

# Exploring new interaction possibilities for video game music scores using sample-based granular synthesis

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## **Abstract**

For a long time, the function of the musical score has been to support activity in video games, largely by reinforcing the drama and excitement. Rather than leave the score in the background, this project explores the interaction possibilities of an adaptive video game score using real-time modulation of granular synthesis. This study evaluates a vertically re-orchestrated musical score with elements of the score being played back with granular synthesis. A game level was created where parts of the musical score utilized one granular synthesis stem, the parameters of which were controlled by the player. A user experience study was conducted to evaluate the granular synthesis interaction. The results show a wide array of user responses, opinions, impression and recommendations about how the granular synthesis interaction was musically experienced. Some results show that the granular synthesis stem is regarded as an interactive feature and have a direct relationship to the background music. Other results show that interaction went unnoticed. In most cases, the granular synthesis score was experienced as comparable to a more conventional game score and so, granular synthesis can be seen a new interactive tool for the sounddesigner. The study shows that there is more to be explored regarding musical interactions within games.

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# 1. Introduction

Granular synthesis is a distinctive sound synthesis technique. Roads (2001) explains that the granular synthesis method makes use of microscopic lengths of sound. A grains duration usually varies in between 1-1500 ms and are then played back in short succession after one another. Grains can be overlapped cloned, reversed, pitch shifted and manipulated in other various ways. This category of synthesis lends itself to creating interesting textural sounds, such as drones etc. Granular synthesis can be regarded as a stochastic synthesis method, as it usually utilizes random parameters. For example, the chance of reversing one grain if four grains are emitted per second.

These qualities make granular synthesis very useful for games. In game audio where repetition is a common problem, granular synthesis can provide solutions by avoiding repetitive sounds by introducing variation. This can be achieved by modulating the inherent parameters of the granulator (Roads, 2001, Young, 2013). Paul (via Collins, 2008) explains that granular synthesis is being used as sound effects and foley in video games, but it is not used to any great extent in the musical score.

Although granular synthesis is being used mostly as ambient sounds in video games such as wind or rain, granular synthesis could potentially also pose as an interesting part of a videogame score. For example, if parts of the music are played back in game using granular synthesis instead of traditional loops, the score could be rendered more “random” and thus introducing more variable elements into a score, if executed well.

With an adaptive video game score there is the possibility that players can interact with the game music. McAlpine, Bett and Scalan (2009) defines that the term “Interactive music” generally as “real time adaptive music”, which is music that is often rearranged in response to player inputs. Thus, players receive feedback from the game musically. Young (2013) explains that adaptive video game music is becoming close to an expected norm in video games, yet that the full potential of adaptive music has yet been fully explored.

## 1.1. Background

Game soundtracks include elements that change in response to the game state and player inputs. Sometimes the connection between player input and sound is obvious, for example when a sound confirms an action. Other times these interactions are more discrete, such as when a musical score becomes more tense because of a build in the drama.

### 1.1.1. Interactions in videogames

Video game designers put a lot of effort into creating games that are highly engaging and immersive. Sound designers can contribute to this goal by creating sounds that are congruent with the picture, or by creating sounddesign-elements that support the musical score. Interactions in video games might be assessed in terms of their value in provoking or sustaining interaction. If sound designers want to explore new interaction potentials, they will be interested in actions that would heighten the engagement of any interaction in regard to sound.

Musical interactions with the score can be seen in games such as “Journey” (Hunicke, 2012) where the main characters noises are always in key with the musical score, but the character

noise is never played back the same way. The noise is interactive in a way that the amplitude of the noise increases depending on how long the player holds down the “noise-button”. Players of the game is randomly matchmaked with other players online, although they are only able to communicate with the noises that their characters emit. The musical score adapts to the tempo of the main characters progression through the story, and this potentially results in an immersive experience for the player. However, the musical score can potentially be modulated in real-time depending on player status, area or event with the use of granular synthesis. This type of real-time adaptation might yield similar interaction results to that of “Journey” (Hunicke, 2012). Any sonic and interactive element needs to fit with the game world.

Collins (2013) explains that sampled sounds are usual in video games and that they can be regarded as realistic sounding in terms of their auditory fidelity (high fidelity sounds that are congruent with the picture). However, kinesonic fidelity (sounds that change dependent on user input) could be regarded as equally important as auditory fidelity. Collins explain a scenario within the video game Wii sports.

*“...If I exaggerate my Wii tennis racket swing, emphatically swing it to the greatest of my strength, but hear only a light tennis ball “pop,” does it matter that the “pop” was a sampled sound that may be technically realistic if that sound does not map onto my action? And how does this affect the ways in which I play? Do I then adjust my actions to account for the lack of sonic feedback to those gestures?”* (Collins, 2013, p. 36)

Collins (2013) further describes it may feel more real to the player to have kinesonic congruity (sound that confirms an action, not necessarily a high-quality sound) than high auditory fidelity. This means that the actual conformation of a movement can be more important than the quality of sound that yields from it (Collins, 2013). If white noise yields more satisfaction than the usage of high-quality samples, the noise might be preferable sound to implement. Interactive granular elements, that may sound obviously synthetic, might yield preferable or enjoyable results.

For Video game music to feel interactive how it adapts needs to respond believably to player behaviour. Granular synthesis could potentially provide this dynamic interactive potential due to the many modulateable parameters often found within sample-based granular synthesizers.

### **1.1.2. Adaptive Videogame Music**

The function of game music has been studied previously. Sweet (2019) explains that music has various functions within a video game. For example, video game music can set the scene, introduce characters, signal a change in game state, increase or decrease dramatic tension, communicate events to the player and emotionally connect players to the game.

McAlpine et al. (2009) suggests that all game music facilitates interaction on some level. Such as music that provides feedback to the gameplay state or music that encourages a specific emotional response from the player. They exemplify a well-known interactive scenario, a live concert. The performer audits a musical output of emotions and the audience provides feedback to the performer by applauds and shouts. This in turn changes the behaviour of the performer. This as a two-way feedback process, which is characteristically interactive. The same principle is applied in video games. An example of this is from the

rhythm game “Parappa the Rapper” (Matsuura, 1996). When the player presses a button out of sync to the music, stems from the main arrangement is removed for a simpler submix as an indicator that the player is performing poorly. This gives the player a chance to improve their timing, before ultimately failing the track. As the player starts to perform well again the stems are put back into the mix.

The removal of stems in “Parappa the Rapper” makes the game more interactive and responsive to player performance. Granulation of individual instrument stems could potentially lead to a similar result. An example of this would be to decrease grain size of an ambient pad as the player health drops, which would lead to a different kind of texture.

McAlpine et al. (2009) introduce different approaches to how real-time adaptive music is being used in video games. They explain that event-driven music cues as “the simplest and often the most effective system of adaptive music”. It is also popular because of how easy it is to implement in the game engine. Video game music is considered “event-driven” when for example, a boss enters the second stage of the fight and in turn the music’s tempo increases.

