Design by Subtraction and its Efficiency Compared to Other Methods

GDEV60001 GAMES DEVELOPMENT PROJECT

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Abstract

Modern games are becoming larger in scope which is inflating budgets and leading to unsustainable development costs and times which has caused continued layoffs within the industry. This paper aims to research Design by Subtraction, a more minimalist approach to game development, to find whether the method is effective in game development and should be used more widely. This paper will assess the developer's perspective of creating something using this design theory and the players response to the gameplay experience created using the theory to further assess if it is viable in the industry. A 2D platformer was developed using Unity with one version being more maximalist in scope while the other version subtracted elements which didn't add to the core themes or lacked coherence in the game creating something more minimalist using design by subtraction. Participants then played both versions of the level and described the experience with most preferring the more minimalist approach having found it more atmospheric due to a lack of gamified elements such as health bars. My paper found that design by subtraction is a viable method which could be used to create more focused and engaging experiences on a lower budget and quicker time frame.

Introduction

Design by Subtraction is a design theory which has had very little research conducted into it. In the modern games industry, we see more and more games filled with content that could be deemed as filler and that takes away from the core themes of the game. While of course this can be seen as somewhat objective, many people have argued that The Last of Us 2 is a core example of this as the games' theme is about how revenge isn't right yet the gameplay has you killing countless enemies and intends to make the combat and violence feel good which goes against its own themes and message. Naughty Dog (the developer of the before mentioned Last of Us) is somewhat aware of issues like this with the comedic trophy titled "Ludonarrative Dissonance" found within Uncharted 4 which is earned via killing 1000 enemies.

It's not only issues like this however that are prevalent in modern gaming. We can also see games filled with filler content leading to people growing tired and bored of this with players coining terms such as "Ubisoft style-design" often with negative connotations of open worlds with the same rinse and repeat content of towers to unlock the map or fetch quests and so on. While games seem focused on prolonging play time, I believe this may push players away as it's leading to empty open worlds, repetitive content and ludonarrative dissonance. Most online services with achievements give players a percentage of how many people finish games and you can see via looking at story quests a huge drop off from people clearing the first level through to the finishing a game in most cases which shows a general loss in player retention which may be somewhat linked to these issues.

This growth of adding more and more content to games is even a key culprit of the growing unsustainable costs within the current triple A market. By developing larger and larger games each year with more content it drives up development costs significantly which adds to longer development times and more risk with each release leading to some of the current issues within today's industry.

While Design by Subtraction is now a fairly old theory having been founded within the PS2 era by Fumito Ueda during the development of Ico, it is still something we sometimes see in more minimalist style games and something I feel could be used more widely in the industry to trim down

on unnecessary content. This theory involves analysing the games design and subtracting elements (narrative, mechanics, levels, etc) which don't add to the games core themes or overall experience. I feel some games may benefit from this more precise design helping keep them more focused and thus I believe it to be worth researching whether it should be used more widely within the triple A industry as opposed to mainly within smaller indie games such as the recently released Neva.

Aims and Objectives

Overall, this paper is analysing Design by Subtraction and its uses within the industry and comparing it to other projects and theories. I felt it was important to view how effective it is from both a design perspective and a player perspective so have investigated other papers on the subject as well as interviews from designers such as Ueda. Essentially the objectives are:

1. Define Design by Subtraction based on professional research and developers
2. Identify current industry design trends and see where if at all Design by Subtraction is applied
3. Learn how much is too much when it comes down to Design by Subtraction e.g. when is subtraction too much?
4. View the different perceptions of players from a more feature rich gameplay experience versus more minimalist experiences via playtests of the project artefact
5. See how effective the process is from a designer's perspective via the creation of a project artefact

Literature Review

The main goal of this review is to analyse Design by Subtraction and its uses within games. Naturally, this goal leads to the first aspect of this literature review which is defining Design by Subtraction.

Defining Design by Subtraction

Victor M. Costa (2022) a philosopher and writer at Nintendo Blast, discusses his definition of the method within his Medium article "The Definition of Design by Subtraction". Within this article, he defines what a design philosophy is which he believes to be a set of rules for developing a game which can potentially be applied to different genres.

Following on from Costa's (2022) definition of philosophies he breaks down Design by Subtraction into something made up of two components "coherentism" and "minimalism". Minimalism is defined in this context as "the minimum necessary to express a certain concept or to convey a certain experience" (Costa, 2022) so in terms of games "expresses a concept and/or conveys an experience with as few video game design elements as possible" (Costa, 2022). He believes these aspects don't have to be technical, instead it may be through a lack of dialogue, a simplified

interface or even menus citing Minit as being a more visually minimalist experience whilst Limbo is more narratively minimalist due to its lack of dialogue (Costa, 2022).
Costa (2022) argues the importance of minimalism in his article in a few different ways. For starters there is the idea of allowing players to create their own interpretations using Limbo to justify their findings they discuss how there are “no dialogues and many scenes are poorly detailed” and the fact the “hostile character in Limbo” isn’t explained “leaving players to draw their own conclusions” (Costa, 2022). The article goes on to cite a developer interview from 2002 featuring Ueda. Ueda argues that minimalism is important in regards to keeping the focus on the core themes and ensuring polish and therefore wouldn’t “hold back on removing and subtracting elements as needed if they felt unfinished or lacking” (Ueda, 2002). Ueda would remove elements he felt were “unnaturally placed in levels just for the sake of level design” such as “invisible walls” (Costa, 2022).

As for coherentism Costa (2022) defines this as ensuring all elements (mechanics, music, sprites etc) align together to communicate the purpose of the game. Costa (2022) cites The Longing as an example of good coherency in games as it is about loneliness and waiting so each aspect of the gameplay ties to this. For example, it takes hours to open doors and the world is designed to be large making players feel lonely showing that aspects of the game were designed to match its core themes.

According to Costa (2022), a game is said to be incoherent “if and only if the experiences or concepts resulting from these elements are contradictory”. An example of this in games is ludonarrative dissonance which causes the player to be disconnected from the game due to it breaking its own rules within the narrative, for example in Grand Theft Auto series the player can commit multiple crimes but never faces any narrative consequences thus losing said coherence. Essentially with Design by Subtraction, these inconsistencies can be avoided as the aspects which go against it can be culled to keep focus on the core themes and ideas.

Just because a game displays coherence or minimalism does not mean it utilises Design by Subtraction, however. Costa (2022) discusses “Shin Megami Tensei 3” and though it is coherent with its “Nietzchean philosophy” it features too many mechanics and elements to be minimalist. Additionally, some games are “simple just because of hardware limitations or budget” (Costa, 2022) as opposed to intentional design.

What Design by Subtraction should leave as the end result is “a video game that delivers a dense and coherent experience” (Costa, 2022). Dense is used to define an experience which is tightly packed with no unnecessary elements which delivers on core themes and ideas.

Using Shadow of the Colossus as an example of Design by Subtraction we see how the protagonist Wander’s sword was used to guide players as opposed to using UI elements showing both minimalism in presentation and coherence in the game's themes of making you feel alone in the world. Brothers is cited as another example here in how the narrative is “largely told through gestures and bodily expressions” (Costa, 2022) keeping it minimalist in narrative whilst the core theme of brothers is conveyed via both being controlled via the two sticks on a controller making the brothers feel like separate characters yet linked allowing for the coherence of their bond.

Essentially Victor M Costa describes Design by Subtraction as being made up of coherence and minimalism. Minimalism to keep things simple, and coherence to ensure all aspects of the game are relevant and have a purpose.

Games Designed with Subtraction

Following the definition of the design theory, I believe it is worth looking into the history and execution of theory within games more closely.

In Mecheri's book "The Works of Fumito Ueda: A Different Perspective on Video Games" (Mecheri, 2019) he discusses extensively the history of Ueda (developer of Ico, Shadow of the Colossus, The Last Guardian and the founder of Design by Subtraction) similarly to that of the Costa (2022) though this time in more depth and focus.

