Agile Model in Video Game Development

Tri Dai Ho

April 9, 2022

—

WRTG 393 6962

—

Professor William Harrell

Executive summary

There are currently 2.95 billion active gamers globally in 2022, which is projected to be 3.07 billion in 2023 (Statista, 2021). Aside from the massive gamer community, the speed of new technologies and gaming platforms push the demand for game quality even higher. Some of the latest AAA titles have a budget of hundreds of million dollars. The combination of art and science makes each gaming project an endeavor that can only be undertaken by a multi-discipline team.

The entertainment value of gaming adds more complexity to the project than any typical software development. Previously, video game studios strictly used the waterfall methodology as the industry standard. In this model, the development process is well thought out in advance and divided into phases. The developer teams spend a significant amount of time defining the project scope, how the game will be played, how many resources are needed, and the timeline. The next phase will not start until the previous phase is complete. The final product is a full game with a hard-set release date. This approach provides a very predictable schedule and a well-defined target. However, it fails to capture the fast pace of the industry.

The agile model offers an alternative approach by shorter iteration with the backlog and sprint. This allows the development team to arrive at a prototype early in the cycle. The agile method helps address the issue of "falling behind" by increasing the adaptivity of the given game project by consistently interacting with players and the team.

Introduction

Every video game at heart is software and a project. A game needs to be playable, visually attractive, and generally bug-free as a software. As a project, the game needs to meet its release date, optimize resource allocation, and be able to deliver the game concept and mechanics. The quality of a game is the entertainment value it brings to the player. This fun factor is the most dominant problem of game development because it requires the involvement of multiple disciplines across many domains, from art to science. When finishing up with the new code set, the coder must recheck for compatibility with the general coding architecture of the game. Many artists struggle with perfectionism; their inspiration, on the other hand, hardly comes by on schedule. The audio artist is always the last to get informed on any changes because they must wait for everything to be put together before starting to work on the sound effect that is unique, realistic, and not overtly shadowing the music.

To satisfy fans and investors, game studios move on and adopt the agile model as a more adaptive method to replace the aging waterfall model. The waterfall model defines the game's scope and provides a clear-cut deadline with an estimated budget. The same three pillars of project management (scope, time, and resource) are not as well defined in the agile model. However, it is this characteristic of agile that opens the creativity in game development and changes the industry forever.

Previous methodology

1. The waterfall

A typical waterfall model has the following steps:

- Concept
- Requirement
- Architectural design
- Detailed design
- Coding and debugging
- Testing

This model addresses an ideal state in video game development, where everything is well-coordinated and anticipated. The production would progress smoothly from one step to the next without revisiting any topic (Bates, 2004, as cited in Archontakis, 2019). Figure 1 describes a more detailed developmental process using the SDL framework.

