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Teaching innovation and practical research on promoting "three-dimensional integration" with "five-in-one"—Taking "College Mathematics I Linear Algebra" as an example

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Abstract: *In the context of education reform in the new era, traditional linear algebra teaching has problems such as a single teaching model and low student participation, which cannot fully stimulate students' mathematical thinking and application ability. Based on the teaching innovation concept of "five-in-one" to promote "three-dimensional integration", this paper takes the course "College Mathematics I: Linear Algebra" as an example to explore a diversified and systematic teaching reform path. The five-in-one includes: teachers and students jointly build resources, cross-disciplinary integration, ideological and political courses, competition and scientific innovation promotion, and full-process evaluation tracking, aiming to improve teaching quality and students' core literacy. Through the redefinition of teaching objectives, the integration of online and offline resources, the expansion of teaching space, and problem-oriented heuristic teaching, the study achieved the three-dimensional integration of "platform-classroom-application", enabling students to make significant progress in knowledge learning, application ability and comprehensive literacy improvement.*

Keywords: *university mathematics; linear algebra; teaching innovation; five-in-one; three-dimensional integration*

1. Introduction

Linear algebra is an important basic course in higher education, which is widely used in many fields such as mathematics, physics, computer science, engineering technology, etc. Linear algebra is not only the knowledge foundation for students to learn subsequent courses, but also the core tool for them to apply mathematical thinking to practical problems. At present, the linear algebra teaching model commonly adopted by colleges and universities is relatively traditional, usually mainly based on teacher lectures and students passive learning, with a single teaching method and teaching content that focuses on theory rather than application, resulting in low interest in learning and difficulty in converting knowledge into practical application ability. In the context of new-era education, cultivating students' innovative thinking, practical ability and comprehensive quality has become an important goal. In recent years, the Ministry of Education has proposed the development policy of " five-in-one education " to promote an education system with comprehensive development of morality, intelligence, physical fitness, aesthetics and labor, which has also become an important guide for college curriculum reform. Linear algebra courses require students to master professional knowledge, and also combine the requirements of quality education to improve students' professional ability and comprehensive quality through teaching innovation. Therefore, this paper innovatively proposes a linear algebra teaching innovation model that promotes "three-dimensional integration" with "five-in-one", combines comprehensive education ideas with linear algebra teaching reform, and explores new teaching models, which has important practical significance. Since the teaching objects are students majoring in science and engineering, and this course is a compulsory general education course, we choose the recommended textbook for postgraduate entrance examination mathematics, "Linear Algebra in Engineering Mathematics" (7th edition) compiled by the Department of Mathematics of Tongji University and published by Higher Education Press as the teaching material. In addition, we also

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select some reference textbooks and put them into the learning pass for students to refer to. This course has 3 credits and a total of 48 hours. It mainly studies determinants and matrices. Linear algebra is widely used in natural sciences and social sciences, and it occupies a primary position in various branches of algebra.

