Design and Application of Agile Development-Based Game Project Management System

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Abstract: With the rapid development of society and the constant change of times, global informatization is gradually approaching. Agile development is a new software development approach that has emerged in recent years. It can effectively meet different customer needs, provide timely feedback on customer suggestions, and greatly improve the success rate of product development. It has been widely recognized by industries. Compared with traditional management methods, agile project management requires higher communication efficiency and requires a high degree of unity in the values of the development team, which has become an inherent driving force in project management. This study is based on game project management and aims to improve product development efficiency and reduce development cycles through the application of agile development. Firstly, an introduction to agile development is provided, followed by an analysis of the software requirements for game project management, including project management processes, system module requirements, and system functional requirements analysis, as well as an explanation of the agile software management process. The study then introduces the agile development game project management system, including game engine integration, item and score modules, art design, 3D modeling, and game interface development. By meeting different customer needs, rapidly updating the database and system functions, and improving work efficiency, this study provides a theoretical basis for future research and software development.

Keywords: Agile Development; Game Project Management; Software; System Design

Introduction

In recent years, China's gaming industry has undergone significant changes. Faced with the impact of well-known foreign game companies, many development teams in China face great market and product pressures [1]. The biggest problem in game development in China is serious homogenization and lack of product diversification. In this social context, agile development has become the development approach for many game companies. Under the project management of agile development, the goal is no longer to make processes and standards the sole focus, but to manage agile projects based on the characteristics of the development team and the nature of the product. This is also an important component of game software development [2]. In this paper, game project systems will be designed through agile development to improve game diversification and meet the needs of different customers.

1. Literature Review

Agile projects require high team collaboration, real-time communication among team members, and a unified value system for project design. Agile development has undergone more than 20 years of development [5] and has become increasingly mature in its application. However, in China, agile development has only been preliminarily applied in small-scale projects or web development, and its presence in large-scale project development is rare.

1.1 Foreign Research Status

The concept of agile development was proposed by Western scholar Roger Nagel at the end of the last century [6]. Common management methods include XP extreme programming, FDD feature-driven development, iterative development, Scrum, etc. More

and more companies have adopted agile software development, and it has become mature in some Western countries. It has evolved from individual models to a comprehensive system [7]. When introducing agile development into the development process, it has fundamentally changed and improved the product quality, development success rate, and reduced development costs, ensuring the sustainable development of enterprises.

1.2 Current Research Status in China

The design of project management systems for domestic game software can be divided into three types. The first type is customization based on customer requirements, with weak project management awareness among managers. The second type is innovative research and development teams that learn from advanced concepts abroad and implement corresponding management systems. Although they have some innovation in products, overall efficiency is not guaranteed. Many research and development teams are currently in this stage. The third type is large-scale software development, where enterprises are already mature and have sufficient resources to implement project management processes. However, these enterprises upgrade their products quickly and find it difficult to meet diverse customer needs, so further improvements are needed.

1.3 Overview of the Relevance of Agile Development

Agile development is a "people-oriented" approach to system development. After rapid iterations, testing and optimization can be conducted to improve the operational efficiency of the system. In the field of games, many large-scale game developments also adopt agile project management models, which enhance communication and use player feedback as a standard for improving games. Game giants like Blizzard are fond of agile development project management systems and have found high application value. In recent years, people have faced high work pressure and enjoy relaxing through games. The requirements for game development are also increasing. With the popularization of game development tools, many small companies can also develop good games and achieve success by seizing the market quickly, as long as the development is done properly. As a "people-oriented" rapid iteration development method, agile development has gained wide recognition in the industry.

2. Requirement Analysis for Game Project Management Software

2.1 Analysis of the Project Management Process of Agile Development

Compared to traditional software project development, agile project development has different development concepts and goals, so there are significant differences in business processes [3]. Firstly, in traditional projects, the requirements are relatively fixed and have clear templates, with limited flexibility. In contrast, agile project development has more flexible plans, and most requirements are generated during the development process. The generated requirements are analyzed, summarized, and then resolved uniformly, which is an advantage of agile project development, showing strong flexibility.