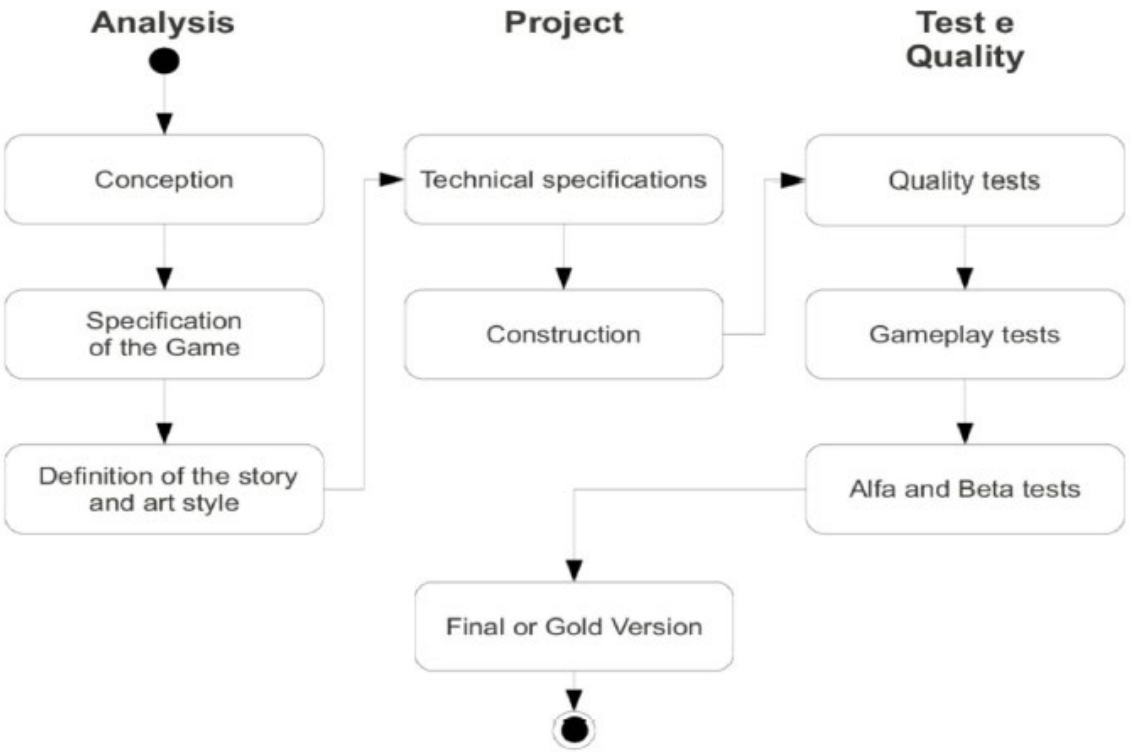

Figure 1 *Waterfall process applies to game development (Petrillo & Pimenta, 2010*)

The waterfall principle is the direct adaptation of the software development process because there were more programmers than artists in the early day of gaming. The developer team generally spends a significant amount of time defining the game concept and specification. Then the group will divide the entire project base on each team's specialty and work on their pieces during the designing and construction period. The game is generally tested for bugs and features at the very end of the cycle prior to the release date (Bates, 2004, as cited in Archontakis, 2019).

As you may already be noticed, the process is only moving in one direction from Concept to Release in the waterfall method. Therefore, it is not very adaptable to new changes. Furthermore, the waterfall requires a large budget upfront, and the production may take from 5 to 10 years to finish. In the gaming industry, this means the game may finish with the older generation technology while having to catch up with new demand from players.

A new approach is needed, but why agile?

1. Agile is more creative even in production

In agile methodology, the entire production is divided into three stages:

- Pre-production,
- Production
- Post-production.

Each stage, in turn, gets divided into shorter iterations with backlog and sprint. A sprint is a crunch period to capture the added feature and requirements in the backlog. The backlog is the production journal that captures any new features and requirements from the last sprint or last iteration (Starloop Studios, 2021). Figure 2 illustrates a typical agile model, where each blue sector represents a sprint, and the orange dialogue box is the backlog.