2. Literature Review

Linear algebra is a basic subject in higher education and is widely used in many fields such as mathematics, physics, computer science, and engineering. As a highly abstract subject, the teaching of linear algebra often faces challenges such as strong theoretical nature, weak application, and low learning interest (Liang Tian et al ., 2024)[1] . In recent years, how to improve the teaching method of linear algebra and improve students' understanding and application ability has become a hot topic in educational research. This paper reviews the research results in recent years from the perspectives of the current status of linear algebra teaching, innovative teaching methods, and application practice, in order to provide reference for future teaching reforms. The current status of linear algebra teaching is mainly manifested in the following deficiencies. First, the teaching content focuses on theory , and the teaching method is mainly lecture-based, which makes it difficult for students to understand the practical meaning and application scenarios of the concepts (Sun Jun, 2024)[2]. Especially for students who are not majoring in mathematics, the abstractness of the course content increases the difficulty of understanding, and some students therefore lack interest in learning. In addition, traditional teaching methods often ignore students' practical application ability, focusing only on the derivation of formulas and theorems while ignoring the connection with practical problems (Liu Cheng et al ., 2024)[3] . These problems lead to low interest in learning and unsatisfactory teaching results. In this context, scholars have realized the necessity of innovation in linear algebra teaching. The goal of the reform is not only to improve students' academic performance, but more importantly to improve their practical application ability, so that students can flexibly apply the knowledge they have learned to practices such as engineering, computing and modeling. In order to cope with existing problems, recent studies have proposed a variety of innovative teaching methods. Situational teaching method is one of the effective means, which aims to visualize abstract mathematical concepts by constructing real-life application scenarios. Bai Xueting et al. (2024)designed practical cases in their research, such as data analysis and image processing, so that students can master knowledge points in the process of solving practical problems. This method has been proven to effectively improve students' understanding and interest in linear algebra knowledge[4]. Flipped classroom, as another emerging teaching method, has also been actively applied in linear algebra teaching. The flipped classroom adopts a learning-before-teaching model, allowing students to preview basic knowledge before class, and conduct interactive discussions and in-depth exploration in class, thereby realizing the internalization of knowledge (Wei Yuqiu et al ., 2021)[5]. Studies have shown that flipped classrooms not only improve students' classroom participation, but also strengthen their mastery of knowledge. In addition, project-based learning has gradually been introduced into linear algebra teaching. The project-driven approach emphasizes the application of knowledge to practical projects, such as solving data processing, engineering calculation and other problems through group cooperation. Students not only deepen their understanding of knowledge through cooperation and practical operations, but also cultivate teamwork and innovative thinking (Wang Qi et al ., 2021)[6]. In addition, the introduction of information technology has provided new possibilities for linear algebra teaching. In modern teaching, the use of programming tools such as MATLAB and Python to assist teaching can enable students to intuitively understand the concepts of linear algebra through programming and simulation (Wei Tao et al ., 2020)[7]. For example, by programming matrix operations and visualization of vector space, students can intuitively see the calculation results during the operation, which increases the interest and intuitiveness of learning. This method has achieved good results in practical applications, enabling students to more clearly understand the practical application of linear algebra in the field of science and technology.

3. Analysis of the Current Situation and Dilemma of Linear Algebra Teaching

Linear algebra is an important course in university mathematics teaching. Its content is widely used in scientific research and engineering applications. It is a basic course for science and engineering as well as some economics, management and other disciplines. However, due to the high abstractness and theoretical nature of the subject, linear algebra teaching has long faced many difficulties. With the needs of interdisciplinary and technological development, the teaching reform and innovation of linear

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algebra has become imperative. This article analyzes the current status and difficulties of linear algebra teaching from the perspectives of existing teaching models, student learning conditions, teaching resources, and teaching applications, in order to provide a reference for teaching improvement.

3.1 Current status of linear algebra teaching

As an important undergraduate course, linear algebra is widely offered in many majors such as mathematics, computer science, physics, and electronic information. Its teaching goal is to help students master basic concepts and theoretical knowledge such as matrix operations, vector spaces, eigenvalues and eigenvectors, and linear transformations, while cultivating students' logical thinking and abstract analysis capabilities. At present, many colleges and universities still use the traditional classroom teaching mode for linear algebra teaching, which is mainly based on textbooks. The teaching content mainly revolves around the explanation of knowledge points and theoretical derivation, focusing on theoretical learning. However, due to the limitations of teaching hours and course progress, teachers focus on explaining basic concepts and reasoning processes, and have few opportunities to explore the application scenarios of these knowledge in practice. There are relatively few practical links outside of theoretical content, which leads to students' lack of intuitive understanding of the practical application of the course. At the same time, with the development of educational technology, some colleges and universities have tried to apply flipped classrooms, micro-classes, online teaching and other models in classroom teaching, hoping to improve teaching effects through innovative teaching methods. However, due to the low popularity of such teaching models, some students lack sufficient autonomous learning ability, and teachers' innovation ability and energy are also limited by teaching tasks. Therefore, the actual application effect of new teaching methods has not yet appeared to a certain extent.

3.2 Main Dilemmas in Teaching Linear Algebra

3.2.1 The knowledge content is abstract and difficult for students to understand

The main contents of linear algebra include highly abstract concepts such as vector space, linear transformation, eigenvalues and eigenvectors, and the connection between these contents and physical phenomena and daily life is relatively vague, making it difficult for students to gain an intuitive understanding in learning. Compared with calculus, many knowledge points in linear algebra do not have obvious geometric meanings, but are understood through algebraic structures, such as matrix multiplication and the determination of linear independence of vectors. Therefore, students often find it difficult and boring to understand these abstract concepts, which reduces their interest and enthusiasm in learning.

