GAME DEVELOPMENT PROJECT MANAGEMENT USING SCRUM FRAMEWORK: HYPERCASUAL GAME CASE STUDY 'RUSH RUNNER'

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Abstract— The research aims to explore and implement an effective Project Management approach in Game Development using the Scrum Framework. A case study was conducted on the development of a hypercasual game titled "Rush Runner." With a focus on rapid iterations, continuous feedback, and adaptation to changes, the Scrum methodology was used to manage the game development workflow from planning to publication. Concrete steps were taken to adapt to user needs and evolving demands as an integral part of the development process. The research findings indicate that the implementation of Scrum had a positive impact on productivity, quality, and user satisfaction in hypercasual game development. Furthermore, the integration of Project Management and the Scrum approach optimized overall time, cost, and quality. These findings provide valuable insights for practitioners and researchers in the field of game development to understand the importance of an adaptive and responsive Project Management approach to market changes and user needs.

Keywords: agile, hypercasual, game, project management, scrum.

Abstrak— Penelitian ini bertujuan untuk menyelidiki dan menerapkan pendekatan Manajemen Proyek yang efektif dalam pengembangan Game dengan menggunakan Framework Scrum. Penelitian kasus dilakukan pada pengembangan Game hypercasual yang berjudul "Rush Runner." Dengan fokus pada iterasi yang cepat, umpan balik yang terus-menerus, dan adaptasi terhadap perubahan, metodologi Scrum digunakan untuk mengelola alur kerja pengembangan Game dari tahap perencanaan hingga publikasi. Langkah-langkah konkret diambil untuk menyesuaikan diri dengan kebutuhan pengguna dan tuntutan yang berkembang sebagai bagian integral dari proses pengembangan. Hasil penelitian menunjukkan bahwa penerapan Scrum memberikan dampak positif terhadap produktivitas, kualitas, dan kepuasan pengguna dalam pengembangan Game hypercasual. Selain itu, integrasi Manajemen Proyek dan pendekatan Scrum telah mengoptimalkan waktu, biaya, dan kualitas secara keseluruhan. Temuan ini memberikan wawasan berharga bagi praktisi dan peneliti di bidang pengembangan Game untuk memahami pentingnya pendekatan Manajemen Proyek yang adaptif dan responsif terhadap perubahan pasar serta kebutuhan pengguna.

Kata Kunci: agile, hypercasual, permainan, manajemen proyek, scrum.

INTRODUCTION

Game development is a dynamic and competitive industry characterized by rapid technological advancements and evolving consumer preferences. In Indonesia, research in game development remains limited due to the small number of game development agencies, offering unexplored opportunities in project management (Rachmat & Gazali, 2021). The unique challenges of game development often render traditional project management methods less effective. Techniques such as Waterfall, Agile, and Scrum present different approaches, with Scrum being particularly adaptive and responsive to market changes (Keith, 2020). This study aims to explore effective game project management using Scrum, particularly in the development of the hypercasual game "Rush Runner", a simple platformer and infinite run game.

Indonesia's burgeoning games industry motivates young developers to create local games,

thereby boosting the economy and job market, even though new studios face challenges due to the low demand for previous game projects (Jondya et al., 2022). This research provides insights into efficient, flexible, and successful game project management by examining Scrum through a case study on "Rush Runner". By leveraging Scrum's iterative and incremental approach, this study aims to contribute to the body of knowledge on game project management, highlighting the potential for Scrum to enhance project outcomes in the context of Indonesia's game development landscape (Pizzo, 2023)

The primary related research is "Improvement of an Android-based Sign Language Educational Game using a Scrum-Gamification Approach" (Rachmat & Gazali, 2021). This study investigates the development of sign language educational games using the Scrum-gamification method, featuring the SIBI and BISINDO alphabets. The authors utilize Scrum to manage the development of the hypercasual game "Rush Runner," focusing on delivering simple and engaging gameplay experiences (Pizzo, 2023). Another relevant study is "Developing 'EMBER': A Fantasy Puzzle Adventure Game with an Agile Game-Scrum Approach" (Jondya et al., 2022). This research explores the adaptation of Agile game-Scrum methodology in developing fantasy adventure puzzle games, demonstrating its practical application in digital game development with necessary modifications. The study underscores the implementation of Scrum in managing the hypercasual game development project "Rush Runner."