The History of Ueda and his Influences

Merechi shares how Ueda preferred more abstract art during his time at university in Osaka studying art due to the meaning behind each piece and how it would make you think and assess the art. We can see how this is brought forward within Ueda's creations with the book also citing the lack of dialogue within Ueda's games causing players to have to think in the same way Ueda would about the art which inspired him. Ueda also found other key inspirations through games during his university years as opposed to just traditional art, the key influences being Another World and Prince of Persia. Ueda found the more realistic movements of Prince of Persia more immersive and was equally inspired by the game's oppressive scenery and lack of music in place of sound effects instead. Merechi (2019) points out how all these traits were later found in Ueda's work as can be observed in Ico's large castle architecture and slow movement while Shadow of the Colossus lacks music within its open world leaving you just with ambient sound. Merechi discusses how Mechner (the developer of Prince of Persia) would regularly remove levels and simplify controls for accessibility mirroring Design by Subtraction and perhaps being the "true" origin point for the theory in terms of practice(ch.1). Ueda himself has cited both games as inspiring his work, when discussing them in an interview he claimed "what they all have in common is the intricacy of the animation. I'm always finding ways that animation can breathe new life into characters" (Shuman & Ueda, 2016). Naturally this is key to Ueda as his games have very little dialogue and a large part of design and storytelling in these works comes through the animations, for example Trico limping upon harm within The Last Guardian or playing in the water in new areas make characters feel alive without any dialogue.

Ueda Games and Design

Merechi (2019) shares how Ueda believes that developing an immersive experience and a believable world within fiction is important in terms of games as a medium. Merechi (2019) analyses this within Ico discussing how the castle is made to feel like a real environment by having everything there feel as though it is there for a reason, and intentionally showing the damage within textures and the environment to add history to the castle. This is, of course, a form of environmental storytelling and makes the player wonder about the environment they are in and its history. Ueda was conscious of avoiding invisible walls as he felt this broke immersion so removed "gamified" elements where necessary and where he could to ground the experience. This forms Design by Subtraction as it is about removing these unnecessary elements and making way for things that fit naturally in the world while still striking a balance with the player and guiding them. A key use of this guidance can be seen in the architecture of the castle through its use of landmarks and how these landmarks help the player make a clear image of where they have been and where they can go. Through having no

invisible walls and everywhere that can be seen being accessible it immerses the player as it feels like a true environment. This is something other games since have tried to mirror to a mix of success. For example Miyazaki (developer of Dark Souls) cites Ico as a core influence in his design and we can see in Dark Souls 1 how we slowly reach all these far-off landmarks and the map interconnects. The book even discusses the castle as though it is a "third character" due to how much depth it has through its design and later cites Double Fine (the development studio behind Psychonauts) who had an entire day going through the castle and brainstorming how they made the castle feel so real.

A more specific example of Design by Subtraction within Ico however is the enemies. Originally Ico was being developed for the Playstation One and had more humanoid enemies but development was shifted to the Playstation Two due to technical issues with the project. This created a new problem as the new graphical power made enemies appear more realistic. Ueda wanted to remove any indications of violence from the game so changed them to be strange smoke creatures instead, this change was also done as enemies could appear from anywhere and having normal humans appear from thin air felt jarring while smoke like creatures made more sense as the player naturally connotates it with magic, rationalising it somewhat. It also helped visually as you could differentiate between Yorda and Ico (two humans) and enemies which were now just smoke helping players see themselves in enemy encounters. This took away from a more complex design (e.g. no longer having to create realistic human animations or realistic-looking people) and yet added a lot to the overall immersion and even improved gameplay legibility.

Ueda's understanding of his method is that "First I come up with an idea of what kind of games I want to create… these are not necessarily games that can really be created on games consoles. We have to think about how we need to change it to come to life […] rather than improving it, perhaps we are taking away from the original. Sometimes… something better than we imagined can be created. That's actually the most serendipitous happening in what I'm creating right now" (Merechi 2019). We see through his games how his subtracted elements end up adding more meaning to the game a lot of the time, for example within Ico originally there was a health bar but Ueda removed this as he felt UI elements made the game less immersive. Removing this then led the way for Yorda's capture being the fail state, meaning the player has to protect Yorda adding to the themes as it makes the player worry for her safety as they desperately attack enemies carrying her away.

Music being reduced also made the castle feel more immersive as it makes it feel more lonely and daunting as you feel alone in the world and when music does then play it's more impactful as it is at pivotal moments and story beats. Shadow of the Colossus follows the same philosophy by including minimalist music highlighting key moments (namely the Colossi battles) and minimal UI elements. While most games of the time included UI indicating where to go Shadow of the Colossus instead features a sword which when held points out a light beam guiding the players, the lack of UI keeping you feeling alone and immersed as you venture through the world.

I feel it is also worth noting that Ico doesn't directly give the player a tutorial and instead they are left to figure out the controls. Removing any UI tutorial prompts ensures players stay immersed as there are no interruptions to the gameplay. The game instead aims to guide the player through camera angles, level design and lighting, for example early on there are crates lit by torches which naturally draws the player to them, players will need to jump to climb these crates so therefore experiment with buttons and learn to jump/climb without a UI interruption.

However, is Design by Subtraction always good even within Ueda's work? When developing Shadow of the Colossus Ueda wanted the horse to feel more real and so would have it occasionally not follow what the player wanted it to do but the team and Ueda found this to be too much and it

added frustration. Now what's interesting is that Ueda later went back to this concept within his game "The Last Guardian" as within this game you play as a boy who is kidnapped and finds a large creature. You cannot directly attack anything and instead command the creature to and form a symbiotic relationship with the creature as you both traverse this strange land with different tool sets that aid one another. Ueda wanted the creature to feel real and thus it doesn't always obey what the player says which could be a huge source of frustration for players leading to fairly mixed reviews upon its release alongside people citing outdated controls for the boy when in fact he was intentionally made to feel slow and clunky as to mimic a real child. While subtraction succeeded in aiding the themes of the game it could certainly be seen as detrimental to the game's "fun" for many players (Merechi 2019).

While Uedas game development times typically are quite long as seen with Ico's 6-year development and The Last Guardians 11 years from concept to release, the reason for these long developments was based on technical issues (Merechi, 2019) and not down to Design by Subtraction. Both games were developed for older hardware before being shifted to new hardware which could manage the projects e.g. Ico shifting from PS1 to PS2 and The Last Guardian shifting from PS3 to PS4 due to the game running poorly on the PlayStation 3 (Merechi, 2019). In fact as mentioned previously, Design by Subtraction sped up development of Ico once it shifted to the PlayStation 2 namely when it came to the enemy design (if you recall, the enemies were changed from human to smoke etc) as there was less to do to design and implement them. While this initial development time may indicate Design by Subtraction as inefficient, I believe based on this research it is purely based more so on circumstances with Ueda due to him exceeding hardware limits extending development time and not the theory itself.

Ueda and his Influence on the Industry

The book (Merechi, 2019) highlights key figures both within games and outside that have cited Ueda's work to have had an influence on them in some way. Hideo Kojima (creator of Metal Gear) has referenced Ico on his Twitter, and Peter Molyneux (creator of Fable) has praised the minimalism of Ueda's work including praise specifically aimed at its use of minimalism and storytelling without language. Even Oscar-winning director Guillermo Del Toro described Ico and Shadow of the Colossus as the only two games he considers masterpieces.

We can see Ueda's legacy within dozens of projects such as The Last of Us creator Neil Druckman citing Ico as an influence on the aforementioned game, however, this is more so through the character relationship between Ellie and Joel through gameplay and not so much of the "Design by Subtraction" theory. The main example of Design by Subtraction being intentionally used in triple-A games would likely be from Miyazaki's "Soulsborne" series. While these games are tightly packed with mechanics, different weapons and large worlds (especially in Elden Ring) when it comes to the narrative they don't rely on cutscenes or dialogue, instead they again rely on environmental storytelling or even item descriptions which don't tell the full story and can be interacted with as much or as little as a player chooses (Fusdahl, 2019). This immerses the player within these lost forgotten worlds and makes them wonder what happened to the world in a similar way to that of Ueda's games. This even adds a game to the game itself as players gain a sense of accomplishment from piecing together this forgotten narrative acting as its own reward (Fusdahl, 2019). Miyazaki does cite Ueda as being a huge influence for him entering the game industry due to Ico being the first game to make him cry so it makes sense why his games would follow similar world-building techniques. The Legend of Zelda: Breath of the Wild also uses Design by Subtraction to some extent as while it is packed with mechanics the developers removed many features they felt didn't add to

the experience including UI aspects such as map markers adding to the games core pillar of exploration as everything was self-guided by the player.

When it comes to Design by Subtraction, it is mainly seen within Indie projects perhaps due to smaller budgets and more focus on a tight dense experience as opposed to a large expansive experience seen in current triple-A games. A good example of this is Papo & Yo cited by Merechi (2019) which somewhat subverts Ico in that the protagonist wants to escape his partner who in this case is a monster who gets enraged when eating too many frogs but is still needed to help solve puzzles. This game is based on the developers own experiences and is about escaping an alcoholic father though the game only alludes to this. Another title which uses design by subtraction is Journey, a game which equally uses minimal UI, no dialogue and music in key moments to elevate them. The creator of Fez (Phil Fish) directly discusses his experience of using Design by Subtraction within Fez as he describes how initially he planned to include item weight, health, health bars and many other mechanics within the game but as time went on he realised none of these elements contributed to the core mechanic of rotating the world so cut them to keep the game more focused, tighter and streamlined (Kumar, 2011).