McAlpine et al. (2009) explains another approach to adaptive music, “Horizontal Resequencing” and “Vertical Re-orchestration”. Both methods utilize in game parameterization to change the music. They explain that “Horizontal Resequencing” monitors one or more different in game parameters in real-time and reorders the musical (loop) once that determined threshold is breached. The different parameters could for example be the time that a player has been standing still, or how many enemies are remaining. “Vertical re-orchestration” uses similar threshold values to that of “horizontal resequencing”, but instead of changing musical loop, various orchestrations (or stems) are added or removed dependent on threshold level. This method introduces new pre-written musical components to the mix.

“Embodiment” of traditional musical notions is hard to replicate in adaptive video game music (McAlpine et al., 2009). For example, it is hard to build up “tension and release” which can be regarded as a standard tool in music compositions. They explain that music in games need to be non-linear (not time fixed) because it’s almost always impossible to anticipate player input or actions. Instead tension and release could be harmonically created in the narrative structure of the story.

However, traditional sample-based granular synthesis has parameters that can be regarded as a substitute for “tension and release”. An example of such a parameter is the grain size, which increases/decreases the time of a single grain, but also in some cases speed up the playback of the singular grain. This parameter can be set to play longer segments of audio through granulation (due to grain size) or shorter segments, which in turn can increase tension (rapid output of shorter grains) and release (slower output of longer grains) (Roads, 2001). Applying granular playback into a vertical re-orchestrated adaptive music method could potentially lead to higher interactive value, if the specified thresholds for the vertical re-orchestration also affects granular parameters. Granular synthesis holds a lot of promise in this regard, and it is already being used in games for ambiances, and some scores; but the potential for musical interactions has not yet been fully explored.

A video game musical score is already dynamically interactive in a sense, since it is adaptable to player states (combat, exploration, minigame, area-music etc.), hints player to the next location by removal of music and the usage of other player guiding techniques.

These techniques have their uses but the musical score's value in sustaining engagement and interactive potential is far greater than is being realized.

In game music, to heighten the interaction value of the musical score, immersive elements, kinesonic fidelity and other interactive functions might be brought together into a dynamically changing musical score (Collins, 2008). Ultimately the functions of granular synthesis to generate textural or variational sounds will be connected to different functions of video game music. This study investigates using granular synthesis to Heighten the interaction value of the game score.

### **1.1.3. Granular synthesis**

Granular synthesis is becoming increasingly accessible through digital audio workstations, such as Ableton live 10s granulator II (Ableton, 2020). Ableton, a popular music creation software package, offers a sample based granular synthesizer. Sample based granular synthesizers use samples as an asset for creating and playing back grains. With sample-based granular synthesis there is potential to create dynamically changing textures on existing material or create brand new textural sounds from essentially nothing (Roads, 2001).

Roads (2001) explains that in granular synthesis, grains are regarded as micro acoustic events. As such they may be understood as taking place in the microscopic time domain. A modifiable envelope is inserted to shape each grain to prohibit unwanted distortion. Grains are generated, duplicated and manipulated in order to create new complex textural or repeating sounds. Thousands of grains are often arranged/rearranged during these short time periods in order to create animated sonic landscapes. Paul (2011) names the common different granulation parameters. Typical parameters for granulation include:

- *Selection order (playback order of grains, forwards/reverse)*
- *Pitch shift (Pitch of generated grains, can be random within range and sometimes alters the playback rate);*
- *Amplitude range (Random volume for each grain within a specified range);*
- *Spatialization/panning (Where grains appear in the panorama);*
- *Grain duration (Determines how long each grain is);*
- *Grain density (number of grains/second or number of grain voices);*
- *Envelope (ASR shape, attack/release slope or windowing function);*
- *DSP effect (reverb, filtering and so on.);*
- *Feedback amount (for granular delay lines)*

Compared to sample-playback granular synthesis have parameters that can drastically alter the sample loaded into the granular synthesizer. Interactive potential can be found if for example, grain density and grain spatialization if automated based on player movement speed, thus animating the sound in real-time. The different parameters of granular synthesis could potentially open up new possibilities for real-time modulation of the musical score in video game music.

Granular synthesis implementation in games is accessible. The game engine “Unreal Engine” (Epic Games, 2020) have a blueprint based granular synthesizer available as a plugin, making it easy to integrate the synthesis-method. Audio kinetics Wwise (Audio kinetic, 2020), which



is an audio middleware tool, also allows for granular synthesis implementation using the “Wwise: SoundSeed Grain plugin”. Both of these plugins can be modulated in real-time with the use of in-game parameters and allows for playback in key with music.

One stem of a musical score can be played back using sample based granular synthesis whilst the other stems are played normally. We can alter the stem using granular synthesis based on in game parameters, such as player health and have the grains rise in pitch if the player loses a set amount of health. Tension and release could possibly be re-created if pitch-related parameters are modulated correctly. However, the chances of creating “un-musical” sounds are high, since most granulation devices have built in stochastic modulators. This results in that some parameters are more modulateable than others for creating tension, such as the grain size, or grain pitch (that follows the key). The result is something that both serves a musical function and is also a potentially interesting interaction for the player.

## **1.2. Research Question**

There may be new interactive potential to be found in a musical score incorporating sample-based granular synthesis. This study will focus on evaluation and refinement of an interactive vertically re-orchestrated score, where one of five stems is played back with sample-based granular synthesis. This musical score will be compared to a score that does not have any granular modulation/interaction applied to it.

In order to understand how to refine the granular stem, we need to understand how the granular stem behaves in correlation to the other musical material and game-mechanics. Thus, it is important to understand the players experience from a musical standpoint. Sub-questions will be asked in order to understand this. For example;

- Do players regard the granular synthesis as a part of the musical background?
- Do players feel in control of mechanics in the music?
- Is the mechanic of the granular interaction instrument like?

## **1.3. Aims & Purpose**

This project is a user experience study, where the aim is to do a "proof of concept" of the Granular synthesis stem in vertical re-orchestration. Results and conclusions can be used to improve the concept and the synthesis and sound design techniques. The purpose is to suggest ways granular synthesizers might be musically/interactively implemented as an alternative to samples or pre-recorded musical scores.

The aim is to encourage sound designers to further develop the interaction potential of game scores, as it may lead to more interesting or complex interactions in videogames.

# **2. Method**

## **2.1. Experiment Description**

In order to evaluate the granular synthesis interaction an active playing/listening test was conducted inside a game environment. The intention of the listening test was to let players freely explore a world where interactions with in-game objects would alter parameters of a

granular synthesizer. In this listening test, user actions modulated grain pitch and grain density. In order to compare the granular synthesis stem version to a traditional game with vertical re-orchestrated musical score, another sounddesign was applied to the same level. In this version the granular synthesis stem was replaced with looped samples. However, both versions of the level would have the same vertically re-orchestrated musical score. The implementation and design of the stems and music are explained in section 2.2.