In the iterative cycle, a large number of requirements need to be processed, and the product manager needs to make weight judgments and communicate with programmers in a timely manner [4], clarifying the purpose of the current programming and achieving agile development's business functions through precise management. Agile project development requires a significant amount of information communication to ensure orderly work and bring out its own characteristics. The specific development process is shown in Figure 1.
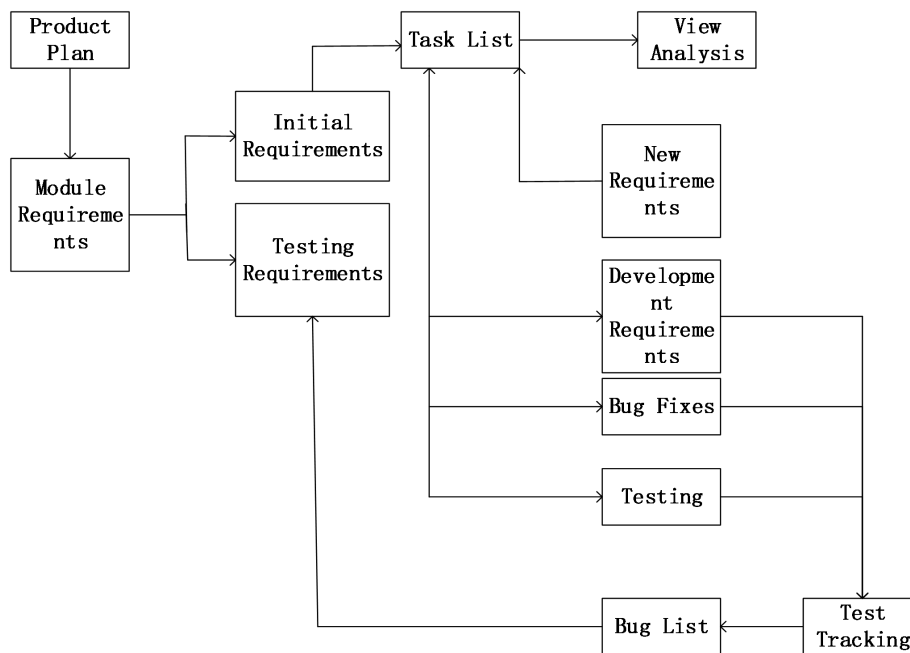
Figure 1 - Business Process Diagram

2.2 Agile Software Management Process

Compared to traditional process management, agile software management can improve project flexibility. In traditional process management, the process sequence is generally predetermined, and it is considered as the core content throughout the process management. Once the project is initiated, it will be strictly implemented according to the plan, with a focus on preventing deviations during execution. Agile software process management is mainly people-oriented, emphasizing the subjectivity and initiative of individuals. Many dynamic changes will occur during project implementation, which requires high innovation ability from individuals. The specific process includes the following five points: ① The non-linear structure in agile management and the non-linear relationships among various factors in the project, with the whole being greater than the sum of its parts; ② Agile process management places more emphasis on the flexibility of individuals and requires active communication among team members; ③ Agile process management is more suitable for projects that require rapid development and have multiple influencing factors; ④ The adaptability of agile process management is the ability to respond to changes; ⑤ Agile management relies more on the collaborative writing process of teams and individuals.

3. Design of Agile Development Game Project Management SystemDesign of Agile Development Game Project Management System

3.1 Basic Framework

In the process of program development, it mainly includes engine design, main program design, and media resources. In the game's main program, it is mainly written in C++ program and can be implemented through the API in the engine program, and it can provide more writing space with the help of media data resources. The sound effects and modeling display in the game scene are mainly constructed through the Game Manager. cpp file, which can display time, status, and more in the game. The overall structure is clear and concise. Under the background of agile development, it also minimizes the number of code modifications as much as possible, providing security guarantees for the safe operation of the game and more optimization space for the physical collisions in the game.