Indie games have given rise to more diverse genres including walking simulators which naturally are quite subtractive as they lack many elements and instead generally focus on an experience, feeling or theme. However, some critics describe walking simulator games like “Firewatch” or more art-based games like “Flower” as “non-games” due to a lack of interaction which could be seen as a critique (Merechi 2019). I believe that term to be untrue as while they don’t include as many game elements they are still very much interactive experiences which often can't be expressed through other mediums. In a paper titled “Subtractive Design Practices and 2010’s New Wave of Indie Horror Games” the writers (Fernandes et al., 2024) discuss how indie developers looked at existing genres and subtracted elements from them creating whole new experiences for players. They discuss how the indie horror game series “Penumbra” created a new format called “first-person avoider” which was later utilised within games like Slender and Amnesia: The Dark Descent. This gameplay structure took what had been done in many other horror games like the Silent Hill or Resident Evil series (specifically Resident Evil 2 and 3 where players are hunted by Mr X and Nemesis respectively) but reduced the players' means of dealing with it by just allowing them to walk creating a new horror game format simply by subtracting gameplay elements.

Minimalism in Game Design

Throughout the previous sections, you can see how Design by Subtraction is very much about the concept of minimalism within games and how this can be seen in a variety of ways through music, UI, visuals and so on. During my research, I wasn’t able to find many sources directly on minimalism in games but did find an interesting paper on minimalism in first-person shooter-designed UI and how that contributes to immersion. Fagerholt and Lorentzon (2009) were able to work with EA DICE during their research giving them an inside look at first-person development aiding their research. During their research they found that it was important to create and strengthen perceptual links between the player and their character. The two discuss this in terms of damage in first-person shooters being represented by the screen getting bloodier as opposed to having a health bar appearing. This clearly and quickly communicates damage to the player while also keeping the player immersed and not adding too many gamified UI elements to the screen. Digetic UI in general is more immersive and ensures players still see key information while not breaking their immersion

as seen in a game like Dead Space where health is displayed on Isaacs's suit, this is more minimalistic in its approach and aids immersion.

The pair argue that giving any explicit information guiding the player isn't always the best option at least when it comes to immersion. When using Mirrors Edge in their studies the pair found that all 5 playtesters had the strongest game experience when not guided by UI as participants claimed it gave them a sense of freedom and discovery. Naturally, this links with what was found within the previous sections where Ueda actively used as little UI as possible to make the player truly believe in their environment.

While unfortunately, there does not appear to be much research into it, Thomas Was Alone is also a core source for minimalism in games as the game simply uses shapes for its graphical presentation while creating a solid 2D experience and narrative. I would argue that this mimics this project in that it attempts to show how little presentation you can get away with whilst still creating a complete experience.

Minimalism can also be found in mechanics as previously mentioned in the opening section of the research. This could be seen also within Last Guardian where the main character has very little control simply being able to move, jump, climb, call and interact while all the complex mechanics are left to Trico. In this instance, I believe that based on Merechi's (2019) finding this is to add attachment between the player and Trico forming a sense of trust and powerlessness adding to the themes.

In the current industry, there has been a greater push towards creating larger "open world" experiences packed with more and more content (Hughes, 2023). In Hughes's (2023) research we can see how they looked into trophy data for a variety of games (Assassin's Creed Odyssey, Fallout 4, GTA V, Skyrim and The Witcher 3) and saw a huge drop off in player retention in regard to the main quest. Hughes (2023) discusses how he believes this is likely due to the amount of content and freedom of choice these games offer meaning players are playing the game at different rates thus some people are still doing side content and haven't progressed the story while others rush the story. While I think there is some truth to that I feel for such a sharp difference, especially with titles over a decade old like Skyrim, that is unlikely to be the case. I believe instead players likely interact with the world and then grow bored or burnt out as they experience content and drop out therefore not completing key content like the main quest. I feel this is a major issue as most development resources and budgets go towards narratives e.g. GTA V where they are fully voiced and animated cutscenes with unique mechanics and areas but most players likely won't even encounter these aspects meaning there is undeniably a waste of resources to some extent. Hughes (2023) also discusses that many critics view open-world games as sometimes feeling empty, bland or generally uninteresting. These are issues which could potentially be remedied through more minimalist linear structures as there is no longer a waste of space, something I feel is now becoming more common with open "zone" games such as Sonic Frontier or even Final Fantasy 16 which feature large areas which are tightly designed oppose to open worlds which are empty and packed with mundane quests like Final Fantasy 15.

Juicy Design

The Counter of Minimalism – "Juicy Design"

Juicy Design refers to the idea that large amounts of audiovisual feedback contribute to a positive player experience (Hicks et al., 2018). Of course, this strongly contrasts with what is seen through minimalism and Design by Subtraction as instead it is about adding "large amounts" of something opposed to subtracting. This feedback could be provided through audio, haptics, visuals etc, for example, upon defeating an enemy perhaps some particle effects appear followed by a musical cue to add to player satisfaction. This was also found to make players perform better when given feedback through these cues as it gave positive reinforcement (Hicks et al., 2018). In the paper "Good Game Feel: An Empirically Grounded Framework for Juicy Design" (Hicks et al., 2018) the researchers created surveys to be completed by 17 game developers to create an affinity diagram which could be used in a framework to show "Juicy Design" and developers mainly discuss how consistency and giving players feedback is key.

Juicy Design in Minimalistic Games

I feel that the aforementioned "consistency" somewhat aligns with the idea of coherence that Costa (2022) discussed in his definition of Design by Subtraction. It is about ensuring all elements naturally interact within the world that's being established. We can see even in minimalist games like Shadow of the Colossus that the game provides "juicy" elements which fit with its themes and context e.g. stabbing Colossi results in blood pouring out and the Colossi to groan, the music swells and becomes more heroic when climbing colossi, the music becomes melancholic upon the defeat of a colossus. The latter of these examples is interesting as it is somewhat a subversion of Juicy Design, while yes it is audio feedback for defeating an enemy, it instead sounds tragic making the player question their actions as opposed to the usual use of "juice" being for that of a celebratory manner. With Juicy Design typically being used to teach players this intentionally subverts the players idea of what's going on as it teaches them early on that perhaps their actions are not right within the games world.

Essentially what I intend to say is that while Juicy Design may seem to be a counter to minimalism within games based on its definition, I feel the opposite can be true. Juicy Design can instead be used to highlight key themes or moments in minimalist games, again citing Shadow of the Colossus as an example, music is not used within the world however is used for the Colossi fights, which makes them feel bigger and therefore more dramatic. Going from having music in these huge moments to the melancholic sound of beating a Colossi to the silence of the open world highlights the minimalist elements and gives the player time to think. The game still uses juice within a traditional sense too, with the music changing during moments you can and are climbing the colossi with one such song even being called "The Opened Way" indicating to the player that the path forward is quite literally open.

Minimalism and Juice

Juice and minimalism can be directly compared within the GDC talk "Juice it or Lose it" (Jonasson and Purho, 2012). In this talk the pair take the simple game of Breakout and add more juice to the game over time. The initial game of Breakout is extremely simple visually yet still offers an extremely satisfying experience with clear visuals. However, within the talk presented we see more elements

(juice) added to the game such as screen shake, sound effects, lights, more balls and so on to make the game feel more satisfying. I feel when watching the talk you can see that while the new version of the game is more exciting it is a lot harder to play as the visuals are far less clear due to all these new elements losing the simple legibility of the original Breakout.

We can directly compare this same research through the Tetris series of games. The original Tetris is extremely simple visually yet is still extremely satisfying. It is very clear visually as you drop different shaped blocks down and attempt to clear lines. Over the years more and more versions of the game have been released including the "juiciest" version, Tetris Effect. Tetris Effect has music and visual effects that constantly play and change throughout each level to create an immersive and relaxing Tetris experience and, while the game does achieve this, I think a lot of the visual legibility can be lost when compared to the original version. The constant flashing lights and changing colours of blocks can be jarring and distracting causing unfair losses to occur, somewhat countering the games relaxing purpose. I feel this is a good comparison when looking at minimalism versus large uses of juice as you can see how these changes directly affect even the same core game and experience. Neither version is better than the other, but both have strengths with the original being more visually clear yet not feeling as satisfying or immersive whilst Tetris Effect feels more satisfying yet loses visual clarity.