### The level designs: Summary

The game level was a first-person puzzle game created using Unreal Engine (Epic games, 2020). In the game, players explore a forest area. Their movements are accompanied by an ambient music score. When the game starts, one out of five stems in total plays. In the game, instructions are given to the player at the start of the level, telling them to find “artefacts” (also referred to as cubes) and return them to a destined location. In total there are four different artefacts with four different colours: green, yellow, purple and red. Whenever a player picks up an artefact, it starts a sound that’s played back either as a looped sample or with granular synthesis. This sound would act as the other stem in the music. When the player returned the artefact to their respective locations, another pre-composed stem would be added into the mix, one for each artefact returned. Once the player returns all of the artefacts, all pre-composed stems would be active and a bridge would appear, allowing the player to continue to the other version of the level. See *Table 1* for the differences between versions of the level.

### The Granular synthesis interaction

In the granular synthesis version of the game, grain pitch would be modulated depending on how high from the ground the player held the cube. The pitch was set to scale-notes to either a pentatonic scale, or another pre-determined melody. As the cube increases in height from the ground, the higher scale-notes would play. Grain density would also be modulated dependent on how fast the player moves the cube in the game world. For example, if a player shakes the cube rapidly more grains would be generated.

*Table 1: Summary of the level differences.*

Granular Synthesis Level	Looped Sample Level
<ul style="list-style-type: none"> <li>- Artefacts sound played back with granular synthesis</li> <li>- Grain pitch changes based on height from the ground.</li> <li>- Grain density increases dependent on artefact velocity</li> </ul>	<ul style="list-style-type: none"> <li>- Artefact sounds played back with a looped sample.</li> </ul>
Identical vertically re-orchestrated musical score	
Identical level-layout	
Cubes placed in same locations, but cube colour differs.	
Identical player-instructions	

## 2.2. Sounddesign & the musical score

An ambient music track consisting of five pre-composed stems was created by the author using Ableton Live 10 (Ableton, 2020). The approach to composition took advantage of granular synthesis’s inherent qualities. Granular synthesis lends itself to creating varying textural sounds and ambient music often layers textural elements. Because of this, less musically complex structures can be created without the music sounding static or repetitive.

### 2.2.1. Composing the stems

The musical score consists of five different synthesized pad stems, one pad for each of the five stems. The pads were synthesized using Xfer Serum (Xfer, 2020), digital synthesizer. A chord progression in the c-major key was created and the pads were layered in different musical registers. Three percussive elements consisting of a kick, a shaker and FX-perc was added onto the pad stems. Thus, three of the stems consisted of one pad and one percussive element. For example, one stem consisted of a string-pad and a kick. Another stem consisted of a sub-bas pad. All stems were three minutes and 19 seconds long. The score has a “dramatic peak” at the end of the score, where chords and pads creates a crescendo. This crescendo is followed by a diminuendo. The stems were exported with set mix levels, thus eliminating the need to mix the different tracks within unreal engine (Epic Games, 2020)

When creating the stems, it was important to anticipate how they would sound together with a changing sample based granular synthesizer. Four instances Grain Scanner (Amazing Noises, 2020) was added into the Project. See the plugin layout in *Figure 1*. This made it possible to monitor how the granular synthesizer potentially would sound within the game. As there were four different artefacts in the game, four different instances of Grain Scanner (Amazing Noises, 2020) were added with the four different samples. For the green artefact a

stock sample from Grain Scanner (Amazing noises 2020) were used which was called “Guitar

Harmonic”. The rest of the samples was synthesized

using Serum (Xfer, 2020) and consisted of a string pad sample, a bell piano sample and a sinewave synthesizer sample. All the of granular samples was pitched to c in order for them to be in key with the rest of the music. Whilst creating the stems, different pitch values of the granular synthesizers could also be monitored. As different pitch values could be set in reference with the other stems, coherent sounding pitch intervals were noted, to be implemented in Unreal engine later.

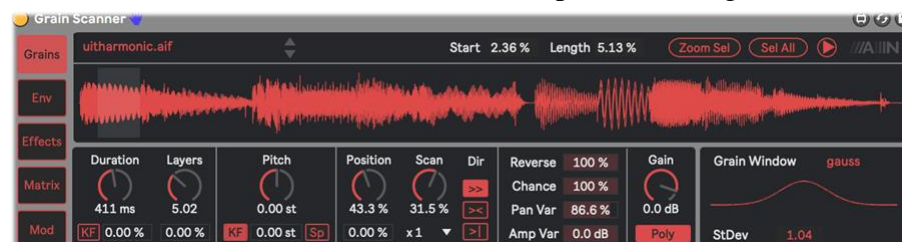


Figure 1: Layout of Grain Scanner by Amazing noises. It shows the different parameters of the granular synthesizer. Monitoring settings for the green artefact is viewed.

In the non-granular version of the game level, the granular synthesizer was replaced by looped samples. These samples were created from the four Grain Scanner (Amazing Noises, 2020) instances in the project. The granular synthesizers were recorded, and a tremolo effect was added to the samples. The four looped samples were set to be ten seconds long. The result was a looping pulsating sound, which acts as a temporary stem in the music whenever the cube is carried by the player. It was important to have the cubes elicit a similar timbral quality between levels since if the sounddesign between versions are too distinct, subjects might prefer the level with the more “agreeable” sounddesign.

### **2.2.2. Other sounds in the game.**

#### **Footsteps**

Footsteps sounds were used for when the player explored the game-area. The foley was by the author by stepping on gravel and concrete. 12 samples were edited and played in a randomized sequence within the game. The same samples were also used for the in-game jumping mechanic.

#### **Artefact pick up and activation sounds.**

A confirming sound was played when players picked up an artefact in the game. The sound was created using Serum (Xfer, 2020) and other effects from Ableton live 10 (Ableton, 2020). The same sound was used for when players successfully activates the artefact but pitched differently.

## **2.3. The Game Level**

The game level was created using Unreal Engine version 4.22.3 (Epic Games, 2020). The concept was to create an as ecological game environment. The initial level was created using the first-person example map template. However other visual assets and game logic were imported from asset packs from the Unreal Engine Marketplace. Visual assets such as static meshes and particle systems were used from the following asset-packs; Advanced Village Pack (Advanced Asset Packs, 2020), Medieval Dungeon (Infuse Studio, 2020), Dynamic Grass System Lite (S. Krezel, 2020), Particles and Wind Control System (Dragon Motion, 2020). The most used asset-pack in the game was the “First Person Puzzle Template” (Divivor, 2020) (also referred as FPPT in this thesis). This pack includes the necessary assets and blueprints to create simple puzzle logic in Unreal Engine. For example, the FPPT included cubes which could be picked up by the players. The cube activators can activate various logic and blueprints from the FPPT asset pack. Activators can create bridges in the game which allows player to traverse the game-area.

