standardization of relevant policies, the maturity of educational technology applications, and a deeper understanding of teacher leadership, the current model of teacher leadership is undergoing a transformation, gradually evolving into a collaborative teacher leadership model.

Under the continuous deepening of new curricula, countries such as China, the United Kingdom, the United States, and Canada have all identified teacher curriculum and instructional leadership as a major strategic reform in education. Enhancing teacher curriculum and instructional leadership is an inevitable trend in curriculum reform and the transformation of curriculum leadership models [7]-[9]. Teacher curriculum and instructional leadership, as a form of teaching practice, is increasingly gaining global attention. The practical realities of the new phase of curriculum reform indicate that teachers should become curriculum leaders. This is because elementary school students have limited cognitive development and a weaker sense of self. A teacher with leadership capabilities can better stimulate students' learning potential, guide them toward active and proactive learning, and enable them to acquire comprehensive, systematic, profound, and rich knowledge in the classroom [10]-[13]. This is an inevitable requirement of the practical application of modern curriculum management theory and an inevitable trend as curriculum reform enters a new phase [14], [15]. Additionally, teachers are a significant resource in new curriculum reform, and enhancing teachers' curriculum teaching leadership can improve curriculum practices and school

curriculum development. However, in practice, teachers' curriculum leadership has not kept pace with the implementation of new curricula, necessitating further research on teachers' curriculum teaching leadership [16]-[18].

Alegado [19] pointed out that the current challenges in teacher leadership development in the Philippines primarily stem from the deeply ingrained perception of principals as the primary leadership form, the lack of leadership training for teachers, and the absence of a teacher classification system. Warren [20] explored the importance of teacher classroom leadership, noting that teachers with leadership capabilities possess excellent classroom management skills and a vision to improve student academic performance, and are more likely to guide students toward academic success and personal growth compared to those without such capabilities. Wang et al. [21] found through regression analysis that teacher curriculum leadership is positively correlated with personal willingness, self-efficacy, and trust in others. Chen et al. [22] explored the factors influencing teacher curriculum leadership, finding that when teachers possess intrinsic leadership motivation, the school environment becomes a significant influencing factor. Therefore, providing an appropriate school environment is an important measure to enhance teacher curriculum leadership. Additionally, Wan [23] analyzed the cultivation of teachers' curriculum leadership from static macro and dynamic micro perspectives. At the macro level, it is cultivated through three aspects: strengthening autonomous leadership awareness, promoting cultural leadership, and constructing implicit leadership identity. It is suggested that a professional competence and collaborative cultivation model be used to create the relevant environment. Current research on enhancing teachers' curriculum teaching leadership remains primarily at the level of philosophical speculation and macro-level argumentation, and lacks specific strategies for improvement. With the continuous development of technology, the education sector is also constantly innovating. Among these innovations, the Sivo Whiteboard, as an advanced teaching tool, has brought numerous benefits to teachers and students. In teaching, the Sivo Whiteboard offers advantages such as strong interactivity, rich multimedia resources, personalized instruction, remote teaching, and ease of use, providing teachers with more teaching methods and resources, and offering students a better learning environment and experience [24], [25].

This paper clarifies the concept of Seewo Whiteboard technology and its basic functions of demonstration writing, creation, interaction, and cloud-based operations, and proposes strategies for the application of Seewo Whiteboard in classroom teaching. It outlines the design process for Seewo Whiteboard activity lesson plans, designs the specific implementation process for teaching action research, and conducts two rounds of research actions in sequence. Research hypotheses and models are formulated, proposing four research hypotheses: the mediating effect of Sivo Whiteboard technology on teachers' teaching strategies and digital literacy, the mediating role of teacher leadership, and the chain mediating effect of teacher digital literacy and teacher leadership. These hypotheses are verified through hypothesis testing and other methods. Combining empirical surveys, the study analyzes teacher leadership and the teaching implementation effects of the two actions.

II. Theoretical basis of Seewo Whiteboard technology

II. A.Interactive Whiteboard Concept

As of today, many experts have offered different definitions for interactive whiteboards. The most widely accepted definition is that provided by the UK Department for Education, Communications, and Technology: an interactive whiteboard is a multimedia LCD device with touchscreen functionality, also known as a “digital touchscreen.” Its principle is quite simple: connect the whiteboard to a computer and use a projector to display images. With specialized software, it can create a large-screen, interactive teaching environment. Teachers and students can use a specific touch pen or the built-in touchscreen functionality to operate applications on the electronic whiteboard, edit, annotate, and save files, as well as perform any other operations that can be accomplished using a keyboard and mouse on a computer.

The core components of the interactive electronic whiteboard hardware system include an electronic sensing whiteboard, a projector, a computer, and a touch pen. The electronic sensing whiteboard replaces traditional blackboards while also serving as the computer's display. The touch pen is used for writing and as a computer mouse. From a practical application perspective, interactive electronic whiteboards achieve true human-computer interaction in modern multimedia teaching environments.