Going back to my previous section, I believe this further ties in with how a balance of juice is still crucial when designing for minimalism as it can teach the player and create a better experience, however, use too much and it can take away from the experience you aim to achieve.

Budgets, Costs and Unsustainability

The current industry is unsustainable due to a variety of reasons. We can see more and more layoffs occurring within the industry with Skill Search's 2024 survey claiming 21% of those surveyed were made redundant within the last 12 months and we can see more and more studio closures with a major reason for these redundancies being studio budget cuts and a lack of profits. Shareholder-driven Triple-A companies (e.g. Ubisoft, EA, Activision) which release large-scale games like the open-world games discussed earlier, have run into huge issues causing many smaller acquired studios they own to be shut down yet the industry seems to be failing to address these issues (Busch et al., 2024). Even Indie developers struggle as their games become buried on online market stalls thus making them struggle to stand out (Busch et al., 2024). Essentially game development is becoming too expensive to be sustained as seen by all of these issues as budgets go up and up each year and returns grow smaller and smaller.

While not an inherent fix, I believe based upon the research here we can see how design by subtraction could be used to reduce costs of development as constantly assessing a game's design and figuring out how essential components are and cutting them negates wasting resources throughout development. Merechi (2019) even cites in his book that the method significantly reduced budget costs on Ico while allowing the team to focus on details. I feel this focused look on a core experience could potentially lower budgets and even lead to better games.

Conclusion

In conclusion of the literature review, I believe Design by Subtraction can lead to better more focused game experiences which innovate on the industry as seen by it budding a new format through indie horror, the creation of Fez, and Ueda's games on the whole. I think it could be a useful tool within the wider industry in terms of reducing budget costs and leading to a more sustainable industry if used correctly. We can even see the application of the method within recent open-world games like "The Legend of Zelda: Breath of the Wild" which go for more minimal approaches. I believe that for immersion Design by Subtraction is very much something which should be analysed as I believe it could be used when analysing elements like music and UI even within juice filled games to elevate key moments.

I think there is a risk with the method in that it can be taken too far if focusing on key themes and sacrificing gameplay leading to divisive releases like The Last Guardian however the same can be said of juice as if it is applied too much the game can become visually incoherent for example.

As for my research, I believe it has given me a greater understanding of Design by Subtraction and will aid me in the creation of the artefact going forward.

Research Methodologies

Artefact Design and Purpose:

I aim to carry out my investigation of the method's efficiency by creating a brief level in a simple game prototype within Unity. I will be creating a basic framework and level and then create two different versions of the game, one utilising a minimalist Design by Subtraction philosophy and one which is more maximalist in nature including multiple 'gameified' elements such as victory noises which aren't contextualised within a game world. I will then evaluate how this felt to create from a designer perspective and conduct a playtest of the artefact to view how players respond to both versions of the level/design philosophy through a mixed data set gained through observations and questionnaires.

The core game and level will remain unchanged to keep the test consistent as we can then directly compare the effects of the methodology on the same framework/experience, however, certain elements will be changed between versions. For example, the version created utilising Design by Subtraction will not contain any tutorialisation or dialogue whilst the maximalist one will include both.

There are a few purposes behind the development of the artefact:

1. It is to judge the creation perspective as a designer judging which version was more efficient to develop through both design and in engine creation.

2. It is to understand how players respond differently to minimalist and maximalist experiences within games (e.g. view how playtime is affected and see whether players feel more immersed due to fewer ‘gameified’ elements)

3. To find out if there are any key elements which can not be subtracted within a gameplay experience

4. To discover which led to the overall better gameplay experience

Development of the Artefact:

I initially began by coming up with the complete version of the prototype including elements like a narrative, tutorial, music, UI and health bars. I designed a simple 2D platformer where every aspect is conveyed through basic shapes (to save on development time) within Unity. The game will also rely heavily on ambient sounds due to a lack of visuals to help the player infer where they are as this also fits with the concept of Design by Subtraction in which sounds are intended to be coherent. In the game the player takes the role of a child returning home from a friend's home and cutting through the woods at night. Here they find an alien which is also lost but can act as a light for the player causing the two to team up as they find their way out of the woods and home. The game's core theme is about friendship as it is about the two characters relationship and how they aid each other through escaping the woods. This concept is inspired by a few different things with the narrative inspired by the movie ET with the gameplay aspect being directly inspired by The Last Guardian and Ico (which were both discussed within my literature review) as well as the companion cube from Portal.

To better describe these inspirations, within The Last Guardian Trico helps the player with combat encounters and is required to pull heavy doors and so on which helps the player form a connection through gameplay as the companion is essential to progression making the player value them and grow concerned for their well being. The same is true of Portal’s companion cube to an extent as this item is used within the level it is introduced and is essential to helping the player progress creating a link between the player and the object (which is used in a comedic way within Portal). This is the sort of link my prototype aims to highlight as the player should form a connection to the alien due to them lighting the dark environment. An additional link with Portal is of course that with every aspect of the games visuals simply using 2D shapes the player will be making a connection with a simple square similar to the companion cubes design. Finally, the link with Ico is that the player themselves cannot die, instead, the Alien dying is the loss state. The reason for this is it makes both characters essential to each other as the alien lights the level for the player whilst the player protects the alien creating a symbiotic relationship as seen with the inspirations discussed above. Contextually the alien is the character that can die as the enemies in the game represent a secret service hunting for the alien (reminiscent of ET). I felt it would be inappropriate and unnecessary for the main character (a child) to be attacked in this scenario.

From here I then utilised Design by Subtraction within the design process as I looked at these elements and assessed what I felt could be trimmed down on while still conveying the core theme and concept. I stuck closely to Costa’s (2022) definition of Design by Subtraction by ensuring that the elements within the game were cohesive and minimalist and assessed my research to ensure I stuck true to trends found within other games using the theory.

The elements I felt could be cut were:

1. Narrative text boxes – I felt I would use Limbo as inspiration and have the player interpret the story themselves opposed to being explicitly told it.

2. Explicit tutorialisation – It was not cohesive within the world and I felt again looking at Ico no tutorials are given to the player so the player should instead figure out the controls

3. Music – I again looked at Ico for inspiration and opted to cut the music to instead make the game more atmospheric and immersive by having as few extrinsic elements as possible

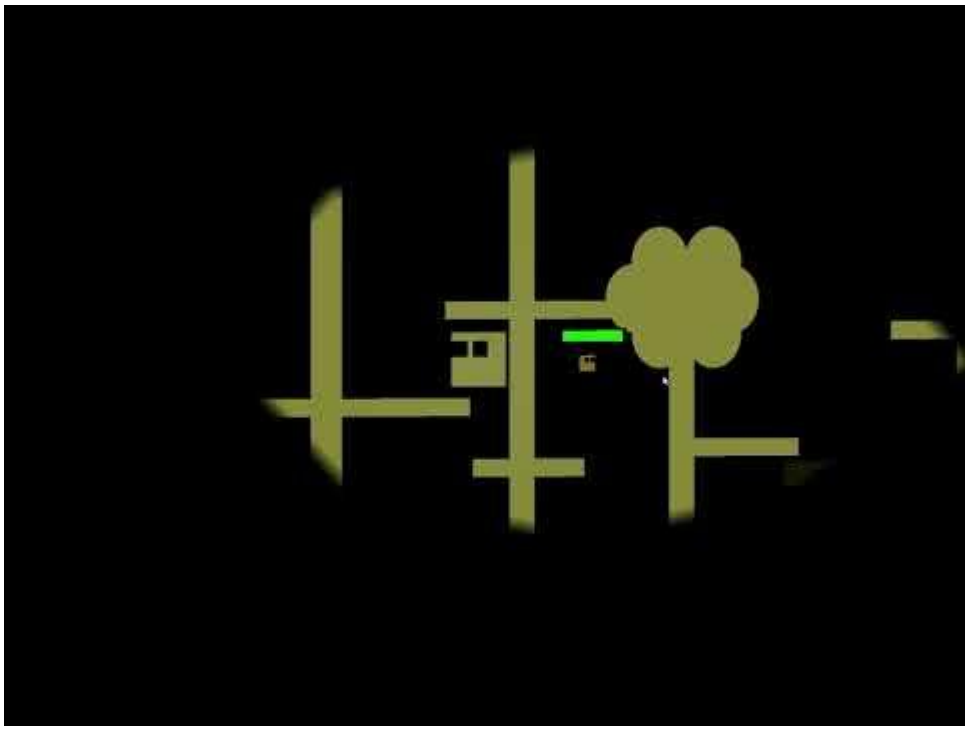
4. Health bars – I removed these as I felt they were incohesive within the world, instead there are other health indicators as I felt it was still something that needed to be conveyed to the player. When the alien takes damage the light will flash indicating a hit and the light will dim based on how much health they have with the same applying to the enemies. This is a clear indication of health and equally affects the player and the alien's relationship as the darker the world is the harder it is to see thus the player has a reason to protect the alien furthering the games theme.