## MATERIALS AND METHODS

Scrum Framework

Source : (Jondya et al., 2022)
Figure 1. Scrum Framework

In keeping with Schwaber, Scrum is a task control framework that divides and coordinates tasks to make certain smooth progress, integrating different agile practices (Jondya et al., 2022). Recognized for its iterative technique, based on

Figure 1, Scrum combines dependent undertaking control with adaptive methods to reply to changing needs. Product improvement happens in iterations referred to as Sprints, lasting two to four weeks (Keith, 2020). Each sprint entails planning, day by day meetings to cope with obstacles, and opinions to assess development. A part of the wider agile method, Scrum emphasizes team collaboration, responsiveness to exchange, and brief, usable product iterations. Extensively used in software improvement, Scrum enhances transparency, responsibility, and collaboration, adding big cost to businesses. Knowledge Scrum's courting with Agile is critical in sport development mission management research.

Research Phase
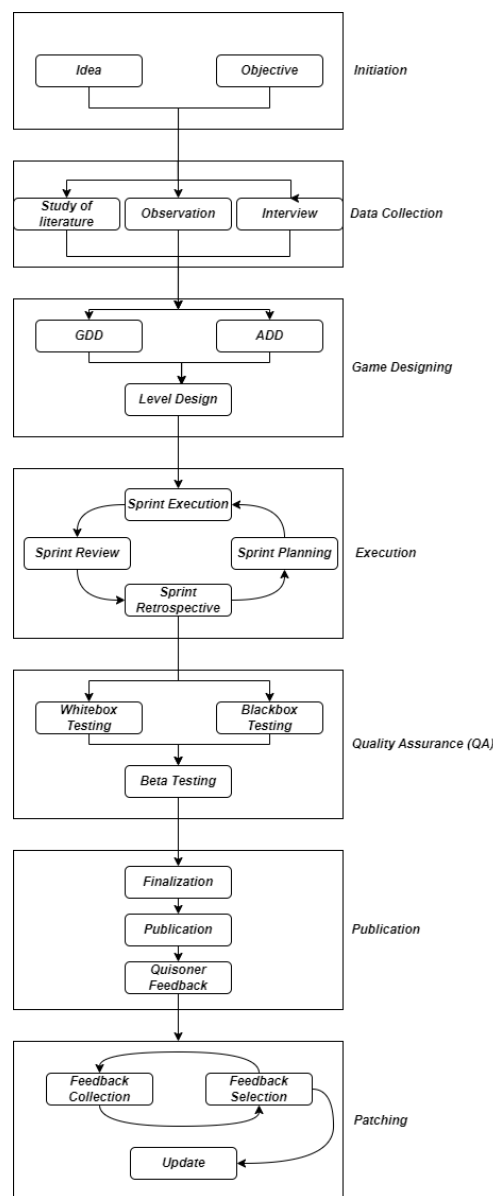
Source: (Research Results, 2024)
Figure 2. Research Phase