II. B.Interactive whiteboard functionality

II. B. 1) Demonstration of writing function

The Seewo Whiteboard has presentation and writing functions, and can not only play Seewo courseware, but also general videos and animations. Teachers can embed pre-prepared teaching resources into Seewo courseware during lesson preparation [26]. However, the Seewo Whiteboard has poor compatibility and cannot play 3D animations exported from commonly used drawing software such as ChemDraw3D, Diamond, Vesta, and

KingDraw. Teachers and students can use a touch pen or directly touch the screen with their hands to write or run software on the Sivo Whiteboard.

II. B. 2) Production Functions

SEWO whiteboard can make slide courseware like PowerPoint, SEWO whiteboard comes with a wealth of courseware templates, which is convenient for teachers to create, and can also be combined with classroom activities, mind maps, subject tools and other items to enrich the courseware content. SEWO whiteboard also has the function of recording micro-lessons, after making the courseware, click to start teaching, and then click the time capsule to enter the recording mode, combined with SEWO supporting SEWO editors can edit the recorded micro-lessons.

II. B. 3) Interactive Functions

Interactive functionality is the core feature that distinguishes interactive electronic whiteboards from other multimedia teaching devices [27]. Using a touch pen and eraser on the Seewo whiteboard, users can write, annotate, and edit content. With the cloning and moving functions, selected objects can be copied, moved, or animated along a path. The overlay and erase functions can be used together to flexibly display content. The magnifying glass and spotlight functions can highlight specific areas of content, allowing students to focus on key teaching points. The screenshot function can capture the entire screen or a portion of it. The mind map function can organize the key points of the lesson in an orderly manner, helping students understand the logical relationships between concepts. The classroom activity function can liven up the classroom atmosphere, motivate students' learning enthusiasm, and achieve human-machine interaction, teacher-student interaction, and student-student interaction in the classroom. Teachers can selectively use these interactive features based on subject characteristics and teaching scenarios to achieve the desired teaching outcomes in actual teaching processes.

II. B. 4) Cloud-based features

Cloud Platform is an integrated virtual platform that combines multiple functions such as search, download, use, management, and backup. Seewo Whiteboard provides users with a service platform for cloud-based lesson materials and cloud classrooms. Teachers can not only store edited Xiwu lesson materials in the cloud lesson materials section but also bypass the limitations of USB drives by directly logging into Xiwu via their mobile phones or computers to view and edit lesson materials. They can even directly log into the Xiwu Whiteboard in the classroom, locate the lesson materials, and begin teaching immediately. This eliminates the need for teachers to carry computers back and forth between the office and classroom, thereby reducing their workload to a certain extent.

III. Strategies and teaching designs for the application of Seewo Whiteboard technology in classroom teaching

III. A. Strategies for using Seewo Whiteboard in classroom teaching

III. A. 1) Cultivating students' logical thinking skills with the help of Seewo Whiteboard

Nowadays, cultivating logical thinking skills in elementary school students has become a top priority in education. If teachers fail to guide students correctly, it will affect their enthusiasm for learning. Therefore, teachers should take effective measures to strive to improve students' logical thinking skills in order to promote their comprehensive development [28]. Schoolwork is becoming more challenging, and the demands on students' thinking abilities are also increasing. Teachers can adopt proactive educational methods to stimulate students' interest in learning, guide them to think actively and explore independently, thereby achieving the best learning outcomes.

III. A. 2) Using visual aids to increase students' interest in learning

Interest can motivate students to learn and actively explore knowledge, helping them improve their skills in their daily learning process. However, due to the complexity of certain concepts, some students find it difficult to truly grasp them, instead finding learning dull and tedious, and even developing a dislike for studying. In daily teaching, teachers can use Sivo Whiteboard to present rich scenarios and images to enhance students' interest in learning knowledge.

III. A. 3) Using Sivo Whiteboard to stimulate students' enthusiasm for learning

Interest is the key to stimulating students' enthusiasm for learning. Traditional classroom teaching methods have not been entirely successful, mainly because they lack interesting teaching content, which weakens students'

enthusiasm for learning. Therefore, before conducting classroom teaching, teachers must first awaken students' enthusiasm for learning in order to lay a solid foundation for creating high-quality and efficient classrooms.

III. A. 4) Utilizing Flash features to help students overcome difficult and challenging topics

Teachers can import images needed for class into their computers and display them on the Seewo Whiteboard. Both students and teachers can interact with the original images, such as drawing shapes on the Seewo Whiteboard, allowing students to experience the joy of learning through hands-on practice.