5. Victory sounds - I removed a victory noise which would play whenever puzzles, checkpoints or combat encounters were triggered. This is because it didn't feel cohesive within the world as it was a non-digetic element.

After designing the game I then created the artefact within Unity. I used the same project, mechanics and level ensuring things were as consistent as possible. Below are both versions of the artefact:

<u>Design by Subtraction (Minimalism)</u>

Standard Design (Maximalist)



How I will gather player feedback:

As mentioned above I will be using a mixed-method approach and will be gathering both qualitative and quantitative data through both observations and questionnaires. The reason I will be conducting observations is I think it's important to witness how a player reacts to each experience first-hand and I can directly compare the experiences of all the participants to see if I spot trends within their gameplay. As for the questionnaires, this will allow me to view participants' feelings on both experiences as they are telling me directly what they felt based on key questions I am asking each participant. I will be gathering this information from 8 participants.

This will be ethically done as participants will have to read an information sheet informing them about the research being conducted, they will then need to sign a consent form before any testing is able to be conducted. Participant data will be kept securely within a locked folder which only I have access to and will be deleted following this study. Participants will be given the right to withdraw their information if they ever choose to. Finally, no participant's name will be given within this dissertation, instead, each participant will simply be called “participant” with a corresponding number e.g. “participant 1”.

I will be getting each participant to play the levels in an alternating order e.g. participant 1 will play the minimalist level first followed by the maximalist level while Participant 2 will play the levels the other way around. This will help me directly compare aspects such as which version takes longer to beat and ensure there isn’t a bias based on which level they play first or last as it swaps for each participant. Due to this, however, it does mean players will already know key elements of the prototype when going to play the second version e.g. all players will know the controls going into the second version and players who played the maximalist version first will also know the initial story as

they are explicitly told it giving them nothing to interpret when they then play the minimalist version. This has been factored into the questionnaire with some questions highlighting they should be ignored if a certain version was played first.

With both these methods of gathering data I believe I should be able to compile a thorough look into how players felt in regards to each version of the game allowing me to view whether players prefer the minimalist experiences created by subtractive design and if they felt certain mechanics could be subtracted from within a more typical game experience.

The questionnaire participants filled out can be found in Appendix 1.

Results and Findings

I will breakdown my results into a few different sections. First, I will discuss briefly what I observed about the development side of Design by Subtraction and how it applied to my work flow in terms of efficiency, from there I will dig into what I learned from player perspectives through observing playtests and via the questionnaires which participants filled out for the project.

Development Perspective:

During the initial concept phase Design by Subtraction naturally added to the time of development as I had to assess and analyse which aspects of the game could be cut and trimmed down while still creating the same core experience. However, during development, the minimalist version of the level was developed much faster due to it containing less features than the maximalist version of the project. The minimalist version is also more polished as the mechanics in the game are more simple meaning I had more time to devote to those aspects of the game whereas within the maximalist version there were more aspects I would be required to polish up.

Player Perspective:

I will break down the player perspective into two sections, first I will share what I witnessed during my observations and following on from this I will share the feedback I received from the questionnaire breaking it down into qualitative and quantitative results.

Observations:

Based on my observations of the participants playing the game I noticed a few trends which emerged. First of all, players who started by playing the maximalist version finished faster than those playing the minimalist version. People seemed to respond differently to the game when given the narrative, players who played the minimalist version first found the game to be eerie and atmospheric whereas players playing the maximalist version found it to be more adventurous in tone.

Breaking the other trends I noticed down into both versions this is what I found:

Minimalist trends:

1. I noticed players who started with the minimalist version of the game struggled to figure out where to go after initially interacting with the alien. Most players assumed they would need to backtrack or could jump from the slope to the tree branches. Only one participant immediately noticed the ladder and realised it was climbable without prompting.

2. Players immediately figured out where they were. Players immediately inferred without prompting that they begin on a street and head through a woodland/park at night. Players also believed enemies to be police officers which was somewhat intended hence the blue and red colour scheme as I felt this was the easiest way to represent the FBI.

3. No players successfully inferred what the ally was. Most people inferred they were an ally however no one guessed they were an alien. Instead responses I received were that it was a firefly, fairy or general creature.

4. One player initially believed that the alien was an enemy and it was chasing after them to kill them

5. Players all assumed the bench was decoration and none realised it was a checkpoint within this version.

Maximalist trends:

1. Most players playing the maximalist version would stop every time text appeared to read it interrupting their gameplay and slowing down their progress.

2. Most players assumed they could shoot their slingshot wherever their mouse was pointing as oppose to just in the direction they were currently facing.

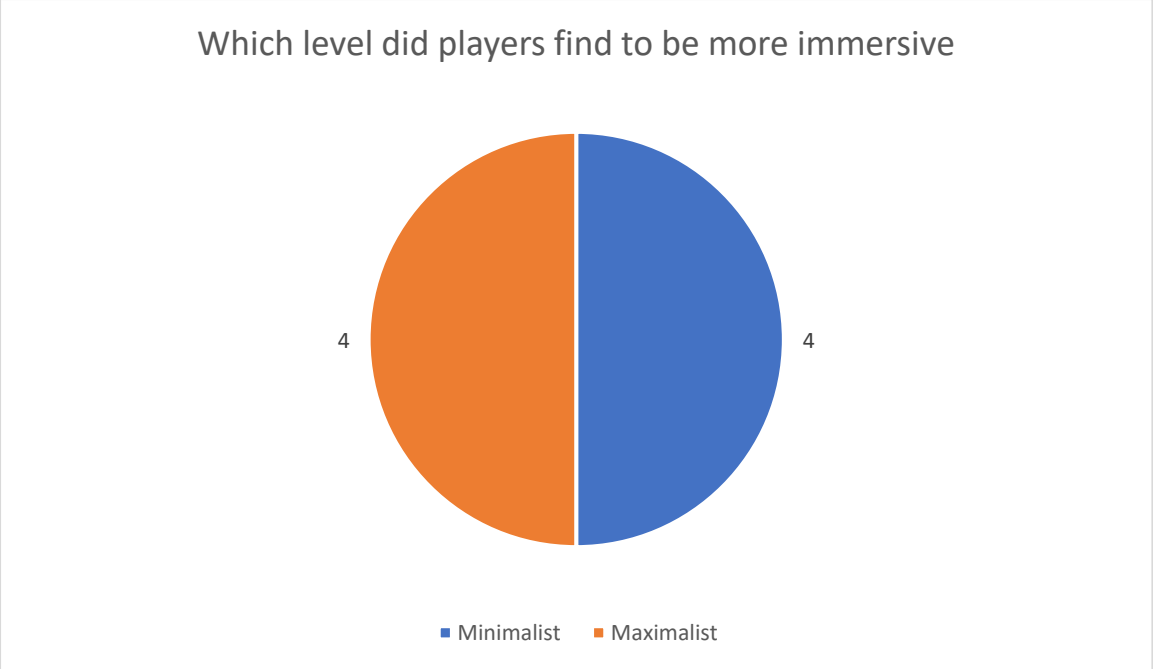
3. Players didn't notice the sounds as much with the music playing in combination with them.