The objective of the game was to return cubes (from FPPT pack) to the pyramids in the center of the game area, which can be viewed in *Figure 2*. Once the player places a cube (of the same colour of the pyramid) in an activator in front of the pyramid, the pyramid would start to glow and start another stem in the music. If the player decides to remove the cube from the activator, that pyramids stem would stop playing. The pyramids appropriate stem only plays if the cube is in the activator. All three pyramid activators need to be activated (meaning that the player needs to place three cubes in the pyramids activators to progress) before the final cube is dropped down from a yellow pillar (Elevator blueprint from FPPT). Once the final cube is placed in its activator (located in the center of the pyramids), a bridge appears, and the player is told to go towards the highest point on the map (a pair of grey towers). Once the player arrives at the highest point, the player is told that they completed the task. After that the other version of the level automatically loads. Both level versions are played the same way, and the cubes can be found in the same places.

The default player pawn and game-mode (framework of rules for the game, for example the number of active actors allowed in the level) were replaced by FPPT’s player pawn and game-mode. The game is played with keyboard and mouse. In the game players can walk, jump and pick up the cubes. Other actions or interactions were not added since it could potentially allow the player to access places not necessary. The entire game area was surrounded by a blocking volume in order to keep the players from throwing the cubes out of

bounds. The player would need to approach the cube in order to pick it up. Once close enough a yellow outline, indicates that the cube is ready to be picked up.



Figure 2: Picture of the pyramids in game. In front of the pyramids, the activators are placed in which the appropriate colored cubes are placed. To the right a cube from FPPT's pack can be seen and the yellow outline. The yellow pillar can be seen in the right side of the figure. For a full view of the game area, see appendix A.

### 2.3.1. Music implementation in Unreal Engine

In order to start different stems for each activator, four copies of the activator blueprint from the FPPT pack (Divivor, 2020) were created. The activator blueprint can be activated by placing a powered cube in its socket, which changes the power state of the activator. The activator blueprint has two different power-states, on and off. Whenever the activators power state was changed a custom “call-event” was triggered. The level blueprint received the call-events and forwarded the power state change to the level music blueprint. See Figure 3 for schematics on the power activator power-updates in the level blueprint. This logic was implemented for each copy of the activator blueprint.

In the level music blueprint, custom events were created to receive the power update from the level blueprint. two events for each stem in the music was created, one event which fades in the stem and one event which fades out the stem. In unreal engine (Epic Games, 2020), four different soundcues was created, which included the different stems. The samples inside the soundcues was looped. In the fade in and



Figure 3: Overview of the level blueprint, which receives power state updates from the different activators (red events on the left). Each activator was connected to one of the four different cubes placed in the level.



fade out nodes in the level music blueprint, float value can decide where in the sample the fade in/out should. happen. A timer was created, which counts up towards the total length of the stems. In the timer, a new float value was set each second. This allowed each stem to be faded in sync with the first stem which always plays since the fade in float value always updates according to the first stem. Whenever the timer reached the max length of the stems, it was reset. See *Figure 4* for level music blueprint schematic.

### 2.3.2. Granular synthesis implementation in Unreal Engine

To implement the granular synthesis, the granular synth-plugin within unreal engine (Epic Games, 2020) was used. Four copies of the “cube” blueprint from the FPPT (Divivor, 2020) was used. This resulted in eight unique cube blueprints, one for each activator in each version of the level. In the cube blueprints, the granular synth plugin was added, thus making it possible for the cubes to drive granular synthesis audio. The granular synth was set to start whenever a player picks up the cube. This activation was made possible with the “BP\_FPPT\_Grabcomponent” blueprint included in the FPPT-asset pack (Divivor, 2020). This blueprint was used within the player pawn blueprint and it allows for cubes to be picked up by the player.

In the “Grabcomponent” blueprint, casts were set up, so whenever a player picked up a cube, the blueprint would look for which cube was picked up. For example, if the player decides to pick up the green cube in the granular version of the level, the Grabcomponent blueprint would start an event in the green cube blueprint, thus starting or stopping the granular synthesizer. The same logic is applied for the non-granular cubes (See Appendix B for scheme). See *Figure 5* for an overview of the casts created in the “Grabcomponent”.

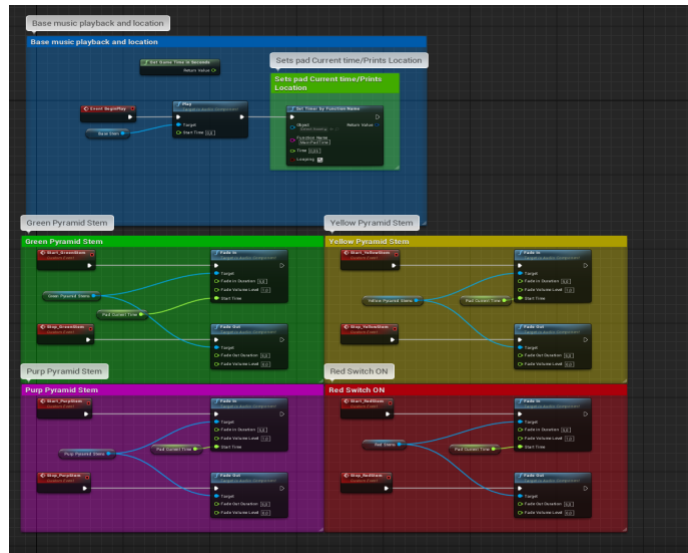


Figure 4: Signal flow of the level music blueprint. Custom events faded in the stems at the main pad current time. The stem fades out whenever a cube is removed from its activator. The blue section of the blueprint starts the first stem of the music on level start-up.

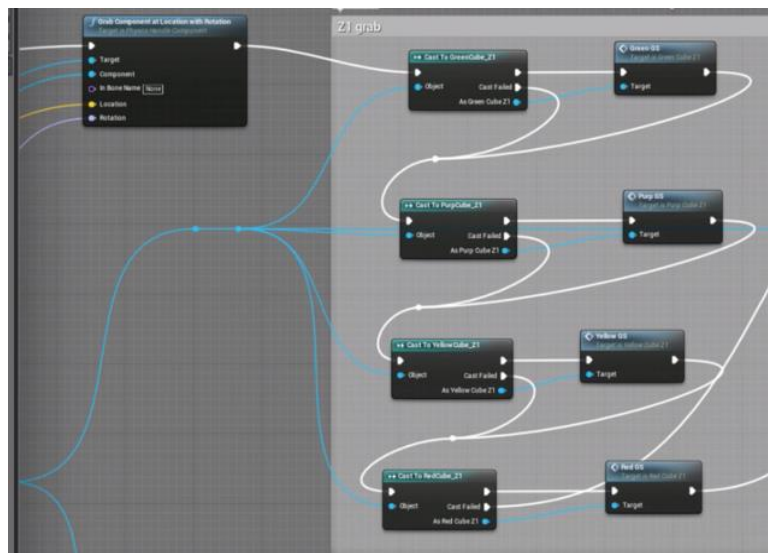


Figure 5: Casts within the Grabcomponent blueprint. Object reference for the casts was component hit from a break hit result.