III. A. 5) Building knowledge bridges and systematizing knowledge

Teachers can help students build a knowledge framework by scientifically and systematically organizing the knowledge points in the textbook, combining various types of knowledge to form a complete knowledge system, thereby enabling students to better apply this knowledge to solve problems. By leveraging the multifunctional features of Seewo Whiteboard, teachers can effectively integrate knowledge points, enabling students to better apply what they have learned and achieve better learning outcomes.

III. A. 6) Utilize the Seewo Whiteboard Resource Library to expand classroom teaching content

Sewo Whiteboard has a powerful information resource library with clear and concise entries and large storage space. It can record the operations of teachers and students to provide examples for classroom teaching. In addition, Sewo Whiteboard can convert information resources in real time for users to use at any time. In the classroom, teachers can combine the actual situation of students to create a variety of teaching scenarios and a good learning environment to help students better understand and apply what they have learned, while effectively expanding the course content.

III. A. 7) Promoting the development of students' comprehensive abilities

In the classroom, evaluating students' performance is a crucial step. A comprehensive assessment of students' learning progress not only boosts their confidence but also helps them identify their weaknesses and make improvements. Additionally, it enables teachers to adjust and optimize their teaching strategies. The “Classroom Activities” module of Sivo Whiteboard offers various mini-games, such as Super Classification, Group Competition, and Word Selection and Filling, which can assist teachers in better evaluating students' learning performance. Sivo Whiteboard can assess students' learning levels through its “Question Bank,” thereby providing a more accurate evaluation of their learning outcomes.

III. B. Design and Implementation of Teaching Action Plans Based on Seewo Whiteboard Technology

III. B. 1) Designing a teaching action research plan

(1) Interactive Whiteboard Function Selection

The rich features of interactive whiteboards can enhance the diversity of teaching activities, but relying solely on technology while neglecting teaching objectives and the needs of students can lead to students losing their central role in the learning process. Therefore, when selecting interactive whiteboard features, the primary focus should be on the students, based on their interests and needs, to capture their attention. At the same time, technology should be used appropriately and flexibly, avoiding excessive reliance on features that are merely “surface-level” and fail to stimulate students' thinking. Secondly, the selection of features should prioritize ease of use for students, with the student as the central focus of learning, to facilitate physical interaction. Finally, the selection of features should aim to stimulate students' thinking and exploration, promote collaboration among students, provide opportunities for students to construct knowledge independently, and achieve conceptual interaction.

(2) Design Process for Interactive Electronic Whiteboard Activity Lesson Plans

Figure 1 illustrates the lesson plan creation process for the Seewo whiteboard. Interactive electronic whiteboard lesson plans should be designed from the students' perspective to capture their attention and spark their interest in learning. They should also consider students' age characteristics and the uniqueness of the activity, selecting interactive functions appropriately to achieve physical and conceptual interaction during implementation, thereby leveraging the advantages of interactive electronic whiteboards [29].

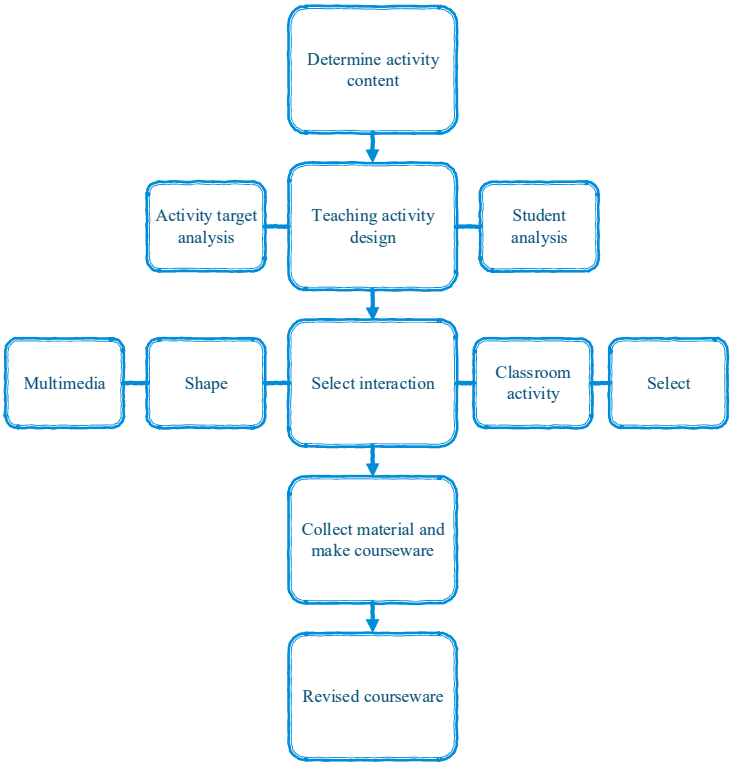

Figure 1: The process of making the whiteboard courseware

III. B. 2) Specific Implementation of Action Research in Teaching

Researchers used observation forms to analyze the implementation of physical interaction by examining students' interactions with the interactive whiteboard and teacher-student interactions during each activity. They analyzed the implementation of conceptual interaction by assessing students' initiative, peer-to-peer interactions, and cognitive performance. After the action research concluded, they evaluated the feasibility of implementing physical and conceptual interaction and summarized strategies and recommendations for applying interactive whiteboards in student teaching activities. To ensure the smooth conduct of the action research, researchers followed the steps of planning, action, observation, and reflection in each round of research. Each activity was recorded on video to facilitate further observation and analysis after the activity concluded, preparing for the next round of action research.