Questionnaire Results:

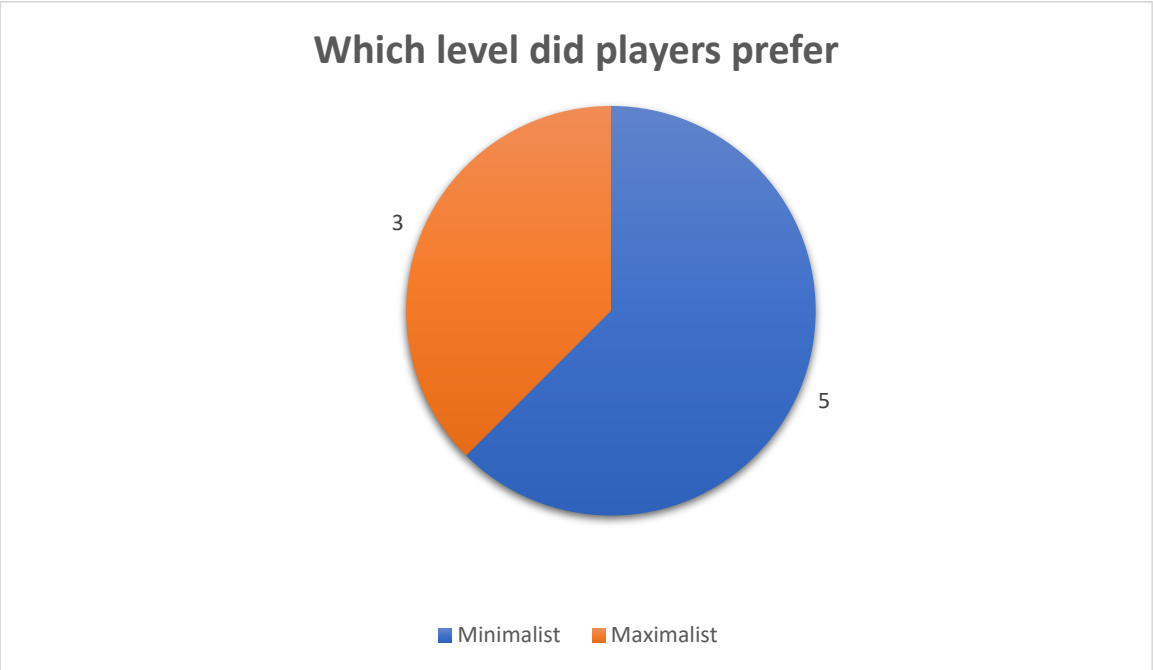
Based on the questionnaire I received a very mixed response on which level was generally preferred and which was considered more immersive.

Data Comparing Both Versions:

When asked about which version was more immersive I got a perfectly even split down the middle as seen on the chart below.

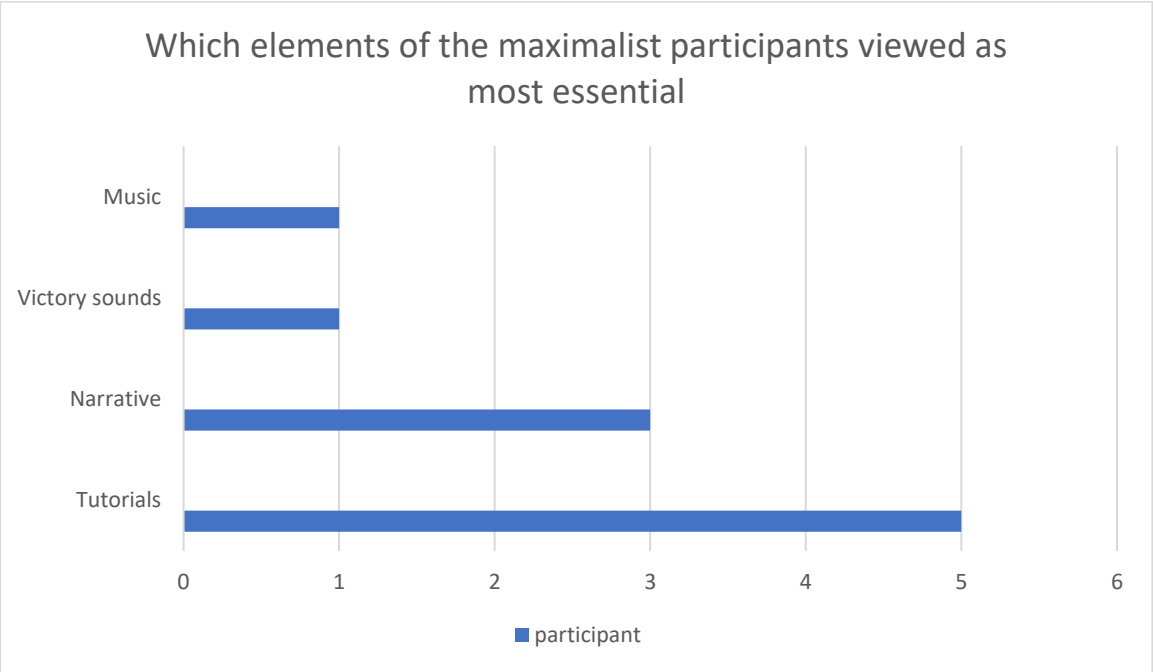


Participants made arguments for their choice. Those who chose the maximalist argued that the maximalist version was more immersive as they were given a clear goal and narrative whereas when playing the minimalist version they were trying to figure everything out but just found themselves more confused than sucked into the experience. However, on the other side of this argument players claimed the minimalist version was more immersive as there were no gamified elements which pulled them out of the experience such as health bars or the victory noises which played throughout the game.



Here by a small margin participants preferred the minimalist version overall. Players claimed this to be the case as they felt the overall atmosphere was stronger and felt it was a more focused and polished experience. Some participants also highlighted the reason they preferred the minimalist

version of the game was due to the fact it was open to interpretation allowing them to come up with their own story, unlike the more linear narrative of the maximalist version.

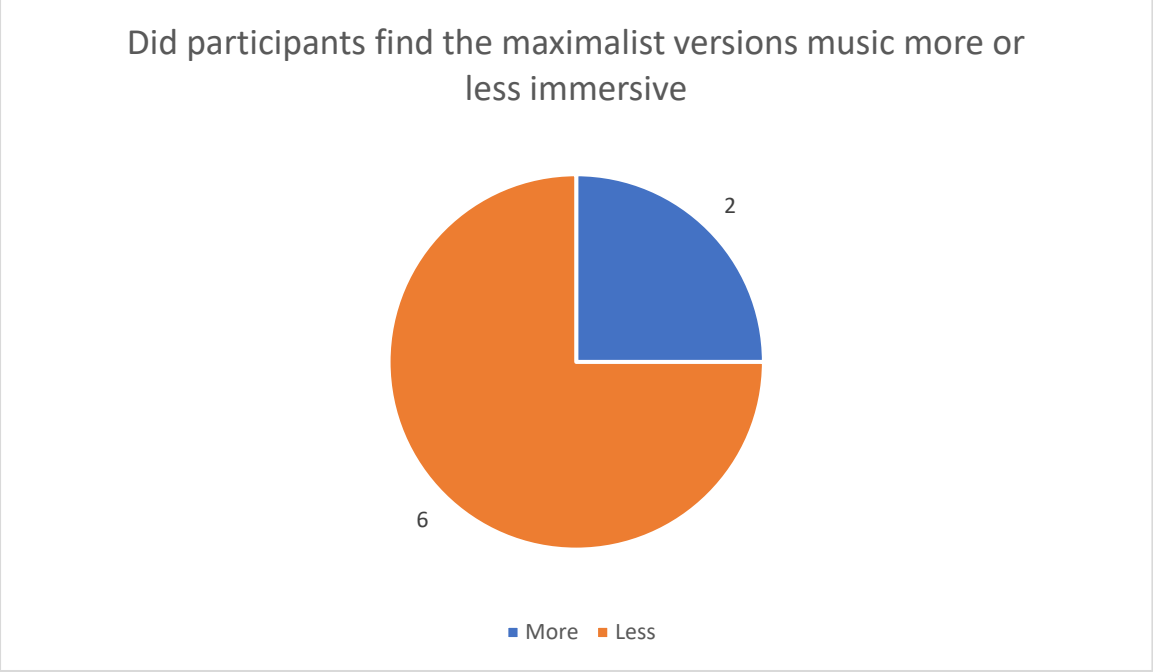


Here I gathered the data of what players felt was essential from the maximalist version. To better break this down however a few people listed tutorialisation but explicitly mentioned it for elements such as being able to climb ladders or shoot as they felt everything else was clear i.e. they would prefer this for more complex mechanics/less standardised controls. This is highlighted by participant 7 who said that “movement controls are the same as most PC games so easy to figure out” however this may not be as easily inferred by those not used to playing games meaning these tutorials may still be key to some players enjoyment/experience.

Within my questionnaires it could be seen that all participants felt that they could clearly and easily figure out where they were due to the shapes and audio design within the level. All players highlighted the audio design as being a key element as to what made the game immersive as they felt all sounds where cohesive and accurately represented what each element was intended to be, for example, the rope bridge and water section participants all clearly knew what it was despite each element being represented by square sprites.