3.2 Game Engine Import

The import of the game engine will import the already created 3D models. The scene model is called "sence New.mesh". After successfully importing a series of files that have been designed, the game can be launched successfully, increasing the fun of the game.

3.3 Props and Score Module

In the game process, there will be many props that can have a crucial impact on winning the game. Generally, props can be divided into reward props, rescue props, and target props. Reward props provide players with more possibilities of winning. They are all made using MAYA. After loading the core file GameManager.cpp, the generation of props is done through random functions and then called in the file after processing. The score module is the foundation of winning. After the model is written, the game character will move. To make the game character move and produce effective physical collisions, the game character needs to win.

3.4 Art Design for Agile Game Development

In art design, the basic art materials of the game are designed to lay a good foundation for the establishment of 3D models. Agile software development does not require high standards for unfinished parts, but they should still have a clear purpose and design cultural settings. The main steps include: ① Using PHOTOSHOP to draw; ② Coloring the line drawing with PHOTOSHOP; ③ Combining and designing some original paintings with unique styles to determine the style of this game design. Based on this, the game design has a foundation in art and provides a macro concept for characters and props in the game.

3.5 3D Modeling for Agile Game Development

After the art design is completed, it enters the 3D modeling phase, which is characterized by efficient and rapid iteration and maintenance and modification of runnable versions. It is generally divided into two stages: the first stage is the art design and engine debugging stage, in which MAYA software is used to design small objects in the game for debugging purposes, mainly trying simple movements after combining them. The second stage is the game production stage, which strengthens the art design. It requires detailed modeling of characters, scenes, tools, and creates corresponding animations.

After the preliminary establishment of the 3D model, the original painting needs to be eliminated and the 3D model adjusted. Because a large amount of resources are consumed during the game's operation, in order to meet the players' visual experience, the aesthetics of the model must be ensured. The number of polygons used is also crucial. To highlight the sharpness of the game model, as few polygons as possible should be used, and the polygons should be processed by the graphics card to make them appear blurred, thereby improving the refinement of the game design.

3.6 Game Interaction Interface Development

In the game development process, there needs to be a certain degree of interactivity, and the most important aspect is the output of image values. When players provide feedback, it also increases the playability of the game. The development of the interaction interface mainly includes four steps: ① Pre-game guidance interface; ② Control of the main menu interface of the game; ③ Numerical interaction interface during the game; ④ Game ending screen.

4. Conclusion

The research results show that the system designed this time can meet the relevant needs of enterprises and users, improve the efficiency and quality of development, and provide great assistance to agile development teams. I hope to continue learning in the future and make my knowledge system more mature, designing better game project management software systems.

References

[1] Lu, G., & Pan, Q. (2018). Design of open laboratory system in higher vocational colleges based on agile development. Science, Technology and Productivity, (3), 118-120.

[2] Jia, Y. (2021). Application research of agile development in information management system design. Computer Knowledge and Technology, 17(19), 65-66, 75.

[3] Zhang, D. (2018). Research on the construction of e-commerce skills training platform based on agile development. Journal of Shaoguan University, 39(6), 34-38.

[4] Shen, C., Lan, H., Guo, J., et al. (2023). Design and implementation of meteorological service support system based on microservice architecture. Meteorological Science and Technology, 51(2), 215-221.

[5] Gong, X., & Wang, L. (2022). Design of experiment process file management system based on low-code development.

Today's Manufacturing and Upgrading, (12), 33-35.

[6] Tang, Q., Lu, W., Liu, T., et al. (2022). Research and application of incremental integration testing technology for nuclear reactor core numerical calculation software. Science Vision, (18), 41-44.

[7] Chen, Y., Wan, J., Hao, Y., et al. (2023). Construction of science and technology management system based on Jet rapid development platform. Journal of Shaanxi University of Science & Technology, 41(1), 196-201, 208.