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Teaching Efficiency Enhancement and Interest Empowerment: A Case Study of Unity3D Development

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Abstract: With the advancement of the digital age, the cultivation of skilled talents has put forward higher requirements for teaching. Under the traditional teaching model, students' lack of initiative in learning not only leads to weak teaching effectiveness but also makes it difficult for the cultivated talents to meet the practical operation ability requirements of real industries. Based on this, in response to the pain points of the courses and industry demands, improvement methods were explored. Abstract knowledge points were transformed into practical contents that can be operated, stimulating students' interest in exploration, achieving teaching efficiency enhancement and interest empowerment. To a certain extent, this has improved students' Unity3D development practical operation ability and professional quality, and effectively enhanced the teaching effectiveness of the courses.

Keywords: Unity3D; Teaching Efficiency Enhancement; Teaching Reform; Interest Empowerment

1. Introduction

Since the promulgation of the "14th Five-Year Plan" for Digital Economic Development, cultivating skilled talents in the field of digital economy has been an important entry point for schools to improve the quality of corresponding courses and talent training [1], and the rapid development of the game industry and virtual reality has made technical talents with Unity3D development capabilities become an industry Just need it. However, the traditional teaching mode directly leads to low teaching effectiveness and serious lack of students' learning initiative due to the lagging teaching content, single teaching mode, single scoring and assessment and other problems [2]. Take Unity3D development as an example, if the course teaching is designed according to a unified standard, it will completely ignore the differences in students' academic situation. Although some students have a foundation, they lack practical experience. Some interdisciplinary students have not even been exposed to C# programming. If they can't keep up with the progress, they will lose their motivation to learn. Second, if the explanation is based on the hard set of textbooks, students' knowledge points will be scattered and unable to form a complete development system [3]. Students will learn all the knowledge points according to chapters and cannot carry out a complete development process in series. In the face of the needs of actual projects, it is easy to fall into difficulties and lose confidence in completion. Third, if teaching focuses on theoretical indoctrination and interest guidance, and the scoring standard focuses on results and processes, students will fall into passive acceptance of learning due to lack of interest, and rarely take the initiative to carry out learning after class. In the end, there may be similarity or plagiarism between projects and works, and it is difficult to transform knowledge into practical development ability [4]. Against this background, teaching efficiency enhancement and interest empowerment highlight their necessity, so that students can realize the relationship between course knowledge and the direction of employment, enhance the practical effect and project development ability, and make students change from passive acceptance to active exploration through interest stimulation, solve the fear of difficulties with interest, and maintain enthusiasm for learning.

2. Teaching Enhancement and Interest Empowerment

Teaching enhancement encompasses instructional optimization aimed at improving quality, capability, and efficiency, preventing

disconnection between learning and application. Centered on the Outcomes-Based Education OBE concept, it anchors the talent demands of the industrys , providing students with direction and technical support for employment and graduation project topics 5. Enhancement offers differentiated resources for students with varying foundational levels subsp. , avoiding wastage of teaching resources, strengthening practical abilities, and preventing misalignment between talent cultivation and industry needs 6. Traditional classroom teaching fails to meet current talent development goals, while teaching enhancement effectively addresses gaps in instructional design.

Interest empowerment takes student interest as the core driver, transforming their passion for courses into active learning motivation through optimized teaching content, experimental design, and incentive mechanisms. Traditional courses, dominated by teacher-led lectures, fail to convert students innate enthusiasm into learning momentum. Students may be familiar with games and trending topics yet remain unaware of the connection between course knowledge and their interests—precisely the gap interest empowerment seeks to bridge. It leverages interest to dismantle students fear of difficulty, encouraging them to dare to learn; links interest to familiar scenarios, motivating them to want to learn; and reinforces a sense of achievement through interest, making them willing to learn—ultimately elevating teaching quality and learning outcomes.

3. Teaching Efficiency Enhancement and Interest Empowerment Application in Unity3D Development

3.1 Analyze the Learning Situation of the Teaching Subjects

Before formulating strategies to increase teaching efficiency and interest empowerment, it is necessary to comprehensively and accurately analyze the learning situation of the subjects, which is the prerequisite for ensuring the effectiveness of the strategy. Taking Unity3D development as an example, the teaching subjects are divided into undergraduates and college students. The teaching subjects of undergraduates are mainly juniors majoring in computer-related majors. They have a certain programming foundation, such as computer programming I, computer programming II, JAVA programming, etc., but in reality Less experience in application and development. At this stage, students are enthusiastic about the game industry, familiar with the current popular games, and willing to transform the knowledge they have learned into actual game works. However, at the same time, there are problems such as lack of learning patience and fear of complex technical principles. Based on this, teaching design should pay attention to the balance of fun, practicality and challenge, make full use of students' interest in games, and lower the threshold of technical learning. Students in the college entrance book pay more attention to the role and significance of the course, and their enthusiasm in the classroom will be higher. However, there are many interdisciplinary students in the college entrance course. The students have different foundations. Some have studied similar courses or completed graduation, and some have not studied C#. Therefore, the design of curriculum resources is targeted and differentiated, and students with weak foundations are proposed. For C# program design make-up modules and Unity basic operation training to ensure that students with different basics can achieve ability results that meet the requirements of the syllabus.