In addition, many contents of linear algebra require high logical reasoning ability. Taking the rank of a matrix and the dimension of a vector space as examples, these contents involve a lot of logical reasoning and abstract thinking processes, requiring students to have strong reasoning ability and mathematical thinking. However, students who are not majoring in mathematics are deficient in abstract reasoning ability, which leads to great difficulties in the learning process. These problems are particularly prominent in applied majors such as engineering and computer science. It is difficult for students to form a deep understanding of knowledge during learning, resulting in poor learning results.

3.2.2 The teaching content is out of touch with practical application, and students lack motivation to learn

As a tool-based subject, linear algebra is widely used in many fields such as data analysis, engineering calculations, machine learning, and economic modeling. However, many teaching contents lack case support at the application level, which makes it difficult for students to understand the practical significance of the course. Traditional teaching methods are mainly based on formula derivation and theoretical demonstration, ignoring the combination of knowledge points and real-world applications, making it difficult for students to develop interest in the subject and motivation to learn. For example, eigenvalues and eigenvectors have important applications in image processing, dynamic system analysis, etc., but these applications are not generally included in teaching. Therefore, many students will have questions during the learning process: "What is the use of these contents in practice?" Unclear application value of knowledge will lead to students' lack of motivation to learn, which will reduce their investment in the course and affect learning outcomes.

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3.2.3 Single teaching method, lack of interaction and participation

Traditional linear algebra teaching is mainly based on lectures. In class, teachers are responsible for imparting knowledge, and students are in a passive acceptance state. There is less interaction in class, and students have difficulty in getting enough opportunities to think and ask questions, and cannot have a deep understanding of knowledge. In the process of teaching, teachers usually gradually explain the knowledge points according to the order of the textbook, focusing on definitions, theorems, derivations and example demonstrations, but lacking the links to guide students to think, discuss and analyze. Under this teaching method, students often focus on memorizing formulas and theorems, and rarely conduct in-depth knowledge exploration, resulting in poor learning results. In the teaching of some universities, although new teaching methods such as flipped classrooms and task-driven have been introduced, the actual effects of these teaching methods need to be further improved due to factors such as teaching resources and student levels. Some students are not adapted to the flipped classroom model that requires high self-study ability, and the pre-class preparation and post-class review are not sufficient, which affects the classroom effect. Teachers also face the pressure of time and energy when introducing new teaching models, so they fail to fully explore the advantages of new methods in teaching practice.

3.2.4 Lack of practical teaching and insufficient application ability of students

The practical teaching of linear algebra mainly includes computer experiments and application projects, but the linear algebra courses in many universities currently lack sufficient practical links. Most courses lack practical application content, such as using MATLAB, Python and other software to perform matrix operations, eigenvalue calculations and other basic programming operations, which limits students' ability to apply theoretical knowledge to practical problems.

Even though some colleges and universities have opened computer experiment courses for linear algebra, the practical content is mostly concentrated on simple matrix operations and basic programming operations. There is a lack of project tasks with practical significance, and students are unable to combine the knowledge they have learned with practical problems. For example, the application of linear algebra in data dimensionality reduction, recommendation systems, and image processing can all be used as practical projects, but these contents are rarely used in teaching. The lack of practical links makes it difficult for students to transform theoretical knowledge into practical application skills, affecting their comprehensive application ability in subsequent courses.

3.2.5 Insufficient teaching resources and pressure on teachers to innovate

At present, the teaching resources of linear algebra are mainly concentrated in textbooks and traditional courseware, and there is a lack of supporting digital teaching resources and cases. Most textbooks focus on theoretical content, and the knowledge content they explain lacks connection with practical applications. In addition, the content of textbooks is updated slowly, making it difficult to reflect the latest applications and developments of the subject. In addition, some teachers lack the energy to innovate the development of teaching resources under the condition of heavy teaching tasks, resulting in a single content of teaching resources. At the same time, since linear algebra is a basic course in undergraduate education, teachers generally bear heavy teaching tasks and lack sufficient time to develop and innovate teaching resources. The lack of teaching resources increases the difficulty of teachers in innovating teaching methods and hinders the promotion of new teaching models. In addition, the lack of corresponding teaching case libraries and resource platforms also limits students' self-study ability and affects the course effect. These difficulties faced in the teaching of linear algebra directly affect students' learning effects and application abilities. First, the high abstractness of theoretical knowledge and the singleness of teaching models make students' learning interest and enthusiasm generally low. Some students show fear of difficulties in the learning process, and even lose their motivation to learn, which affects their academic performance. In addition, the teaching content is out of touch with practical applications, which makes it difficult for students to apply the knowledge they have learned in subsequent subjects after the course ends, resulting in a low knowledge conversion rate. The lack of practical links also leads to students' lack of ability to solve practical problems. If students cannot effectively apply the knowledge of linear algebra to practical problems in their subsequent studies or work, it will be difficult for them to form interdisciplinary comprehensive application capabilities. This not only affects students' personal development, but also limits the improvement of the quality of talent training in colleges and universities.