### 2.3.3. Granular synth parameters

Some parameters of the granular synthesizer were set to update each frame, and other parameters were set whenever the player picked up the cube. For example, the grain pitch and grains per second was updated each frame with event tick, whilst grain envelope type was set whenever the player picked up the cube. Each cube had slightly different parameter settings, making them more distinguishable from each other. It was necessary to have different timbre for each cube as this would perhaps yield more results about the granular synthesizers

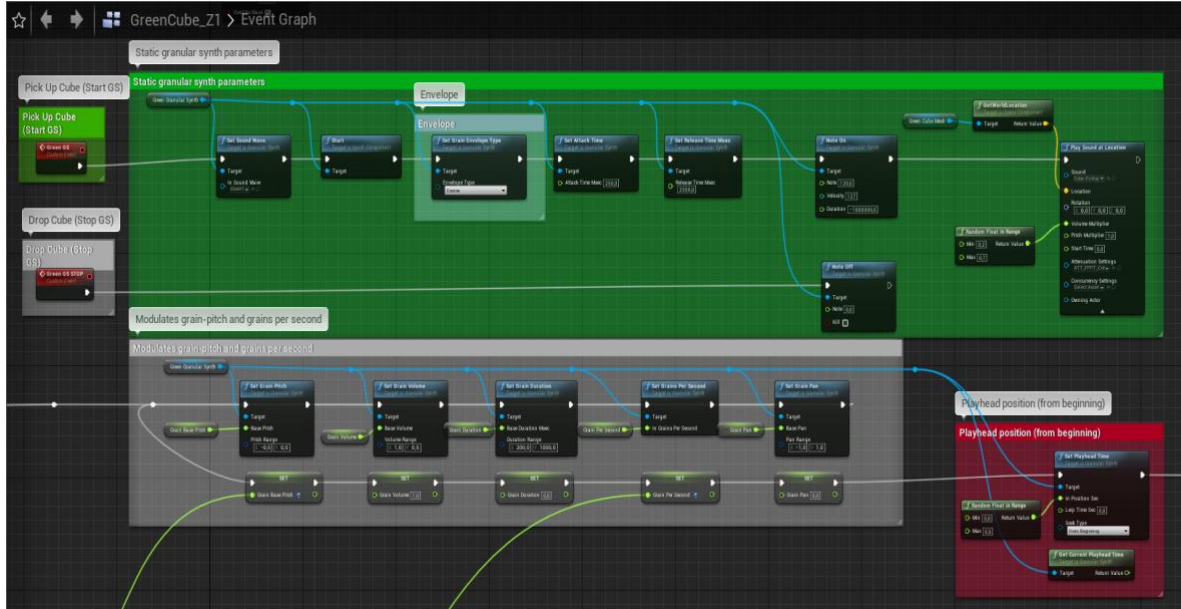


Figure 6: The cube blueprint schematics consisting of the granular synthesizer.

sounddesign in the game. The main difference of the different cubes is the sample used within the granular synth. The granular synths audio mix level was set by ear in order for the audio to blend with the music. Figure 6 shows the different nodes in the cube blueprints (granular synthesizer parameters). The Note on and Note Off nodes determine if the granular synthesizer should elicit audio or not. In the “Set Sound Wave” node, the sample is chosen. The “Play Sound at Location” node at the end of the green granular synthesis chain, plays the cube pickup sound every time player grabs the cube. Table 2 show a summary of the granular synth parameters for each cube. Below is an explanation of each parameter setting of the granular synthesizer.

- Amplitude envelopes determines the attack and release time for when the granular synthesizers start or stop.
- Playhead-time determines from where in the sample grains are generated. From beginning means that the grains are generated from the start of the sample.
- Grain Envelope type determines the attack/decay time of each individual grain.
- Grain volume range randomizes the volume for each individual grain where X is the max possible value and Y is the minimum possible value. If X=1 it means that the volume for that grain will be of the same volume of the imported sample.

- Grain Duration range randomizes the duration of each individual gain within the determined range.
- Grain panning range determines where in the stereo field the grain is placed. For example, if X = -1 the grain is panned max to the left.

Table 2: Summary of the granular synth parameters for each cube.

Table 2: Static Granular synth parameters				
Parameter/Cube	Green Cube	Purple Cube	Yellow Cube	Red Cube
Amplitude Envelope – Attack time	250 ms	250 ms	250 ms	250 ms
Amplitude Envelope – Release time	2500 ms	2500 ms	2500 ms	2500 ms
Sample Playhead-time (seek type)	From beginning	From beginning	From beginning	From beginning
Grain Envelope type	Cosine	Triangle	Blackman Harris	Cosine
Grain Volume Range	X:1, Y:0,5	X:1, Y:1	X:1, Y:1	X:1, Y:0,6
Grain Duration Range	200-1000ms	400-1000ms	700-1000ms	200-1000ms
Grain Panning Range	X: -1, Y:1	X: -1, Y:1	X: -0,5, Y:0,5	X: -0,25, Y: 0,25

Table 3: Key to corresponding float value for the grain pitch node within Unreal Engine (Epic Games, 2020). Table created by ear, thus not 100% pitch correct.

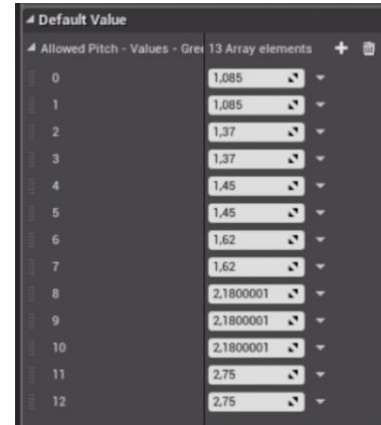
Key	Float
C2	1,085
C#2	1,17
D2	1,24
D#2	1,3
E2	1,37
F2	1,45
F#2	1,53
G2	1,62
G#2	1,73
A2	1,83
A#2	1,94
B2	2,05
C3	2,18
C#3	2,3
D3	2,45
D#3	2,6
E3	2,75
F3	2,9
F#3	3,08
G3	3,27
G#3	3,45
A3	3,67
A#3	3,9
B3	4,15
C4	4,35

### 2.3.4. Modulating the Granular synth: Grain Pitch-setup

The grain pitch was modulated depending on how players held the cube. The goal of the pitch-modulation was to let players freely set the pitch of the granular synthesizers by raising or lowering the cubes in the air. In order to do this, a ray trace by channel was made every frame on every cube. The hit result from the trace measured the trace distance travelled and was then scaled down. If players held the cube by the ground a float value of 0 (truncated from float to integer) would be generated, and if players held it higher from the ground a max float value of 12 would be generated. An array was created for each cube which consisted of 13 different float values which would determine the grain pitch. However, the “Set Grain Pitch” node sets pitch with a float value but the float value which does not correspond to any set musical pitch. Thus, a table had to be created, where a set musical note was cross referenced with a float value. The table was created by listening to a set piano note, for example c2, and then playing back the same sample in the granular synthesizer from within unreal engine. While listening the granular synthesizer and the correct piano note, the pitch value in the “Set Grain Pitch” was adjusted until matched for that note. This made it possible to insert musical scale notes into unreal engines granular synthesizer correctly. See *table 3* for key to corresponding float values. With this the grains could be generated in current musical pitch.