(1) First round of action research

The researcher reviewed relevant literature to clarify the developmental requirements for students in course learning. Two activities were conducted in the first round of action research to achieve two objectives.

The original conventional activity plan was adjusted based on the need to achieve physical and conceptual interaction. The adjusted plan was redesigned to generate an interactive electronic whiteboard teaching activity plan.

(2) Second round of action research

Based on the characteristic that students need to understand knowledge through concrete and tangible objects, the researchers utilized the cloning and touchscreen functions of the interactive whiteboard to provide students with a wealth of visual materials. Students were encouraged to manually operate, move, and compare objects, fully leveraging the physical interaction advantages of the interactive whiteboard to further achieve physical interaction. At the beginning of the activity, students could not accurately count. During the activity, they gradually mastered the method of counting the number of irregularly arranged objects, ultimately achieving the ability to independently count the number of irregularly arranged objects, thereby partially demonstrating conceptual interaction.

IV. Results and analysis of teaching action research

IV. A. The Impact of Sivo Whiteboard Technology on Teacher Leadership

IV. A. 1) Research Hypotheses and Models

(1) Seewo Whiteboard Technology and Teacher Teaching Strategies

Seewo Whiteboard technology has penetrated the education sector in a comprehensive and profound manner, with its influence extending to multiple areas such as teaching, management, scientific research, and teacher development. Focusing on the teaching level, Seewo Whiteboard technology is reshaping the underlying logic of teachers' teaching strategies from different dimensions, including teaching resources, teaching scenarios, teaching models, and evaluation feedback.

Based on the above reasons, this study proposes the following hypothesis:

H1: There is a direct positive correlation between Seewo Whiteboard Technology and teachers' teaching strategies.

(2) The mediating effect of digital literacy

The application of Seewo Whiteboard Technology in teaching can promote the improvement of teachers' digital literacy. Research shows that artificial intelligence is both the cognitive object for the improvement of teachers' digital literacy and the practical scenario for the development of teachers' digital literacy.

Based on the above reasons, this study proposes the following hypothesis:

H2: Teachers' digital literacy plays a mediating role between Sivo Whiteboard technology and teachers' teaching strategies.

(3) The mediating role of teachers' leadership.

This study argues that teachers' ability to apply generative artificial intelligence technology is a manifestation of their leadership, and this leadership directly influences the formulation and implementation of teachers' teaching strategies. Flexibly applying Sivo Whiteboard technology in teaching can cultivate or stimulate teachers' learning and innovation capabilities, thereby enhancing their leadership.

Based on the above reasons, this study proposes the following hypothesis:

H3: Teacher leadership mediates the relationship between Seewo Whiteboard technology and teacher teaching strategies.

(4) The chain mediation effect of teacher digital literacy and teacher leadership

Teacher leadership is primarily manifested in core aspects such as participating in decision-making, promoting collaboration among colleagues, and facilitating professional development among teachers. Enhancing teacher digital literacy can effectively enhance teacher leadership from these key dimensions.

In summary, this study proposes the following hypothesis:

H4: Teacher digital literacy and teacher leadership jointly play a chain-mediated role in the use of Siewo Whiteboard technology and teacher teaching strategies.

IV. A. 2) Model fitting test

This study employed a questionnaire survey to investigate the levels of relevant indicator variables among teachers. The sample distribution structure was reasonable in terms of demographic characteristics, providing a reliable foundation for research inferences.

This study utilized AMOS 28.0 to construct a multi-group confirmatory model, employing a three-stage testing process: First, the chi-square distribution was corrected using the Bootstrap method (B=2000 iterations). Then, the direct effect of Sivo Whiteboard technology on teaching strategies was assessed based on standardized path coefficients. Finally, the mediating effect was examined to reveal the mediating mechanism.

In terms of model fit assessment, the higher the model fit, the higher the model usability, and the more meaningful the parameter estimates. Referring to the evaluation standards for structural equation models, this study assesses model fit from three aspects: absolute fit, incremental fit, and parsimonious fit. Table 1 shows the model fit. After testing, all fit indices meet the critical value requirements. From the perspective of the absolute fit index, the actual values of the GFI, AGFI, and RMSEA indices are 0.9468, 0.9248, 0.0596, respectively, indicating that the model fits well and is suitable for further hypothesis testing.