In Figure 2 above, the author details the research flow that will be carried out starting from the process of detailing the challenge concept inside the initiation stage, consisting of subject matter, gameplay mechanics, storyline, goal market, style, platform, and enterprise version. This degree is critical for articulating the game vision and increasing the ability for task success, with validation of the concept through person remarks key to making sure its fee (Ameisen & Safari, 2020). Putting assignment goals facilitates in directing development efforts, prioritizing, allocating resources, and making strategic choices. on the facts series level, a literature assessment is essential to perceive information gaps and guide studies path, building a robust theoretical framework (Laine & Lindberg, 2020). Observations and interviews had been used to accumulate accurate and in-intensity qualitative facts, with interviews carried out the usage of questionnaires and administering a beta version of the sport to selected contributors to collect feedback (Deng et al., 2020). sports assets are acquired from free sources inclusive of Freepik, Pixabay, Zapslay, Freesound, and Soundimage, considering that copyright safety in Indonesia isn't but completely evolved (Agung et al., 2023).
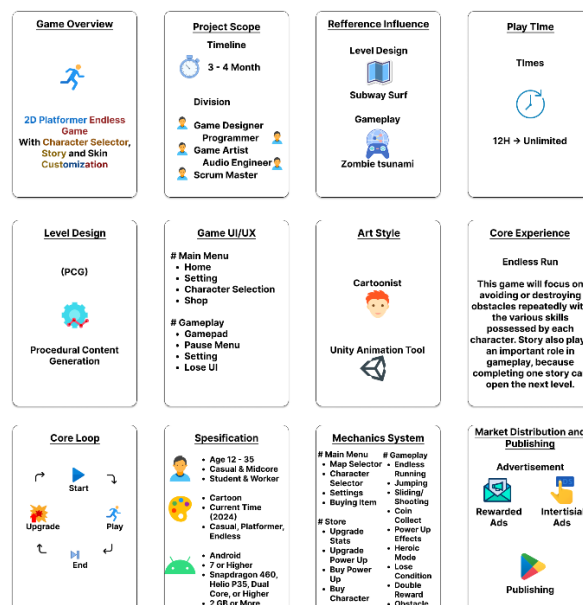
Game Design Document (GDD) and Art Design Document (ADD) detail the primary elements for recreation improvement, such as theme, characters, mechanics, and technical elements (Evan et al., 2023). Stage layout makes use of procedural strategies to create a balanced and modern participant enjoy (Acevedo et al., 2022). The authors used on-line gear consisting of GitHub for version manage and Figma to create GDD's and ADD's, with an excessive degree of satisfaction from participants (Tushev et al., 2020)(Pramudita et al., 2021) solidarity Engine is used as the primary improvement tool because of its ease of get admission to and professionalism (Hocking, 2018). within the execution segment, sprint making plans, sprint execution, each day scrum, sprint evaluation, and sprint retrospective are important elements of the Scrum technique for managing paintings flow (Agh & Ramsin, 2021)(Angara et al., 2020)(Sassa et al., 2023) (Matthies, 2020). The high-quality guarantee (QA) level includes Black container testing and White box trying out to make certain the software functions in line with specifications (Mujiyanto, 2022) (Andriyadi et al., 2020). Beta trying out is executed to accumulate person comments earlier than the professional release (Othman et al., 2020). The e-book procedure entails double checking and e-book on platforms along with Play shop or itch.io (Vu & Bezemer, 2020). After that, remarks facts is amassed and analyzed for the next update inside the patching process.

RESULTS AND DISCUSSION

Result of Idea, GDD, ADD, and Level Design

The studies findings encompass several conclusions, starting from ideation to patching techniques. The generated concept is a 2nd Platformer endless sport with one-of-a-kind themes in every game map. records have been gathered thru direct commentary from the author's enjoy all through a 6-month recreation development training at a enterprise named limitless studying. subsequent statistics had been received thru an interview with one of the professional sport designers from the equal business enterprise determined during endless getting to know, named R. Rahmat Jamal, who is living in Batam. here are the outcomes of facts collection through interviews.

The interviewees' approach in making use of Agile methodologies like Scrum for hypercasual game development makes a speciality of speedy iterations, non-stop comments, and adaptive changes. They prioritize creativity, simplicity, and speed, making sure the product remains applicable and engaging for gamers. Scrum is used to test new principles, combine player comments, and make rapid adjustments via strong crew collaboration and excessive adaptability. Practices like retrospective conferences assist improve methods constantly, whilst stand-up conferences and sprint making plans ensure open communication and effective collaboration. Integrating task control with Scrum improves improvement great, time, and prices, permitting short trouble identification and resource optimization.

Source: (Research Results, 2024)
Figure 3. Game Design Document

The GDD is based on the depicted figure in Figure 3. ADD is not significantly different from what is depicted in the GDD.
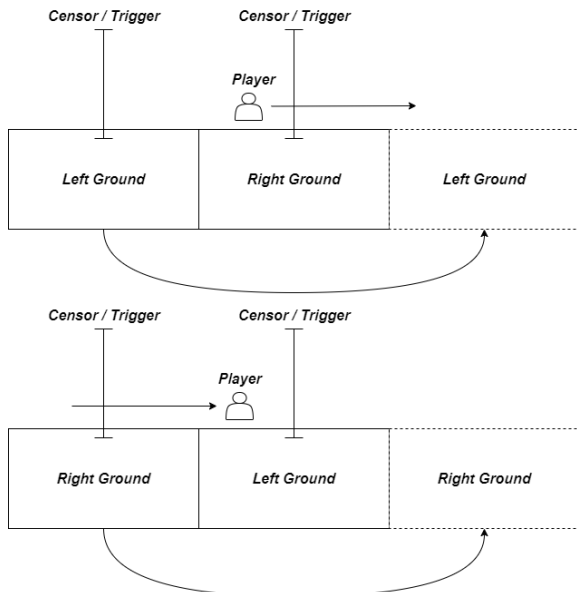
Source: (Research Results, 2024)
Figure 4. Level Design