In summary, there are many difficulties in linear algebra teaching in terms of teaching content, teaching methods, teaching resources and practical applications. The existence of these problems not only affects students' learning interest and learning effect, but also hinders the cultivation of students'

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comprehensive application ability. In order to solve these difficulties, colleges and universities should gradually promote the reform of linear algebra teaching, actively introduce new teaching methods such as situational teaching, flipped classroom, task-driven, strengthen practical links, and enrich teaching resources. Through various improvements, it will help improve students' learning effect and comprehensive quality, and lay a solid foundation for students' subsequent development.

4. Teaching innovation and exploration to promote "three-dimensional integration" with "five-in-one"

In the science and engineering curriculum system of higher education, linear algebra, as a basic subject, has strong theoretical, abstract and extensive application value. In recent years, with the development of science and technology and the need for interdisciplinary cross-disciplinary studies, colleges and universities have gradually realized the key role of linear algebra teaching and promoted the innovation of teaching models to improve students' learning effects and application capabilities. Based on actual teaching cases, this paper analyzes the specific difficulties and innovative practices in linear algebra teaching, and shows how to achieve the improvement of teaching quality and efficiency through the "five-in-one" teaching model to promote the "three-dimensional integration" teaching model, and cultivate students' innovative thinking and comprehensive application capabilities.

4.1 Pre-teaching student situation survey and the design concept of teaching students in accordance with their aptitude

Linear algebra is taught to students of science and engineering, but even among similar majors, students' subject foundations and learning needs often differ. In order to effectively deal with this differentiation, the instructors use the online learning management platform "Xuexitong" to publish questionnaires and conduct student surveys before designing the teaching. This process helps teachers gain an in-depth understanding of the knowledge base and learning needs of students in each class. By analyzing the strengths and weaknesses of students in terms of mathematical foundation, learning interests, and application capabilities, teachers can identify the pain points and difficulties that students may encounter in the learning process, thereby formulating teaching plans "according to local conditions". The student survey not only promotes the scientific arrangement of teaching content by teachers, but also provides targeted reference for classroom interaction, problem design, and assessment methods in subsequent teaching.

In the construction of teaching design, the teaching team has refined it from macro to micro, from the overall educational concept of "one base, two axes and three levels of progression" of the course, to the design of each chapter and each knowledge point, and then to the preparation of specific teaching plans. Every step is repeatedly scrutinized to achieve the systematicness and coherence of the teaching content. The educational concept of "one base, two axes and three levels of progression" is based on "student-centeredness", combined with the two main lines of "mathematical knowledge teaching" and "application ability training", and the learning content is progressively promoted through three stages of basic knowledge, knowledge expansion and high-level application. At the same time, the research results and contributions of mathematicians are organically embedded in the teaching content to help students understand the development of mathematics from a historical and cultural perspective. In addition, teachers are equipped with a knowledge system mind map and high-level application topics in each knowledge section, making the students' knowledge system clearer and strengthening the combination of theory and application.

4.2 Make full use of the digital resources of the Learning Platform to achieve efficient classroom management

With the increasing abundance of digital teaching resources, the "Learning Pass" platform has become an indispensable management tool in the teaching of linear algebra. Teachers use this platform to provide students with rich learning resources, including course videos, textbooks, exercises, etc., gradually expand and update the course content, and build a convenient online learning resource library for students. Through the Learning Pass platform, teachers can timely issue high-level task sheets, detect students' pre-class self-study situation, and obtain feedback information so as to adjust the teaching content in a targeted manner before formal teaching. This process not only improves the effect of students' pre-class learning, but also effectively reduces the pressure of repeated explanation of knowledge points in class, making classroom teaching more focused and in-depth. Classroom teaching

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is mainly based on the model of "context introduction-exploration and knowledge-task implementation-summary and evaluation", emphasizing the subject status of students. Through "context introduction", students' interest is stimulated and students are guided to actively explore the learning content; in the process of "exploration and knowledge", students are guided to solve problems independently and enhance their understanding of knowledge points; in the "task implementation" stage, knowledge understanding is further deepened through practical operations and discussions; the final "summary and evaluation" link helps students reflect on the learning process and summarize knowledge gains and deficiencies. The use of the Learning Tong platform provides teachers with a variety of teaching management methods, making the transfer and consolidation of knowledge inside and outside the classroom more systematic and efficient.