Table 1: Model fitting

Adaptation standard	Absolute compatibility index		
	GFI	AGFI	RMSEA
Critical value	>0.9	>0.9	<0.08
Actual value	0.9468	0.9248	0.0596
Adaptation standard	Value-added compatibility index		
	NFI	RFI	CFI
Critical value	>0.9	>0.9	>0.9
Actual value	0.9466	0.9636	0.9836
Adaptation standard	Simplicity and compatibility index		

	PNFI	PCFI	χ^2 /df
Critical value	>0.5	>0.5	1<NC<3
Actual value	0.7964	0.7769	2.9485

IV. A. 3) Research Hypothesis Testing

After structural equation modeling validation, research hypothesis H1 did not reach statistical significance, while research hypotheses H2, H3, and H4 all reached statistical significance, with path coefficients of 0.5954, 0.2094, and 0.6698, respectively, all greater than zero and passing the 1% significance level test (p<0.001), as shown in Table 2. The above research results indicate that hypothesis H1 is not valid, i.e., the use of Sivo Whiteboard technology does not directly influence teachers' teaching strategies. Sewo Whiteboard technology has a positive effect on teachers' digital literacy, confirming hypothesis H2, i.e., the application of Sewo Whiteboard technology can enhance teachers' digital literacy, the application of Sewo Whiteboard technology has a positive impact on teachers' leadership, confirming hypothesis H3, i.e., the better the application of Sewo Whiteboard technology by teachers, the stronger their leadership, the standardized regression coefficient for the influence of teachers' digital literacy on leadership is 0.6698, p < 0.001, indicating that teachers' digital literacy and leadership jointly mediate the relationship between Sivo Whiteboard technology and teachers' instructional strategies, meaning that improvements in teachers' digital literacy contribute to the development of their leadership skills.

Table 2: Research the results of hypothesis testing

Research Hypothesis	Path	Estimate	S.E.	C.R.	P	Test result
H1	Teacher teaching strategy← Seewo Whiteboard Technology	-0.0035	0.6188	-0.7468	0.9887	Out of reach
H2	Teacher digital literacy← Seewo Whiteboard Technology	0.5954	0.0452	13.5345	***	Set up
	Teacher teaching strategy← Teacher digital literacy	0.3948	0.0798	7.9499	***	Set up
H3	Leadership leadership← Seewo Whiteboard Technology	0.2094	0.0595	5.0549	***	Set up
	Teacher teaching strategy← Leadership leadership	0.4198	0.0636	8.4985	***	Set up
H4	Leadership leadership← Teacher digital literacy	0.6698	0.0498	15.1948	***	Set up

IV. A. 4) Direct and mediating effects analysis

The study also employed AMOS's Bootstrap self-sampling method to test the mediating effect of teachers' digital literacy and leadership. With a confidence interval set at 95%, the results showed that the upper and lower limits were between 0.6236 and 0.3658, excluding 0, indicating that the indirect effect was significant. When examining the direct effect, the upper and lower bounds were found to be between 0.1136 and -0.0934, including 0, indicating that the direct effect was not significant. Thus, teacher digital literacy and teacher leadership exerted a significant full mediating effect between the application of Sivo Whiteboard technology and teacher teaching strategies, supporting hypothesis H4.

Examining the mediation effect results, as shown in Table 3, the total effect of Sivo Whiteboard technology on teachers' teaching strategies is significant (effect size = 0.4796, 95% confidence interval = [0.3485, 0.5485]). The direct effect value is -0.0034, with a 95% confidence interval of [-0.1098, 0.1125], which includes 0, indicating that the direct effect is not significant. The mediation effect value of teachers' digital literacy between Sivo Whiteboard technology and teachers' teaching strategies is 0.2344, with a 95% confidence interval of [0.1636, 0.3648], which does not include 0, indicating that the mediation effect is significant. The indirect effect of teachers' digital literacy accounts for 48.55% (0.2348/0.4836). The mediation effect value of teacher leadership between Seewo Whiteboard technology and teacher teaching strategies is 0.0844, with a 95% confidence interval of [0.0248, 0.1458], which does not include 0, indicating that the mediation effect is significant. The indirect effect of teacher leadership accounts for 17.87% (0.0864/0.4836). Finally, examining the chained mediating path, the mediating effect value is 0.1658, with a 95% confidence interval of [0.0648, 0.2374], which also does not include 0. This indicates that the chained mediating effect of teacher digital literacy on teacher leadership is significant, with the chained mediating effect accounting for 33.58% (0.1624/0.4836).