For example, a low c, could be played if the player held the cube to the ground, and if a player held the cube higher a high c (octave) could be played. See *Figure 7* for an example of pitch values set for the green cube. For the yellow cube, a pentatonic scale was set. For the other cubes a melodic scale determined by experimentation was set. It would be desirable to have two pentatonic scales instead of one, but when setting the values for the other cubes it sounded out of pitch. The reason for this could be because of the spectral content of each granular sample. Thus a “functioning” scale was set for each cube. See appendix C for the blueprint schematics of how pitch is determined dependent on cube height from the ground.



*Figure 7: The array for allowed pitch values for the green cube. Dependent on cube height from the ground, the logic truncated the pitch value to one of these values.*

### 2.3.5. Modulating the Granular synth: Grains per second-setup

The “Grains per second” parameter was modulated by how fast the cube travelled in the world. The faster the cube travelled in the world the more grains would be generated within a specified range for each cube. For example, if the player swings the cube rapidly more grains will be generated. The minimum amount of grains per second was set so that the sounddesign of the granular synthesizer would be coherent (by not emitting singular grains at a time). Although this can be preferable in some sounddesign cases, for this study the amount of grains was limited. See *table 4* for how many grains per second are set for each cube. See appendix D for the blueprint schematics of this logic.

*Table 4: Minimum and maximum values of grains generated per second dependent on the cube’s velocity (vector length).*

Grains per second	Green Cube	Purple Cube	Yellow Cube	Red Cube
Max grains per second	180	90	120	55
Min grains per second	7	9	8	7

## 2.4. Pilot-study & error correction

With both levels implemented, before the main experiment took place, a pilot-study was conducted. The pilot-study took place at the computer lab, at Luleå Tekniska Universitet [LTU], Campus Piteå. The purpose of the pilot-study was to gain feedback on the game level itself, and to see if the interview questions worked properly and elicited desirable information. Another reason for having the pilot-study was to estimate the duration of the interviews could become. This information was used to determine how many subjects were going to be interviewed. Five audio engineering-students and one composer-student from LTU took part in the pilot-study. The test-subjects got to play both versions of the level in a randomized order determined by an online randomizer (Random.org, 2020), fill in the questionnaire and answer the semi-structured interview questions. The instructions explaining how to play could be found within the game. They were placed directly in front of the player on a tree log in the player-start area. By approaching the log and pressing the E



*“OPEN THE WAY: Artefacts have been scattered across these sacred lands. The artefacts have been asleep for a decade. You need to shake them high in order to wake them up. Upon their return to the shrines, the way forward will show”*

Other level corrections included other game mechanics improvements changes and bug fixes for both versions of the level. For example, after the pre-study, it was made easier to walk up hills. Whenever the player sprinted, the maximum walking speed was reduced after the player would stop sprinting. To fix this, the sprint function was removed entirely and was replaced by an increase in the default walking-speed.

Some of the questions in the semi-structured interview were altered to better probe on specific types of interactions. For example, instead of asking if the cube’s sound was complex, the subjects were instead asked to rate the cubes musical complexity on a scale of one to ten. This alteration made it easier to ask subjects to motivate their ratings and describe their experiences of the interaction. Other potential probes were also noted after the interviews. The interviews took about ten to fifteen minutes to complete in the pilot-study. It was decided to include seven interview subjects in the main study.

## 2.5. Main Study

In order to evaluate the player’s experience a post-game survey and semi-structured interviews was conducted. The post-game survey was conducted using google forms, an online questionnaire programme (Google, 2020). In the post-game survey subject’s demographic information was gathered. Subjects also got to motivate a preference for one of the levels and explain, in the post-game survey, the differences between the sound in the granular synthesis level and the non-granular stem. All subjects were asked to fill out the post-game survey regardless if the subject was going to be interviewed or not. The first seven out of the sixteen subjects in total were interviewed about the nature of the interaction in the granular synthesis level.

### 2.5.1. Subject requirements and demographics

The subject pool consisted of audio engineering students, music-students, journalism-students and alumni from LTU. The study was not restricted to people who plays games over a specified number of hours per week. This is because some students don’t have time to play games every week, but still have gaming experience prior to this experiment. Since the study aims to evaluate a musical interaction, it is appropriate to have subjects who invest time in music as a hobby or who are professional or semi-professional musicians. However, there

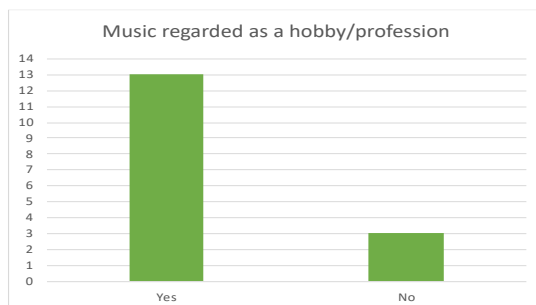


Figure 9: Total amount of subjects who regard music as a hobby/profession. Answers gathered in the post-game survey

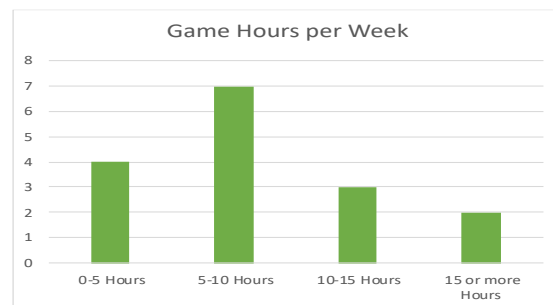


Figure 10: Subjects game hours per week. Answers gathered in the post-game survey

were no reason to restrict the subject pool because some game-enthusiasts might be sensitive to sound or music even if it is not their main interest. Subjects were welcome to participate in the study if they identified themselves as players of games. Above, a demographic summary can be viewed where *Figure 9* displays how many subjects considered music as a hobby or profession. *Figure 10* displays a summary of how many hours subjects played games per week. See appendix F for all the demographic information compiled from the post-game survey.