4.3 Constructing a "three-room, three-platform, two-group, and one-area" teaching space to expand the spatial and temporal boundaries of learning

On the basis of traditional classrooms, the teaching team actively explores the "three rooms, three platforms, two groups and one area" teaching space, striving to expand students' learning space and make learning more flexible and rich. Specifically, the "three rooms" refer to classrooms, dormitories and study rooms. Students can not only participate in teaching activities in the classroom, but also use learning resources in dormitories and study rooms, review and practice anytime and anywhere, thus forming flexible learning. The "three platforms" refer to the online course platform of Xuexitong, the online interactive platform of Zhihu and the WeChat public platform. Through open communication platforms such as Zhihu, students can ask questions and discuss around the learning content, making knowledge transfer and answers more timely. The "two groups and one area" refers to QQ groups, WeChat groups and online discussion areas. QQ groups and WeChat groups enhance emotional communication and knowledge sharing between teachers and students, and between students, so that students can also get support and feedback outside of class; the discussion area provides an open discussion environment for teachers and students, further promoting the level and quality of "teacher-student interaction" and "student-student interaction".

This diversified teaching space effectively breaks the time and space limitations of traditional classrooms, expands the time and space boundaries of learning, and makes learning activities no longer limited to the classroom, but a dynamic process throughout students' lives and practices. Through these platforms and spaces, students can ask teachers or classmates for advice at any time when they encounter questions about knowledge, which improves interactivity and flexibility in knowledge acquisition.

4.4 Heuristic teaching and problem-oriented teaching to stimulate students' curiosity and inquiry ability

Linear algebra is highly theoretical, logical, and abstract, and traditional lecture-based teaching is difficult to fully stimulate students' interest in learning. Therefore, in the teaching process, the teaching team actively explored heuristic and problem-oriented teaching models, and provoked students' thinking by raising challenging questions. For example, when teaching the concept of "linear correlation", the teacher raised the question of "simultaneous shrinkage" to attract students' attention to the essence of linear relationships; in the chapter "Eigenvalues and Eigenvectors", the importance of linear transformation was introduced through the collapse of the Fontanka Bridge in 1906, or the experiment of twisting chalk allowed students to intuitively feel the effect of linear transformation. This kind of heuristic question can not only stimulate students' curiosity, but also help them to continuously explore and verify in the process of understanding knowledge, and cultivate students' independent thinking and analytical ability. Through this problem-oriented teaching method, students' classroom participation has been significantly improved, and their enthusiasm has also been improved. Guiding students to discover and solve problems can help them build a strong sense of achievement and interest in learning, and truly realize the transformation from "passive learning" to "active learning".

4.5 Scientific teaching reflection and literacy cultivation

Teaching reflection is an important means of teaching improvement. During the teaching process, the teaching team constantly reflects on teaching and summarizes and improves the teaching effect of each chapter. Through this process, teachers can timely discover problems in the teaching process and improve teaching methods. For example, the teaching team found that the traditional teaching methods

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of theorem derivation and calculation examples have certain limitations, and it is difficult for students to form an overall mathematical thinking. To this end, the teacher added the introduction of the background of theorem and the discussion of application scenarios in teaching to help students master the knowledge as a whole. In terms of literacy cultivation, the teaching team strives to cultivate and improve students' "five skills, four allowances and three uses" literacy, namely: "five skills" - learn to raise questions, learn to apply, learn to analyze, learn to evaluate, and learn to innovate; "four allowances" - let students summarize rules, summarize methods, challenge difficult problems, and design applications; "three uses" - use mathematical knowledge to analyze practical problems, use mathematical methods to simplify complex applications, and use mathematical literacy to improve comprehensive quality; through the cultivation of "five skills, four allowances and three uses" literacy, students have formed good learning habits and scientific literacy in the learning process. This literacy not only helps students master linear algebra knowledge, but also lays a solid foundation for their future academic and career development.