Table 3: Analysis of direct effects and mediating effects

/	STD Estimate	Estimate	P	95% Confidence Interval
				B.C.
Overall effect	/	0.4796	***	0.3485,0.5485
Direct effect	0.4896	-0.0034	0.9697	-0.1098,0.1125
Total indirect effect	0.4836	0.4858	***	0.3648,0.6174
Seewo Whiteboard Technology > Teachers' Digital Literacy > Teachers' Teaching Strategies	0.2348	0.2344	***	0.1636,0.3648
The proportion of indirect effects of teachers' digital literacy	48.55% (0.2348/0.4836)			
Seewo Whiteboard Technology > Teacher Leadership > Teacher Teaching Strategies	0.0864	0.0844	**	0.0248,0.1458
The proportion of indirect effects of teachers' leadership	17.87% (0.0864/0.4836)			
Seewo Whiteboard Technology > Teacher Digital Literacy > Teacher Leadership > Teacher Teaching Strategies	0.1624	0.1658	***	0.0648,0.2374
The proportion of chain mediating effect	33.58% (0.1624/0.4836)			

IV. B. Analysis of Teacher Leadership

IV. B. 1) Frequency distribution of leadership behaviors

Figure 2 shows the frequency distribution of teacher leadership behaviors. School teachers demonstrate a high frequency of implementation in both instructional and administrative leadership behaviors, particularly those related to indirect instructional leadership. Specifically, over 90% of school teachers frequently or very frequently participated in activities aimed at promoting teacher collaboration, ensuring teachers improve their instructional skills, and enhancing teachers' sense of responsibility toward student learning over the past year. This indicates that school teachers are highly concerned about instructional work within the school. However, it is worth noting that only 22% of school teachers frequently or very frequently directly enter the classroom to address discipline issues with students. Combining these two proportions, it can be seen that the way school teachers exercise instructional leadership is not by directly supervising teachers' instructional practices on the front lines, but rather by promoting teachers' professional development. This aligns with scholars' assertion that the primary mission of teachers is to promote teachers' professional development.

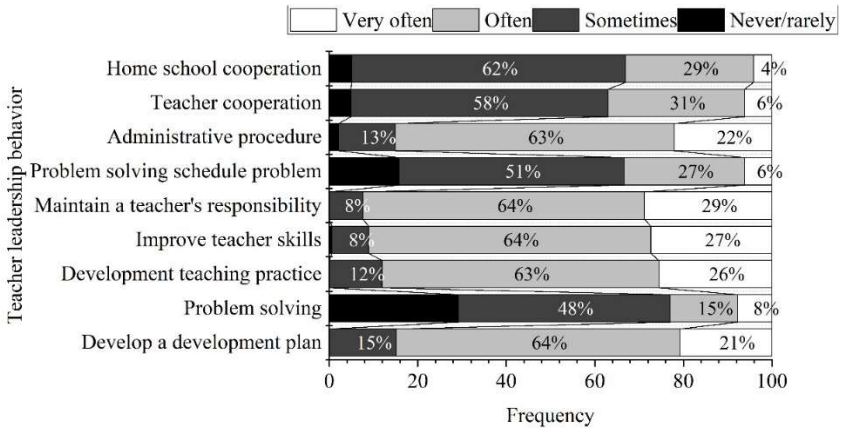

Figure 2: The frequency distribution of teacher leadership behavior

IV. B. 2) Analysis of potential teacher categories

Based on the frequency of leadership behaviors, this study used latent class analysis to categorize the sample teachers into four groups, as shown in Figure 3. The frequencies of each behavior for the first, second, third, and fourth groups were 0.8715, 0.6515, 0.4874, and 0.3188, respectively. Among these, the first category exhibits high execution frequencies across all behaviors. The second category demonstrates performance similar to the first category in terms of indirect instructional leadership behaviors, while its performance in other behaviors is similar to that of the third category. The difference between the third and second categories lies in the execution frequency of indirect leadership behaviors, whereas the fourth category exhibits the lowest execution frequencies across all behaviors.