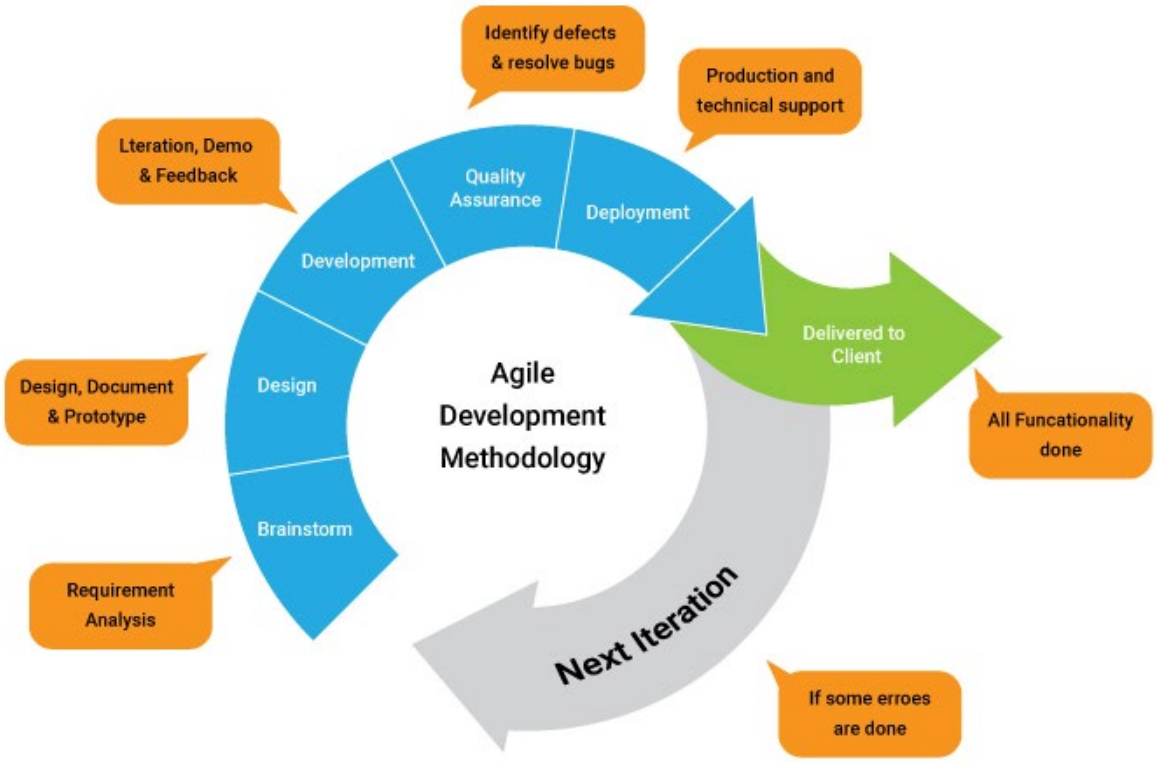

Figure 2 *An illustration of the Agile model by Trotman (2020)*

Unlike the waterfall, the agile methods focus on capturing the project's momentum, not the milestone. The entire team will work together in the first few iterations to develop a prototype of the game or the kindergarten version of the actual product. The early prototype allows critical concepts and ideas to materialize. Figure 3 illustrates how a project emerges through iterations.

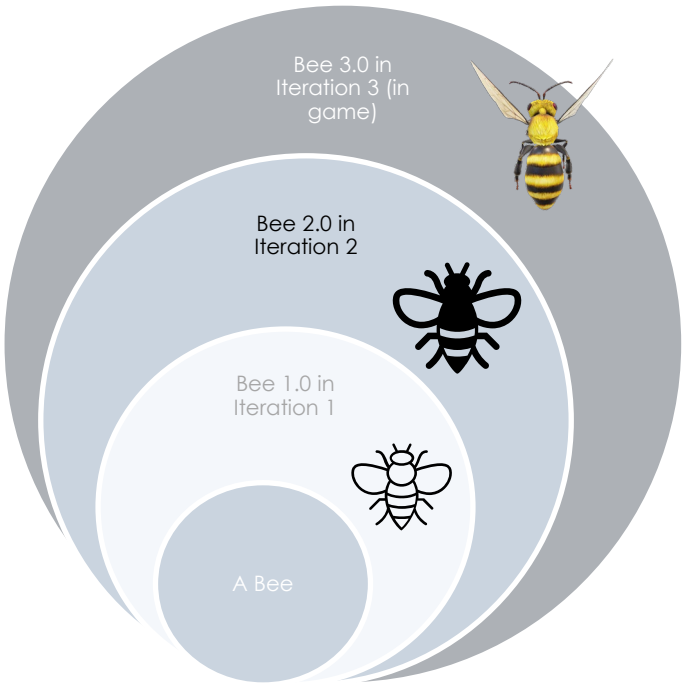

Figure 3 *The materialization process of a bee from concept to in-game graphic using agile principles*

In essence, the agile methodology transfers the game-making process into a continuous improvement project. The team effort and resources aim to improve the prototype every day with added features. Due to this characteristic, many developers refer to this method as "Make. Play. Repeat". The agile model allows the developer to collect feedback early on and incorporate them as needed (Sutherland, 2004, as cited in Mercan & Becerikli, 2020). This is the lead indicator to the fun factor and makes the waterfall method look more like a chore.

2. Agile is more funding friendly

The clear-cut advantage of the waterfall model is the capability to deliver a good product within budget (Gallagher et al., 2019). In contrast, gaming projects that utilize the agile framework often accel in successfully securing additional funding. Due to the close interaction between the producer and gamers in the agile model, the development team does not have to rely strictly on the publisher for funding. The initial financing of Wasteland is a prime example. Its creator and Interplay founder, Brian Fargo (well known for his work in *Fallout, Baldur's Gate*, and *Bard's Tale*), managed to secure $1.25 million for the game from fan crowdfunding (Orland, 2012).