### **2.5.2. Randomization**

Before each experiment, the start level was randomized using Random.org (random.org, 2020). Some subjects started with the granular synthesis level, and some did not. It was important to randomize the starting level for each subject. Regardless of the start level, it was expected that subjects would be likely to spend a shorter amount of time in the second level because of familiarity with the task and level progression. It was assumed that this might influence the subject's level preferences and randomizing the start level could help compensate for this.

### **2.5.3. Experiment equipment and location**

The active listening test and the interviews was conducted at the computer lab, at Luleå Tekniska Universitet, campus Piteå. The experiment was conducted using;

- A windows computer with unreal engine version 4.22.3 (Epic Games, 2020)
- Focusrite Scarlett 2i2 (2<sup>nd</sup> generation) audio interface
- Audio Technica ATH-M50X closed back headphones.
- Corsair Sabre, optical gaming mouse
- Dell, Wired keyboard

A mouse suitable for gaming was also important because gamers are usually more used to this kind of equipment. In particular, this would allow experienced gamers to be more comfortable. The sensitivity of the mouse may also change how they interact with the cubes in the levels as it allows the player to experience the interaction at different speeds if they so want. Thus, subjects were allowed to alter the sensitivity of the mouse with buttons on the mouse.

Closed back headphones were used to isolate noise or reverberation present in the computer lab. Closed back headphones are also a popular choice of headphones by gamers. Subjects were allowed to adjust the audio level whilst playing the game. The reason for not setting a static audio level for all subjects was to allow subjects to have an ecologically valid game-experience. The computer lab was quiet, filled with other computers and big windows lit up the room with natural light. No overhead lights were turned on, as the computer screen would sometimes become less visible due to the rooms natural lighting. No other person was present in the room whilst conducting the tests.

### **2.5.4. Experiment procedure.**

Prior to the subject's arrival at the test site, the subject's randomized starting level were set. Before the experiment started, the subjects were engaged in some informal small talk with the

researcher about their gaming experience to verify their suitability for participation. These discussions were conducted in Swedish.

Subjects were informed that the screen was being recorded. The reason for this recording was to see how subjects interact with the different cubes in both versions of the level. The footage was also used to see if any errors occurred during the gameplay. The screen was recorded using Microsoft Xbox Gamebar (Microsoft, 2020). However, the three first subject's screen were not recorded due to technical errors.

There was no set time-limit for the subjects whilst playing the game. In the pilot-study it took about ten to fifteen minutes for subjects to complete both versions of the level. Setting a hard limit could potentially stress subjects to complete the game faster, thus not allowing the subjects to adapt an explorative approach.

The subjects were told before arriving whether or not they were participating in an interview after the playing test. All subjects were promised anonymity in the results and interviews were not recorded or transcribed without their consent. Before the experiment started a script with instructions were read for the players. The subjects were told the following in Swedish:

- That there are two versions of the level, one called A1 (the level without granular synthesis), and the other called Z1 (The level with granular synthesis). *The differences of the levels were not explained to the subjects.*
- The name of the current level could be seen in the bottom left corner.
- The game controls (*keyboard and mouse*)
- The subjects would find instructions on a tree log at the start of the game. The subjects were told to read them through carefully. *(The instructions were located in the same place as in the pilot-study)*
- The subjects could freely adjust the game-volume on the audio interface whenever they wanted (but not mute the audio).
- The subjects could freely adjust the mouse-sensitivity whenever they wanted with buttons on the mouse.
- That the screen is being recorded for potential analysis.
- That once they completed the first version of level, the second version would load automatically.
- That once they completed both versions of the level to answer the questions in the post-game survey.
- That the researcher would leave the room, and once out of the room, they could start setting the audio volume and mouse sensitivity and begin the test.

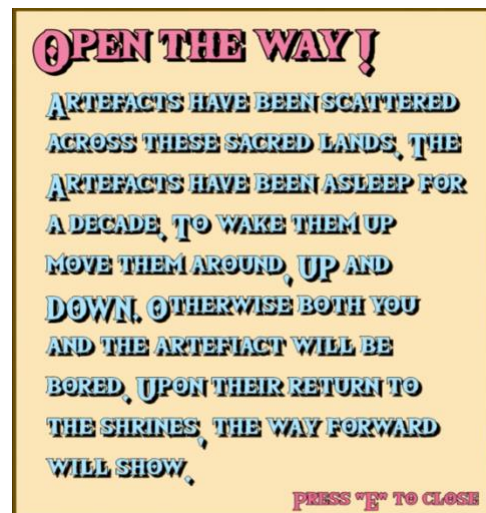
- That if the subjects experienced bugs or other gameplay issues, to contact the researcher.
- That there were no set time-restriction, they could play until completion of both levels.
- Once filling out the google form, the test was over. (The subject was thanked for their participation, if the subject was not interviewed).

Once the subjects who were participating in an interview had completed the post-game survey, they were showed a video. The video demonstrated directly the differences between the two levels (the difference between cubes' sound). This video was shown in order for the subject to understand some of the questions ahead, in case they had not noticed the difference in the pitch-change in the granular synthesis level. After the video was shown the semi-structured interview began. The interviews were conducted in Swedish and was conversational in nature, as subjects were allowed to freely explain their experiences. Subjects could ask the interviewer questions if they liked, however, this was not established beforehand.

#### 2.5.5. Subject grouping and in-game instruction alterations

During the course of the experiments, some alterations were made. Three of the first four subjects in the main study interacted with the cubes in a fashion similar to those observed in the pre-study, despite the adjustments made after the pre-study. Thus, new instructions were given to the rest of the subjects (the instructions which were found on the tree log). The purpose of new instructions was to guide players more towards interaction of the sort being evaluated in this study. The rest of the subjects saw these new instructions, viewed in *Figure 11*.

However, no noteworthy change in players' interaction or gameplay were noticed in results or screen-recordings for the remaining subjects. As a result of this addition, all subjects will be grouped together in the analysis, instead of comparing results between two groups.



*Figure 11: Picture of the re-worked instructions that players could read in the game.*

#### 2.6. Survey Questions

All subjects were instructed to answer a survey in the google forms document after the experiment. The survey questions were in English, but the subjects could answer in whatever language they felt most comfortable with. The following questions was asked in order:

##### **What programme are you in? (Free text area)**

This question was asked in order to separate subjects into different categories such as musician or non-musician.

**Do you create or preform music as a hobby? (Free text area)**

This question was asked to see if any connection could be found between artefact interactions and the subjects musical background. Since an estimated amount of audio engineers was anticipated to take part in the study, this question separates them into musician and non-musician groups.

**Please explain your musical activities (Free text area)**

This question was asked to see what kind of instrument the subject plays or other musical pastimes.

**How many hours a week do you play video games? (When you have the time to spare) (Multiple choice question)**

- 0 - 5 Hours
- 5 - 10 Hours
- 10 - 15 Hours
- 15 Hours or more
- Other (free text area)

This question was asked to get a grasp of how many hours the subjects plays games when they have the time to spare.