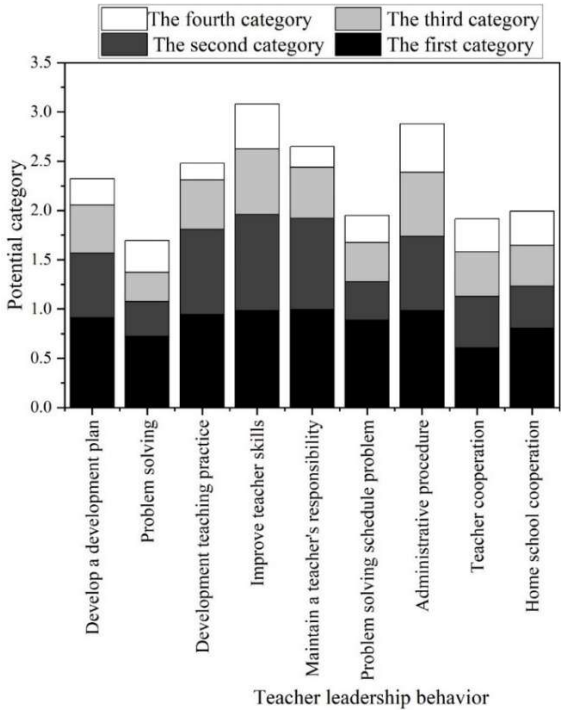

Figure 3: Teacher potential category analysis

IV. B. 3) Teaching Leadership Evaluation Results

Figure 4 shows the teaching leadership scores. This paper uses a fuzzy comprehensive evaluation model to calculate the membership degrees, weights, and comprehensive evaluation scores for each dimension of teaching leadership. A quadrant diagram is used to analyze the evaluation scores for each dimension of teaching leadership and other indicators to explore effective measures for improving teachers' teaching leadership. The letters A-I represent nine leadership indicators, including developing development plans and home-school cooperation. The comprehensive evaluation scores for teaching leadership among the participating teachers were A > F > C > I > B > H > E > G > D, with comprehensive evaluation scores of 3.7502, 3.73, 3.7194, 3.7168, 3.7, 3.6807, 3.6712, and 3.6609, respectively.

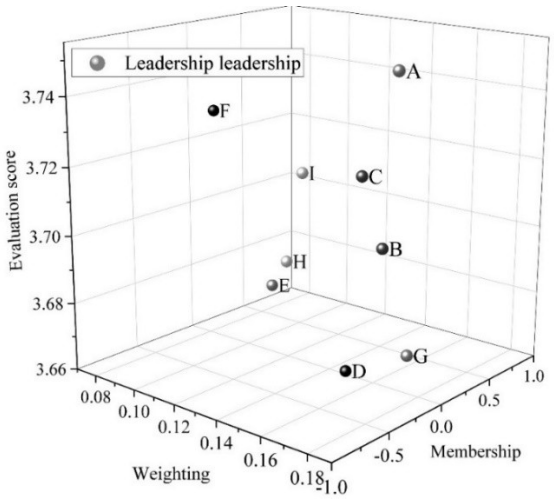

Figure 4: Teaching leadership score

IV. C. Analysis of Teaching Implementation Results

IV. C. 1) First Action

Select a school in City B to evaluate the effectiveness of teaching implementation using the Seewo Whiteboard technology. Two classes were selected, one experimental class and one control class, each with 50 students. The

experimental class students were taught using courses based on Seewo Whiteboard technology, while the control class students were taught using traditional teaching methods, and a comparative experiment was conducted between the two classes. After two and a half months of teaching practice, both the experimental class and the control class took the city-wide mid-term exam (the exam paper was uniformly prepared by the B City Education Research Institute, with high reliability and validity, moderate difficulty and discrimination, and a full score of 100 points). The first performance comparison analysis was conducted based on the exam scores of the two classes. Using SPSS 26 software, histograms were plotted for the scores of the experimental and control classes, and normal distribution curves were displayed, as shown in Figure 5. The scores of the experimental class ranged from 40 to 96, while those of the control class ranged from 40 to 99. From the distribution, the average scores of the experimental and control classes were 81.4994 and 77.2648, respectively.

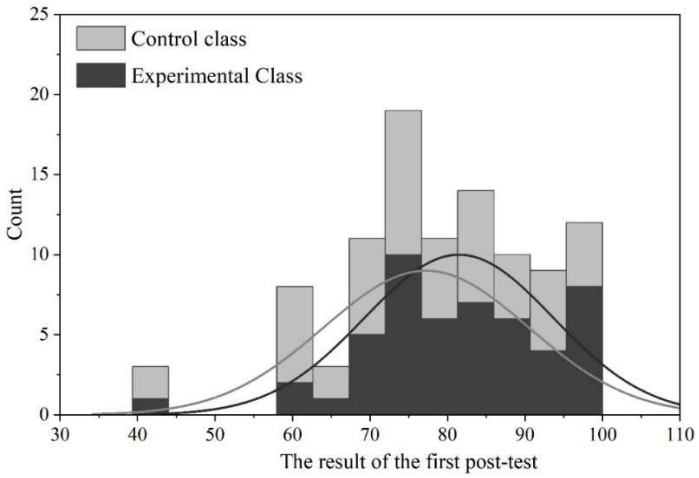

Figure 5: The experimental results of the experimental class and the cross-verse class

Table 4 shows the results of the independent samples t-test. The observed value of the F statistic for this test is 0.1485, with a corresponding probability p-value of 0.0048, which is much smaller than 0.05. This indicates that there is a significant difference in the variances of the two populations. Therefore, the value should be read from the row that does not assume equal variances, with a t-value of 0.6548 and a corresponding two-tailed probability p-value of 0.0498, which is much smaller than 0.05. Thus, it can be concluded that there is a significant difference in performance between the experimental class and the control class, indicating that the use of interactive courseware in teaching has a certain positive impact on improving student performance.