3.2 Restructuring the Teaching Content

Textbook content is typically organized into technical modules for sequential instruction, often lacking coherence between knowledge points that hinders students from building a comprehensive knowledge framework. Educators can structure fragmented knowledge into a cohesive system following the logical progression of foundational concepts, core skills, and integrated applications, aligning with students 'cognitive development. During the introductory phase, focus on explaining technical terminology in the game engine Unity, operating the Unity editor interface, and resource management fundamentals to help students quickly adapt to the game engine environment. This stage can be enhanced by introducing environmental materials, constructing scenes, and designing 3D characters, enabling students to master basic scene-building operations and build confidence in their learning journey. Figure 1 demonstrates the textbook's original scene setup compared to its reconstructed version, intentionally delaying

immediate programming assignments to cultivate students' interest in learning. During the core skills phase, following the practical development process of Unity3D, we systematically cover essential concepts including project creation, character import and animation, physics engine application, UI system development, game logic programming, and sound effect/animation production. We emphasize the integration and synergy between these knowledge points. For instance, when teaching physics engine applications, we first help students master fundamental concepts like rigid bodies and collision detection. Building on previously learned scene construction techniques, we then demonstrate how to implement physical effects in game environments—such as object collisions and gravity-based motion—allowing students to grasp the interconnected nature of different technical domains. During the integrated application phase, we implement real-world project simulations with comprehensive development tasks. Students are required to apply their acquired knowledge holistically to complete the full development lifecycle—from requirement analysis and design planning to implementation. For example, when developing character attack mechanics with damage calculation, students must undertake multiple design aspects including character data architecture, game balance optimization, damage computation algorithms, and injury resistance mechanisms. This process integrates game engine logic analysis, animation system development, and script programming, effectively bridging the gap between theoretical learning and practical application.

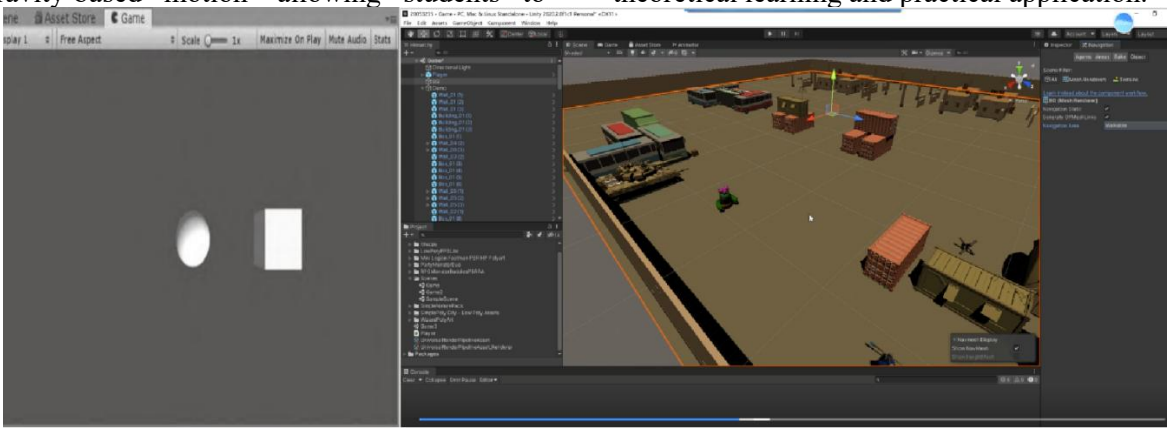

Figure 1. Comparison of Scenario Building and Reconstruction after Scenario Building

3.3 Enrich the Experimental Process

Teaching needs to choose suitable development projects and experimental content. The selection of experimental projects and content directly affects students' interest in learning. First of all, the experimental project should be in lines with the purpose and requirements of the experiment, closely combine theoretical knowledge with practical operation, so that students can take the initiative to master the knowledge content covered by the Unity3D development process in the process of completing the project, and lay the practical foundation for the practical work in the field of Unity3D development in the future. Secondly, , the project should be interesting and challenging, but not too difficult. In terms of fun, you can choose the game themes that students are familiar with and like, such as classic role-playing games, action adventure games, etc., so that students can feel the fun of developing their favorite game types during the experiment. The challenge is reflected in the fact that the project requires students to apply multiple knowledge points learned in the course to complete through independent thinking and exploration.