4.6 "Five-in-one" teaching innovation model promoting "three-dimensional integration"

After years of teaching exploration, the teaching team has built a teaching model that promotes "three-dimensional integration" through "five-in-one". With "students as the center", the team works together in the following five directions: (1) Teacher-student co-construction: the teaching team and the teaching assistant team jointly develop rich learning resources, including video and non-video resources, to support students' self-study; (2) Interdisciplinary: guide students to conduct interdisciplinary research, such as cooperating with West China Fourth Hospital and West China School of Clinical Medicine to carry out research on CT image analysis of cerebral hemorrhage and apply for invention patents; (3) Ideological and political infiltration: by telling the research achievements of mathematicians, infiltrating scientific spirit and cultural connotation, and cultivating students' sense of responsibility and mission; (4) Competition and scientific innovation: encourage students to participate in mathematics competitions, modeling competitions and other activities to stimulate their potential and improve their high-level thinking; (5) Full-process evaluation: use the learning pass to assign homework, tests and other learning tasks, and comprehensively track and provide feedback on students' learning progress. This teaching model realizes the three-dimensional integration of "platform-classroom-application": the learning pass platform serves as a resource management platform, and the classroom is mainly based on high-level flipped teaching.The effect data after innovative practice is shown in Table 1.

Table 1: Effects of innovative practices

Issue Name		2022-2023-2	2023-2024-1	2023-2024-2
Number of students enrolled	Number of people	479	300	226
Teaching Resources	Total number of teaching videos	32	32	32
	Total duration of the lecture video (minutes)	196	196	196
Non-video resources	Quantity (pcs)	234	234	234
Course Announcement	Quantity (pcs)	463	463	463
Classroom Activities	Total number of distribution activities (times)	52	13	51
	Total number of participants (person-times)	2883	622	2671
	Total number of sign-ins issued (times)	43	8	51
	Total number of participants (times)	2420	475	2671
	Total number of questionnaires distributed (times)	8	5	0
	Total number of participants in the questionnaire (person-times)	460	147	0
	Total number of candidates issued (times)	1	0	0
	Total number of candidates participating in the election (person-times)	3	0	0
Quizzes and Assignments	Total times (times)	191	154	76
	Total number of exercises (questions)	284	284	284
	Number of participants (persons)	467	300	225
Interactive communication	Total number of posts (posts)	194	52	191
	Number of posts by teachers (posts)	114	30	16
	Number of people participating in the interaction (persons)	57	11	76
Assessment (Test)	Number of times	23	20	4
	Total number of test questions (questions)	54	54	54
	Number of participants (persons)	427	298	190
	Number of people who passed the course (persons)	459	290	225

Under the new model, through academic surveys and teaching designs that teach students in

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accordance with their aptitude, course content is more in line with students' needs. With rich online learning resources, enhanced classroom interaction, and a combination of pre-class preview, classroom discussion, and post-class consolidation, students have gradually formed good study habits, and their learning interest and initiative have significantly improved. The whole-process evaluation mechanism records students' learning status through Xuexuetong, forming a closed loop of "feedback-improvement-enhancement" to help teachers grasp students' learning progress and adjust teaching strategies in a timely manner. Students have a clearer understanding of their own learning effectiveness and continue to adjust based on feedback, significantly improving their learning effectiveness.

5. Conclusion

The linear algebra teaching model of "five-in-one" promoting "three-dimensional integration" has effectively solved the problems of strong abstractness and insufficient student participation in traditional teaching through systematic innovative practice. Through the investigation of learning conditions, teaching students in accordance with their aptitude, integration of digital resources, expansion of teaching space and application of heuristic teaching methods, the teaching design is more targeted, interactive and flexible, which improves students' learning experience. At the same time, the teaching concept of "three-dimensional integration" emphasizes the comprehensive combination of learning platform, classroom teaching and practical application, which not only consolidates students' basic knowledge, but also expands their ability to solve practical problems. The application of this model shows that the deep integration of theoretical knowledge and application scenarios and the cultivation of literacy throughout the course can help build a more efficient teaching system and provide a solid foundation for cultivating innovative talents. Future teaching research can continue to deepen practice on the basis of this model and continuously optimize teaching effects to meet the needs of talent training in the new era.

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