According to one mathematical simulation research by Anand et al. (2021), projects using an agile framework have the potential to reserve up to 7.5% of capital allocation. This extra resource can improve the project or shorten the deadline.

3. Agile replaces "release date" with release sequence

Agile puts a lot of emphasis on player interaction and fan feedback more than any other method. Therefore, agile game projects tend to have extended-release dates. But why does a studio have to fight for a release date while they can work on the same project and periodically release new content? This is indeed the latest trend in the video game market. The *Call of Duty* franchise successfully uses this formula by continuously reworking its maps and introducing new game modes in its latest products. (Doster, 2018 as cited in Archontakis, I, 2019). On the other hand, Bethesda intentionally released *Fallout 4* and The *Elder Scrolls V*: *Skyrim* unpolished so that the players can modify the game to their preferences (Kleinman, 2018 as cited in Archontakis, I, 2019).

Conclusion

Whether it is the waterfall or agile model, each framework has its unique advantages and disadvantages. In recent years, gaming studios (both indie and AAA) are migrating their development principles toward the agile

framework and slowly moving away from the waterfall. This does not mean the waterfall no longer remains relevant. The game developer can still count on this process to have a predictable result that stays within budget. However, the agile model introduces a more innovative dimension to the development cycle with its “Make. Play. Repeat” rhythm. Agile allows both players and developers to experiment with new ideas and redefine the “fun” element in gaming. If you want what you pay for, then stay with waterfall. If you are more curious and like to test out theories and challenge principles like me, you will find games developed with agile frameworks have a lot more to offer.

Bonus point: this paper is composed using agile principles. I incorporated feedback from multiple sources and continuously improved this paper, draft after draft. There were times when I thought it was impossible to finish it within the deadline. In truth, I had never truly known how this paper would turn out until the day I finished it, which was two days ago. If you read my first draft, this could feel like a complete overhaul.

Cited Sources

Anand, A., Kaur, J., Singh, O., & Ram, M. (2021). Optimal resource allocation for software development under an agile framework. *Reliability: Theory & Applications*, *16*, 48–58 http://ezproxy.umgc.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=asn&AN=153667601&site=eds-live&scope=site

Archontakis, I. S. (2019). Agile development in the video game industry: Examining the effects of iteration and methods of limiting it (Dissertation). Retrieved from http://urn.kb.se/resolve?urn=urn:nbn:se:umu:diva-156211http://ezproxy.umgc.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=edsoai&AN=edsoai.on1234784939&site=eds-live&scope=site

Gallagher, A., Dunleavy, J., & Reeves, P. (2019, April 22). *How to use waterfall and agile practices on your next project*. IBM Developer. Retrieved April 9, 2022, from https://developer.ibm.com/articles/using-waterfall-and-agile-practices/

Mercan, Ş., & Becerikli, Y. (2020). Agile methods in game programming based on scrum. *Sakarya University Journal of Science*, *24*(5), 882–891. https://doi-org.ezproxy.umgc.edu/10.16984/saufenbilder.658752

Orland, K. (2012, March 15). *Interplay's Brian Fargo finds fan funding for Wasteland sequel*. Ars Technica. Retrieved April 9, 2022, from https://arstechnica.com/gaming/2012/03/interplays-brian-fargo-finds-fan-funding-for-wasteland-sequel/?msclkid=76489a3fb84311ecb28acb3326fba494

Petrillo, F., & Pimenta, M. (2010). Is agility out there? *Proceedings of the 28th ACM International Conference on Design of Communication - SIGDOC '10*. https://doi.org/10.1145/1878450.1878453

Starloop Studios. (2021, March 15). *Best Agile Practices in Game Development | Starloop Studios Blog*. Game Development Outsourcing Company, 3D Art Outsourcing, 3D Animation Outsourcing | Starloop Studios. Retrieved April 9, 2022, from https://starloopstudios.com/best-agile-practices-in-game-development/

Statista. (2021, June 1). *Number of video gamers worldwide 2015–2023*. Retrieved April 3, 2022, from https://www.statista.com/statistics/748044/number-video-gamers-world/

Trotman, J. (2020, September 26). [Illustration]. Nimble AppGenie. https://www.nimbleappgenie.com/blogs/project-development-methodologies-agile-scrum-waterfall-and-kanban/