Table 1. Examples of Course Experiments

project name	experiment content	Corresponding teaching objectives
Use of Unity3D development framework	1. Software configuration and environment configuration: the overall structure of the project, the creation of the project and the import of materials, the construction of scenes, etc. 2. Learn the basic interface layout of Unity editor by using optional environmental materials: including hierarchy, inspector, scene, game and other windows. 3. Use optional role materials Common basic functions and	1. Master the basic functions of Unity3D, such as creating projects, importing resources, creating scenes, adding components, etc. 2. Understand and use the basic components in Unity to build game objects. 3. Master the basic operation of Unity

	components in Unity: such as Transform component, Mesh renderer, Collider, etc.	editor, including interface layout, project management, scene creation and editing, etc.
Set the UI (elements can refer to the Black Myth Monkey King)	1. Visualize the available health bar and experience bar models: Create the enemy's health bar (UpdateHealthBar), player information bar (PlayerInfo), and experience bar (UpdateExpBar). 2. Use the material to create your own creative ideas for different types of dialog boxes: background board setup, use of Text components, and response. 3. Create the main menu: UI Settings for the main menu (MainMenu), option buttons for game Settings (Start, Continue, Setting, etc), and scene transfer (SceneManager).	1. Familiar with the basic components and operations of the UI system in Unity. 2. Master the use of UI to create the layout, button function and interaction logic of the main menu. 3. Learn to handle communication and switching between the main menu and other modules of the game.

Secondly, experiments need to be integrated into coherent game works. Traditional experimental teaching is often carried out independently of each experiment. After completing an experiment, students do not pay continuous attention to the results of the experiment. In order to change this situation, various experiments can be integrated into a coherent game work. At the beginning of the course, determine a complete Unity3D development goal, such as developing a small role-playing game. Then, the whole game development process is broken down into multiple experimental tasks, each of which is a part of the project development. At the end of the course, students can independently complete a complete work of their own. This sense of accomplishment will greatly stimulate students' interest in experiments and enthusiasm for learning, and make students more actively engage in experimental operations. Students who have not completed this part of the task will have a certain sense of crisis when they see other students who have completed it. In the end, all of them can give students a sense of accomplishment when they have completed the real project.

3.4 Encourage Innovation and Increase Incentives

A scientifically designed scoring and reward system effectively motivates students 'enthusiasm and initiative in learning, providing clear goals and motivation throughout the educational process. Taking Unity3D development as an example, optimizing the scoring mechanism, introducing peer evaluation systems, and incorporating feedback mechanisms can significantly boost students' engagement in coursework and creative projects. This approach encourages independent innovation, allowing each student to develop personalized projects with unique ideas, while respecting individual differences in teaching practices. For instance, experimental tasks should focus on core technical requirements and functional objectives rather than fixed themes or designs, enabling students to freely choose topics, gameplay mechanics, and artistic styles. Furthermore, outstanding works can be showcased during breaks, allowing all students to experience

4. Reflections and Prospects

Through teaching efficiency enhancement and interest empowerment, the problems of traditional teaching that focus on theory and neglect practice and industry disconnection, unified teaching ignore academic differences, and focus on result assessment ignore process motivation to a certain extent [7], but combined with the real teaching situation of the course, student feedback and teaching reflection, it is still necessary to deal with the problems and obstacles faced. Targeted solutions provide a basis for subsequent optimization. For example, there are certain limitations in the layered teaching after analyzing the learning situation of the teaching object, and the accuracy of efficiency is insufficient. The current stratification is based on the questionnaire on the learning situation of the course, and the progress and progress of students' learning are not tracked in real time. When reconstructing the teaching content, there is a homogeneous bias in interest empowerment, and the coverage is insufficient. The course cases focus on some mainstream topics and games, ignoring the interests of different students, resulting in cases not being able to interest all students. Some cases are not fresh enough. For example, "Black Mythology: Wukong" was not integrated into the course until half a year after it was launched. The course of teaching leads some students to think

that the teaching content lacks timeliness and freshness, which affects the enthusiasm for learning.

Based on the above reflection, future courses need to further strengthen the role and sustainability of teaching efficiency and interest empowerment from the perspective of dynamic adaptation, case diversity, and school-enterprise collaborative results incubation, so that students can stimulate initial interest from the scenario construction of zero programming threshold, to deepen learning enthusiasm in popular cases, and then to the creation of personalized works to maintain exploration. Desire to realize the transformation from "let me learn" to "I want to learn", and provide more solid talent support for the development of Unity3D and the development of the digital economy.

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