Level Design is defined in Figure 4, wherein the game map is created automatically by means of transferring the ground from left to proper when the player passes sensors. demanding situations in this recreation are divided into three sorts: instant dying impediment, progressive obstacle, and Impeding Barrier impediment. using Procedural content material technology (PCG), gameplay can proceed constantly with ever-changing challenges, creating a dynamic and non-boring gaming experience.

Sprint Execution

Table 1. Product Backlog

No	Product Backlog	Description	Complexity
1	Game Mechanics	List the mechanics and Gameplay of the game.	M
2	Game Mehcanics Implementation	Implement mechanics into the product.	L
3	Character Design Concept	Create design concepts for characters, from normal skins to special skins.	S
4	Character Design	Create character designs including predetermined skins.	M
5	Character Animation	Using the rigging method, create character animations consisting of several types of body parts.	L
6	Game UI/UX Design	Create Mockups, Prototypes and final Game UI and UX assets.	M
7	Game UI/UX Implementation	Implementing Game UI into the product.	L
8	Environment Design	Create a game environment design including final assets (background, sky, ground, objects etc.)	M
9	Environment Implementation	Implement assets and environmental design in the game	L
10	Environment Animation	Create animations for animationable environments.	M
11	Level Design	Create a design for a map and game level.	M
12	Level Design Implementation	Implementing Design Levels into products	L
13	Assets Listing	Make a list of assets created or obtained from all sections.	S
14	Sound Design	Create or search for sound designs including sound effects and BGM.	M
15	Sound Implementation	Implementing Sound Design in products.	M
16	Cloud Save	Create a system to store game data online (Login System etc.)	S
17	Monetisation System	Create a system for placing Unity ads using Rewarded Ads and Intertitial Ads.	L
18	Assets Optimization	Optimizing assets starting from compressing and quality checking.	M
19	Game Optimization	Optimizing the game in terms of programming and functionality to achieve the lowest minimum device requirements.	M
20	Porting and Export	Exporting the game in the targeted Platform format (Android) and ensuring its compatibility.	L
21	Testing and Debuging	Carrying out Inside Studio Testing (Quality Assurance) including Whitebox and Blackbox.	L
22	Beta Release	Carrying out pre-final publications to get feedback from the market with certain limitations.	M
23	Finalization	Re-checking activities throughout the process to ensure there are no technical or non-technical errors.	M
24	Publishing	Publish the game to the specified platform (Play Store) and fulfill all the requirements.	L

No	Product Backlog	Description	Complexity
25	Iteration *Development*	The process of collecting feedback and implementing all feedback into the product.	M
26	Paching	Updating products to Market platform and creation of Update Log.	S

Source: (Research Results, 2024)

Next is the execution process, which consists of 4 sprints with backlogs worked on as shown in Table 1.

1) The First sprint, conducted from February 1 to 21, 2024, aimed to create a comprehensive recreation layout, which include a recreation design record (GDD), artwork design record (add), and level design. This sprint's scope included essential sport factors such as sport mechanics, individual design, environment design, and UI/UX design. Every challenge became outlined with particular desires and finishing touch standards. Despite the fact that the man or woman design required extra exact work usually dealt with via a second artist, all obligations were finished in the time-frame without sizable troubles. The improvement system adjusted for efficiency, mainly in UI/UX layout, bypassing the prototype level to store time the usage of Figma's mixed functionalities. This sprint focused mainly on planning and design, with minimum fees for the reason that paintings relied on the writer's capabilities, heading off expert expenses. The estimated charges, typically ranging from Rp. 500,000 to Rp. 6,000,000, were covered by the writer at no cost.