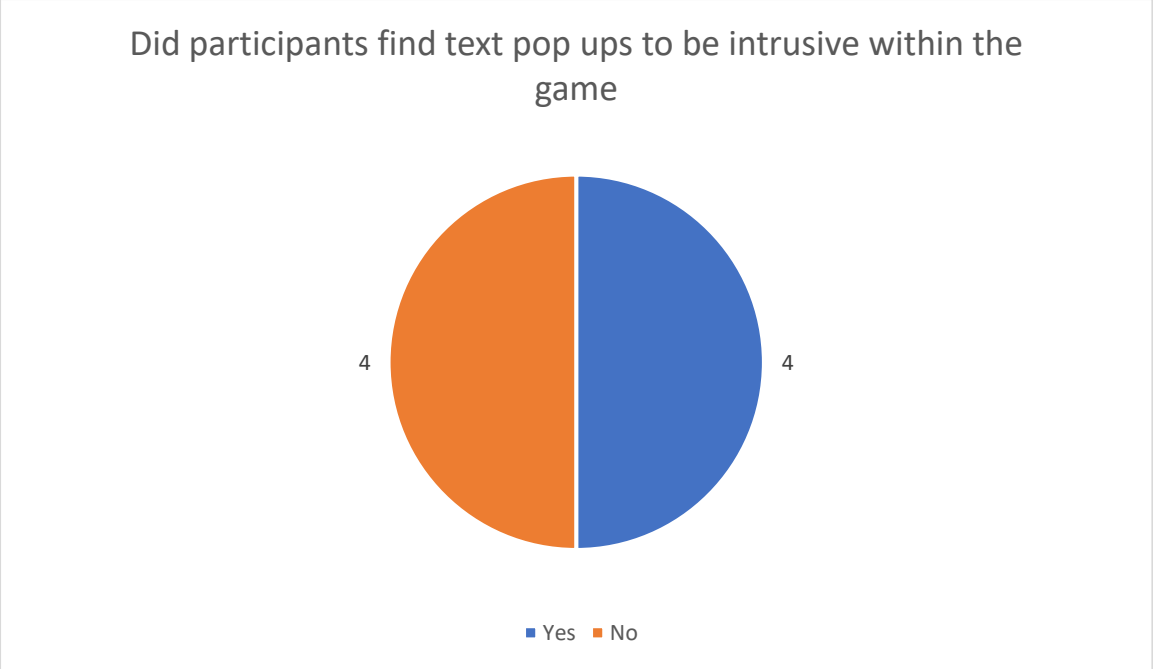
Participants also highlighted the lighting as being immersive as they could immediately tell it was night time and understood the importance of light within the game world.

Data Exclusively About the Maximalist Version:



Most players felt that the music made the game less immersive with participant 1 stating they ”quite liked the lack of music in the first game as I could hear the sounds better and it made the dark environment feel scarier as there was a haunting silence” which was echoed by participant 7 claiming they felt it was “more immersive without the music as the sound effects could be heard easier, which added to the creepy feel of the woods”.

Participants were fairly divisive on the “harp” victory noise found in the maximalist version of the game. One participant cited it as still feeling coherent as it “has the same vibe” as the other sounds in the game while another participant described it as “jarring” taking them out of the experience as they felt it clashed with the dark atmosphere established throughout the level. Most players did claim however that it did add to the experience from a design perspective as they found it would “clearly indicate” when they had done something right and it made them feel “satisfied” by being rewarded for solving a puzzle or beating an enemy encounter.



People were split as to whether they found the text pop ups in the game to be intrusive. Those who did not find them intrusive stated that they weren't intrusive as "text helped to add to the story and understand what the players goal was" meaning for them they found it essential to the experience as without it they felt aimless. However other participants highlighted that it "distracted from the gameplay" which made them feel they had to "stop to read it" slowing the overall pace and gameplay flow. Additionally participant 7 felt it "could block portions of the game" obscuring the view and taking away from their immersion.

Data Exclusively About the Minimalist Version:

Participants who played the minimalist version of the game first all had a very similar interpretation of the core narrative of the game when asked what they believed it to be about. Below quotes from these participants can be seen:

Participant 1 - "I think the games narrative involved finding your way through the darkness, with limited light sources encouraging cautious gameplay."

Participant 3 - "The player has to walk through a park and traverse the landscape to reach an end goal, while evading the police. I did not understand what the light following me was, but it helped with the parkour mechanics"

Participant 5 - "Getting home in the dark. Meeting a creature who helps light your way and then protecting him from his enemies."

Participant 7 – "It is about a person trying to find their way home through a forest/park and various streets. The enemy were police as we seemed to break into and out of a warehouse. The friend is a firefly or possibly some form of folklore like a fairy helping you find your way home."

Discussion and Analysis

In this section I will again break down my findings into two halves, a developer perspective and a player perspective in order to best answer my research question of whether this method is efficient and could be used in the wider industry.

Development Experience:

From a developer perspective, I believe the artefact has proven Design by Subtraction as an efficient method. While it was slower to come up with during the design phase as you have to carefully analyse what can be cut whilst keeping the core experience the same, it then becomes much faster to develop within engine as there is less to develop. Additionally, I feel it leads to a more polished experience based on my literature review and findings as you have less elements to create so more time to focus on what is added and ensure as good of a core experience as possible. I believe It also helps keep the game more cohesive as I initially planned to include keys to locked doors in the game. However, using Costa's definition of the theory I realised it was not coherent as it didn't make sense to have locked doors and keys in the forest so I swapped this for a large box which is found in a tree house within the actual version of the game which is far more cohesive and feels more natural and less game-like whilst still serving the same purpose of gating the player.

Its efficiency can also be seen in the fact most players preferred the minimalist version of the level and found it to be more immersive even if only by a small amount.

Player Experience:

Overall, my research has shown some surprising results which generally seem to be split down the middle in terms of player responses to the design theory. Participants actively praised elements of the minimalist version such as the sound design and atmosphere but despite that, the game was fairly evenly split between which version players preferred and found most immersive. While most players did find the minimalist version to be more immersive it's only by a very small margin.

I feel based on the observations I made and the responses I gathered, that players lacked any major context in the minimalist version of the game which reduced their engagement/investment. I feel looking back to my literature review when we dissect games like Limbo and Ico, while both are minimalist and don't tell the player much about their narrative, they still give you a good amount to infer through the visuals. While my game did this with the environment with each abstract shape being given clear sounds conveying what they were to players, the characters themselves were too visually simple and similar. I feel if the protagonist was perhaps more visually similar to a child and the alien was more visually distinct players would understand these elements and grow more attached. Looking at Ico for example, if we reduced Yorda and Ico (the character) to simple boxes we would then lose the core theme of boy meets girl which Ueda intended for as the player would not be able to visually tell that that is the case.

This hypothesis is backed up by my research as I highlighted that some participants mentioned that they preferred being told the story in the maximalist version as it gave them a clear goal. However

all players who began the minimalist version still were clearly able to interpret the narrative almost perfectly and the same way solely missing the key element of the companion being an alien.

I feel this somewhat answers one of the initial goals of the project being “when is Design by Subtraction too much”. I feel here we can clearly see that without any clear narrative and a lack of clear visuals, a number of players do find it harder to get invested in a game.

An element which I found to be extremely cohesive with my literature review and artefact is the use of both sounds and music within games and its overall importance to immersion and atmosphere. 75% of participants felt that adding in music made the game feel significantly less immersive which of course lines up with what was found within the literature review where Ueda discussed wanting to use music as little as possible in his games as it is a non-diegetic element. Based on the research I gathered we can see most people highlighting that the game was immersive discuss the sounds as being a key factor as it allowed them to better set the scene with them figuring out the start was set on a street due to there being cars, despite there being none visible.

One aspect which did surprise me and somewhat goes against what I found in the literature review however is that there was a 50% split as to whether the text elements were intrusive or not. My research indicates that these elements would break immersion and feel unnatural in the game but a good proportion of participants actually argued it made them feel more immersed due to it giving a clear narrative and goal (again touching on what I discussed previously). Additionally, participant 1, though an outlier, did claim that health bars allowed them to get more immersed within the games combat as they felt it gave a clearer indication of their health. This goes very much against what was found within the literature review I conducted where I found as few UI elements as possible make the game more immersive. That said this point was only stated by one player so could be an outlier and also doesn’t take into account the game as a whole but only one system so may not be entirely relevant.

Digging deeper into elements which participants felt were essential, many players mentioned the tutorials within their responses, however this was specifically for less conventional controls such as shooting being on the mouse or W to climb. Many participants specifically mentioned that they felt basic controls such as movement and jumping do not need to be explained but W and the mouse do. I attempted to design the game in a way where the player cannot progress without learning how to use controls at key moments, e.g. when the player first falls they must jump up the tree, the player must pick up the alien to see a ladder and has to climb that to progress etc… I feel these elements are natural tutorials and were designed so the player must teach themselves if not explicitly told for the minimalist versions lack of tutorials. What I find interesting is most participants were familiar with basic controls of PC games hence it was a clear universal language to them for those basic controls. However, those inexperienced with games would likely not know that space is to jump for example. This is a wider topic with tutorialisation and how it should be executed in games but I found it interesting so many players actively wanted these tutorials but only for certain mechanics.