Table 4: Results of the independent sample t test

Levin's variance test						
Grade	/	F	Significance	T	Degree of freedom	/
	Assuming equal variance	0.1485	0.0048	0.6548	100	
	Equal variance is not assumed			0.6548	99.2754	
Mean equivalence t-test						
Grade	/	Sig. (Double tail)	Mean difference	SED	95% confidence interval	
					Lower limit	Upper limit
	Assuming equal variance	0.0455	1.3428	2.0569	-2.7486	5.4485
	Equal variance is not assumed	0.0498	1.3428	2.0548	-2.7486	5.4269

IV. C. 2) Second Action

Figure 6 shows the students' grades after the second intervention. The average final exam score for the experimental class was 83.1252 points, while the average final exam score for the control class was 79.6531 points. The average score for the experimental class was 3.4721 points higher than that of the control class, indicating a significant difference in performance between the two classes.

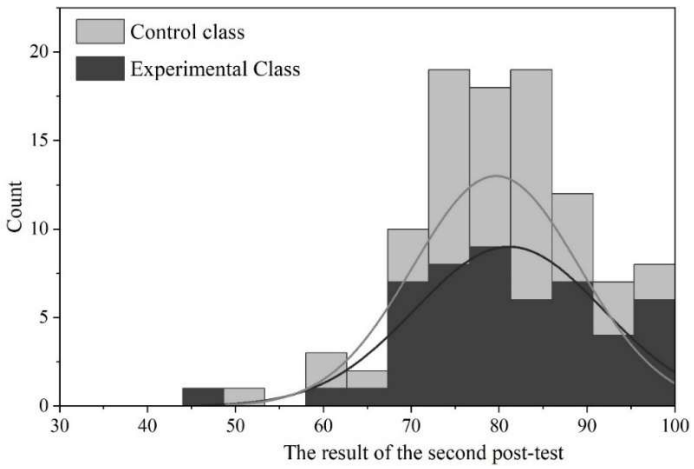

Figure 6: Second action

Table 5 presents the results of the independent samples t-test. The observed value of the F statistic is 0.0524, with a corresponding probability p-value of 0.8165, which is significantly greater than 0.05. Therefore, it can be concluded that there is no significant difference in the variance of the two classes' scores. Based on this, since there is no significant difference in the variance of the two classes' scores, the t-value should be read from the row assuming equal variance, which is 2.0964. with a corresponding two-tailed p-value of 0.0348, which is much smaller than 0.05, i.e., $p < \alpha$. Therefore, it can be concluded that there is a significant difference between the scores of the experimental class and the control class, indicating that the use of Sivo whiteboard technology in teaching is beneficial to improving student performance.

In summary, through a semester of teaching practice and analysis of midterm and final exam scores using SPSS 26 software, it can be concluded that interactive teaching methods have a certain positive impact on improving student performance. This also indirectly suggests that the application of interactive courseware in the classroom can enhance teaching effectiveness and elevate students' subject-specific core competencies.

Table 5: Results of the independent sample t test

Levin's variance test						/
Grade	/	F	Significance	T	Degree of freedom	
	Assuming equal variance	0.0524	0.8165	2.0964	100	
	Equal variance is not assumed			2.0934	98.4825	
Mean equivalence t-test						
Grade	/	Sig. (Double tail)	Mean difference	SED	95% confidence interval	
					Lower limit	Upper limit
	Assuming equal variance	0.0348	3.1587	1.5048	0.1695	6.1487
	Equal variance is not assumed	0.0348	3.1587	1.5048	0.1695	6.1491

V. Conclusion

This paper is based on the fundamental concepts of the Siewo Whiteboard technology, summarizing the functions of interactive electronic whiteboards, proposing strategies for the application of Siewo Whiteboards in classroom teaching, and designing a teaching action plan based on Siewo Whiteboard technology. A research hypothesis model is constructed to evaluate the impact of Siewo Whiteboard technology on teachers' classroom teaching leadership. The path coefficients for research hypotheses H2, H3, and H4 are 0.5954, 0.2094, and 0.6698, respectively, all of which are greater than 0 and statistically significant. Additionally, in the effect analysis, the total effect of Seewo Whiteboard technology on teachers' teaching strategies was significant, with an effect value of 0.4796 and a 95% confidence interval of [0.3485, 0.5485]. The indirect effect of teachers' digital literacy accounted for 48.55%. The frequency of teachers' leadership behavior execution was categorized into four groups. The frequencies for the first, second, third, and fourth categories were 0.8715, 0.6515, 0.4874, and 0.3188, respectively. Using the fuzzy comprehensive evaluation model, the comprehensive evaluation of teachers' instructional leadership was conducted. The comprehensive evaluation scores for teachers' instructional leadership were A > F >

C > I > B > H > E > G > D, with scores of 3.7502, 3.73, 3.7194, 3.7168, 3.7, 3.6807, 3.6712, and 3.6609, respectively.

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