2) The second sprint, conducted from February 21 to March 22, 2024, aimed to broaden the game by means of imposing structures the use of solidarity Engine and integrating belongings from the first sprint. Key responsibilities included recreation mechanics implementation, individual and surroundings animation, UI/UX integration, sound layout, monetization gadget setup, asset optimization, and exporting the sport for Android. Despite the sizeable workload, all duties were finished on agenda with minor modifications for encryption methods. The writer, leveraging programming skills, avoided huge fees related to hiring expert programmers, predicted at Rp. 4,000,000 to Rp. 10,000,000. The usage of unity personal saved charges minimum, despite the fact that this version blanketed a watermark and could incur prices upon reaching sure revenue thresholds. The writer managed to complete these obligations correctly, ensuring

the challenge stayed on course and within budget.

3) Third print was conducted from March 23 to April thirteen, 2024, aiming for recreation testing and book, inclusive of meeting Play save requirements. This sprint worried sound implementation, black container and white box checking out, beta release, finalization, and book. Black field testing confirmed all elements functioned as predicted except for the missing cutscene. White field testing verified the capability of inputs, camera, audio, and controls, except for loading information from the internet. The game became uploaded to cloud storage and tested through 10 users for the duration of the beta release, yielding wonderful remarks on visuals, controls, trouble, audio, balance, and overall performance. Due to uncertainty with Google Play Console evaluations, the publication became performed on itch.io, but the $25 Play shop registration rate turned into budgeted. The scope included all implementation and checking out, time changed into constrained to a few weeks specializing in excellent warranty and booklet, and value turned into correctly managed thru the writer's programming talents, averting additional charges for hiring a programmer and budgeting for the Google Play Console registration fee.

4) Fourth sprint, performed among April 14 and may four, 2023, the focus become on iteration improvement. The main purpose become to gather and implement comments to improve subsequent recreation patches. Responsibilities included optimizing assets and gameplay, porting and exporting, and addressing iteration improvement and patching wishes. These responsibilities had been correctly completed within a three-week time-frame. The sprint aimed to decorate the released product by using studying comments obtained thru publish-launch questionnaires and addressing market preferences. Tremendous evaluations had been received from 24 out of 73 downloads, with respondents expressing general delight and minimum widespread bugs pronounced. Notwithstanding time constraints due to platform goal adjustments, the assignment remained solid and managed. No charges have been incurred all through this sprint, as the e-book process on itch.io turned into fee-loose, and all respondents were a part of the public. Average, all 4 sprints had been successfully completed, and the undertaking stepped forward as planned, in spite of minor demanding situations within the remaining sprints.

By completing four sprints, this task was completed efficiently although there were some limitations that could be overcome quickly. The fourth sprint, in particular, implemented feedback effectively and increased the overall stability and success of the project. Each sprint is carefully planned and executed, ensuring that every aspect of the game development process is addressed, from initial design and mechanics to final testing and publishing. This methodical approach allows for the identification and resolution of problems at every stage, resulting in a flawless and functional final product.

An important difference between this research and the related research in the previous chapter lies in cost efficiency, and the number of game developers. The focus is on minimizing costs wherever possible, with the entire development process managed by one individual, often referred to as an indie developer. This approach differs from projects involving large teams and higher costs. By relying on personal skills and resources, the project avoids the huge costs typically associated with hiring professional developers, artists and other specialists. This efficient solo development strategy shows how dedicated indie developers can produce high-quality games with limited budgets and more manageable management.

CONCLUSION

The study's findings indicate that implementing the Scrum approach in sports development initiatives is highly effective, demonstrating improvements in quality, responsiveness to change, and cost efficiency compared to traditional methods like waterfall. Scrum enables flexibility in adapting to evolving user needs and project environments, facilitating quicker adjustments and integration of stakeholder feedback. Additionally, Scrum enhances scheduling accuracy and resource utilization through iterative processes, thereby reducing development risks and overall costs. These results underscore Scrum's ability to deliver superior game products that align with market expectations.

Future game developers are encouraged to adopt Scrum for efficient project management and goal achievement. Based on the research findings, several recommendations emerge. Firstly, expanding the scope of literature reviews on Scrum's application across various game development contexts would provide insights into its broader applicability. Secondly, developing specific evaluation tools or models to assess Scrum's effectiveness in game projects could enhance project management practices. Incorporating precise metrics for measuring Scrum

success and considering external factors such as team composition, game characteristics, and work environment are crucial steps forward.

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