The lack of tutorials within the minimalist version did extend playtime for participants as they would typically get stuck at the part where they must climb the ladder. This was as they simply assumed it wasn’t within the control scheme opposed to a lack of clear visual representation for said ladder based on what I observed. I always expected the minimalist to take longest due to the lack of tutorials so this wasn’t a surprising discovery for me.

The main limitations and criticism of my study is naturally the participant size. I feel in order to gather better and more conclusive results a study should be undertaken at a greater scale as I feel it's likely to be less down the middle when more opinions are bought into account. I also feel something which may have held back the project is the artefact I created as I am not the strongest when it comes to coding in games leading to the project being somewhat unpolished. I feel these are aspects which could have been improved upon and if someone were to undertake this study again this is something which a researcher should consider.

I believe the core methodology for the project is sound as I believe you can directly compare and contrast how these changes affect a design experience and a player experience and clearly visualise the changes the theory leads to through both versions. With that said I don't feel the artefact here is necessarily the best demonstration of that as I believe certain elements may be too simple within both versions and thus a larger more polished artefact would likely better show the design theory. Naturally something which likely impacted results is which version of the level players played first as having played one naturally they know the same beats of the level in the next version, I did consider creating two different levels to offset this however I felt that made it harder to directly compare the effects of the theory on an experience and I do feel this is the best way to conduct the experiment.

Conclusion

The main research goal of this dissertation was to research and analyse whether "Design by Subtraction" is an efficient method and whether it should be applied more widely within the games industry. Having analysed both a player and developer perspective we can clearly see a few different conclusions which can be drawn from how the design theory affects an experience.

Developer Perspective:

From a developers perspective "Design by Subtraction " has proved to be extremely efficient. While it begins initially quite slow in the design phase as more considerations need to be taken as to what elements are essential and what can be cut down upon. However, when it comes to creating the game within engine, development went far faster and much more smoothly as there were less elements to create allowing me to split my time more evenly and create a more balanced project. Within Design by Subtraction a project should also be continually assessed even during in engine development and that is something I also assessed each time I added a mechanic I would question whether it could be cohesively be factored into the games world and if not would cut it. We can see that the minimalist version of the game led to a more atmospheric and polished experience through the feedback given by players showing development proved effective.

While my game of course had no budget, the fact it was quicker to develop and more simple would mean it would take less development time and a smaller team to create lowering the budget of the game and making it a more sustainable development style than many large modern Triple A games as discussed within my literature review.

Player Perspective:

From a player standpoint the response to theory was more mixed. While the minimalist version generally was preferred by participants for its atmosphere there was a preference from many players for the explicit narrative found within the maximalist version as it gave players a clearer goal. A significant portion of participants did find it harder to engage with the more minimalist visuals and narrative of the minimalist version of the game which made it harder to make them feel immersed and understand the emotional connection between the player and the alien. Based on my personal findings with the literature review and my results I believe that while minimalism can enhance immersion in some contexts it can also hinder player investment if some elements are too simplified (in this instance the character designs as they make the narrative too unclear).

Initial Aims and Objectives:

I will break down the initial aims and objectives of this dissertation and will discuss whether I was able to successfully find the answer to each.

1. Define Design by Subtraction based on professional research and developers - I believe throughout the literature review the paper clearly defined Design by Subtraction as a game which is minimalist and coherent using Costa as a key source as well as a thorough analysis of Fumito Ueda, the creator of the philosophy. This allowed me to identify how the method is used within the current games industry (objective 2) which was then used during the creation of the artefacts design.

2. Identify current industry trends and see where if at all Design by Subtraction is applied – This was researched within my literature review where I learnt that Design by Subtraction generally is used less commonly within the mainstream industry. However, I learnt that many indie developers use this style such as the creator of Fez and the developers of Journey. Based on my research this was due to a push by larger companies in the industry aiming to develop bigger games as oppose to more minimalist experiences.

3. Learn how much is too much when it comes down to Design by Subtraction e.g. when is subtraction too much? – This was first touched upon in the literature review where The Last Guardian was highlighted as being an experience which frustrated many players due to a lack of control of Trico. Additionally, I found through my results and findings that an experience with a lack of clear visuals and a lack of explicit narrative can confuse players making them less immersed which shows using the method can be a balancing act.

4. View the different perceptions of players from more feature rich gameplay experiences versus more minimalist experiences via playtests of the project artefact – This was one of the main reasons behind the artefact's development and was thoroughly analysed through observations and analyses. We could see players tended to prefer the minimalist gameplay by a small margin however were split as to which was more immersive due to some players being confused by the more abstract experience.

5. See how effective the process is from a designer's perspective via the creation of a project artefact – When developing the artefact I stuck as closely to the found definition of the design theory as I could in order to best understand how it felt to develop something using this method. This has then been assessed and discussed throughout the dissertation

Each aim and objective was met to some capacity and was clearly considered throughout the writing of the paper.

As mentioned previously there were some limitations to the paper, primarily I feel a larger sample size of participants likely would have given greater feedback to analyse as this is only a small handful of people and isn't representative of a wider audience, instead it is only a select few. Additionally, the artefact is held back somewhat by me not being that competent in engine meaning the artefact could only have very limited scope. I feel that should someone else do the project, a more detailed artefact which is longer and more complex would make for a better proof of concept for this project.

Overall, despite the limitations of the project I believe Design by Subtraction is an efficient design method which could be more widely used within the industry especially when creating a cohesive, polished and immersive gameplay experience. That said, however, it is important to be careful when using the method to ensure balance is struck between clarity and minimalism as I found during testing of the artefact with players being confused in the minimalist version due to a lack of narrative and visual clarity taking them out of the experience.

I believe the industry could benefit from this method as it could even lower budgets if a more subtractive approach was taken as it keeps the game more focused and smaller scale.

Recommendations

I would recommend that people conducting this study create a more polished artefact with more distinct differences. For example, I believe the minimalist version of the level I created was effective. However, I believe the maximalist version could have shown more significant changes perhaps using more detailed visuals for the characters e.g. having the main character be a child silhouette similar to that of the game Limbo. The abstract visuals in the maximalist version don't do an effective job at highlighting the difference in approach between minimalism and maximalism. I also feel more elements highlighting juice could have been added such as having a camera shake on damage, particle effects on enemy deaths etc.

I believe a longer experience would also help better determine how players feel about both design approaches. Within the artefact I developed new elements are constantly being introduced which, for the minimalist experience with no tutorialisation, could feel quite daunting and confusing leading to some responses stating they weren't immersed due to trying to figure out how to play. If the level was longer and the players had more time between each mechanic being introduced and saw them appear more this confusion would likely fade somewhat, producing a different result. A standard game/experience would also follow this sort of gameplay progression where mechanics are introduced and the player has time to learn these systems whereas here they do not get adequate time with the systems. I also feel that with a longer game I would hypothesise players would begin to find the text boxes more intrusive whereas with a short experience that wasn't as much the case. I feel a longer level would better highlight how players do respond to both approaches within a more typically designed game.

Additionally, I feel asking more participants would help better test players opinions on the design theory as I feel here I only had a small sample size, asking more people would better represent wider opinions and equally would ensure there are fewer potential anomalies within the data gathered.

Overall I feel a more polished artefact would better highlight the effects on players experience between methodologies and it would be worth investigating further in other papers to better understand the use of the methodology within the wider industry.

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Appendices

Appendix 1 – Questionnaire given to participants

Minimalist questions

Ignore this question if you played the maximalist version of the game first: What do you think the games narrative was about?

Ignore this question if you played the maximalist version of the game first: Did you find it easy to figure out the controls or did you wish there was some tutorialosation?

Did you find the game immersive, why did you feel that way?

Did every element feel coherent within the games world?

Did you feel there were any elements that felt "gamey"/unnatural in the level? If so what and why?

Maximalist questions

Did you find the text pop-ups to be intrusive?

Did the harp sound effect add to the effect of solving/beating a puzzle/event?

Did the harp feel coherent with the game?

Did the music make the game feel more immersive?

Did the music add to the experience?

Did you feel the game was immersive? What made it less immersive?

After both played

Which level did you play first?

How long did the first level you played take you to beat?

What differences did you notice between the two levels?

Which did you find more immersive and why?

Did you prefer interpreting the story yourself or being told it and why?

Did the sound effects allow you to figure out what everything was? E.g. creaking on a platform to represent a branch. Were any unclear?

Did you feel any elements of the maximalist version were essential? E.g. tutorial prompts, story, harp sound, music. Why do you think so?

Which level did you prefer?