**What genre of games do you usually play? (Free text area)**

This question was asked in order to see any prior gaming-experience the subject had. It also shows if prior experience influences their level preference.

**Do you usually play games with the music turned on? (Multiple choice question)**

- Yes
- No
- Other (free text area)

Many games are played online with multiplayer features. Thus, some gaming audiences might turn off music or sound FX in order to hear teammates voices over various audio over IP softwares, such as Discord (Discord, 2020)

**Which version of the level did you prefer?**

- Level A1
- Level Z1
- No Preference

This question is asked in order to see what version of the level the subject prefers. A no preference option is also available for subjects who cannot express a preference for one over the other.

**(Next page)**

The following questions are asked on a separate page in order to remove distractions, and have subjects commit to their answers so far.

**What influenced your level preference? (Free text area)**

This question is asked in order to see why people prefer one level over the other.

### **What was different about the sound in level Z1? (Free text area)**

This question serves as direct way to evaluate to the granular synthesis stem. It also evaluates wither people notice a difference between the 2 versions of the level.

## **2.7. Interview questions**

Seven interviews were recorded and transcribed. The interviews were conducted and transcribed in Swedish by the author. However, the results were translated into English. For full interview transcriptions see the appendix G. The subjects were also informed that the interview would focus only on the sounds in level Z1 (the granular synthesis level).

### **Please tell me about your first experience picking up a cube in level Z1.**

This question opened up the interview, giving the subjects a chance to elaborate freely about the interaction.

### **Did you notice any difference between the cubes?**

This question allowed to probe more about the different sounds of the cubes in the level.

### **Was easy to figure how the cubes work?**

- How did you figure it out?

This question allows the subjects to explain how they figured out the cube's mechanics. If they did not figure out the mechanics, they were instead asked as to what made them not discover the mechanics.

### **Do you prefer one cube over another?**

- Why

The question focuses on individual cube evaluation, and to find potential properties within those granular synthesizer parameters.

### **Can you describe the relationship between the cubes sound and the background music?**

This question is asked to see wither or not the subjects saw a relationship between the granular synthesis and the background music. It also opens up for potential probes about the musicality of the interaction.

### **Do you think that the cubes sound fit in with the background music?**

- Why
- Why not

This question allowed subjects to further explain the granular synth relationship with the music. The question also evaluates directly if they regard the granular synthesis stem as a part of the music.

### **Did you ever feel in control of the music whilst holding the cube?**

- Did you find notes that fitted with the musical context?



- Did you find melodies
- Was it easy to find you preferred notes?
- Were the cubes responsive enough?
- Did it feel like an instrument?
- In what way did it not feel like an instrument?

These questions probe about the musicality of the interaction.

### **Does this game remind you of any other musical experience that you have?**

This question was asked in order to see if any of the subjects could compare the interaction with any musical experience that they earlier had participated in. For example, band practice, producing or jamming (playing music freely)

### **Can you rate the cubes complexity from 1 – 10 if 1 is simple, and 10 is complex?**

- Why

These questions were asked to further probe about how complex the cubes different sounds were. It also allows the subjects to further elaborate on the different granular synth parameters.

### **How can the cubes become more musically interesting?**

This allowed the subjects to express potential improvements to the interaction.

### **Can you relate any of these game levels towards any commercial games that you have previously played?**

- How is the sound from that game related to this game?

To find out if this game can be related to any other game, and if they before had experienced any similar interactions. It also serves as a way to aesthetically evaluate the games sound and visual aspects.

### **Do you usually play with the music on or off?**

- What make you to start the music again?

This was regarded as a control question. It was also asked in order to see if the subjects value the music in games, or if they prefer to play with it off.

## **3. Results & Analysis**

In this section the results and analysis will be presented with tables, figures and code-tables.

### **3.1. Survey Results & Analysis**

In this section, the results from the post-game survey will be presented and analysed. For complete answers to the survey questions see Appendix F. For complete interview transcriptions see appendix G.

## Level Preference

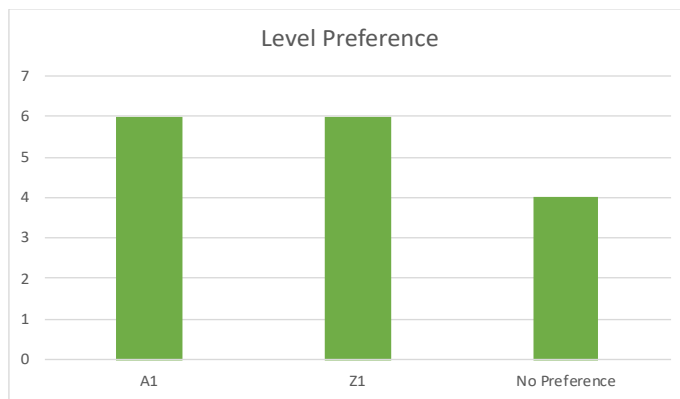


Figure 12: Subjects level preference visualized.

The results show that no level is more preferred over another (Figure 12, Table 5). Results also show that ten subjects had level Z1 as their first level and six subjects had A1 as their first level. Compiled motivations for level preference are shown in the respective code-tables (table 6 – 8)

Table 5: Shows start level and level preference for each subject who participated in the study.

Subject Number (*interviewed subject)	Start level (randomized)	Level Preference
1*	Z1	Level Z1
2*	Z1	Level A1
3*	A1	Level A1
4*	Z1	Level A1
5*	Z1	No Preference
6*	Z1	Level A1
7*	A1	Level Z1
8	Z1	Level Z1
9	Z1	Level Z1
10	Z1	Level A1
11	Z1	Level Z1
12	A1	No Preference
13	A1	No Preference
14	A1	Level A1
15	Z1	No Preference
16	A1	Level Z1

## Post-game Survey: Codes

A grounded approach was used to analyse the qualitative answers. Responses were coded because subjects referred to related concepts or experiences in multiple responses. Coding the responses made it possible to identify correlations among question responses and gave a comprehensive view of the subjects' experiences. Below the different codes are explained. Each code represents a concept or game element indicated by the subjects' responses. After the responses were coded, subject responses were then grouped according to their preferred level. The reason for this was to get an overview of what might influence their level preference.

### Code: Level Play Order & Level Familiarity

Subjects describe that level preference was influenced by the order in which they played the levels. Also subjects who expresses preference based on level familiarity.

### Code: Artefact Interaction

Subjects describe interactions/preference with the cubes in both versions of the level. Other comments about the cubes are also noted with this code.

### Code: The Background Music

Reactions to the music in respective version of the level.

### Code: Sounddesign

Sound design influenced subjects' level preference. General comments about the sound in both versions.

### Code: Amount of level reactivity

Subjects explain their involvement in either of the levels. Other reactions to gameplay is also noted. For example: "It felt more reactive to my gameplay" – S11.

*Code: Liked the granular synthesis (Z1)*

Summarizes subjects positive experience with the cubes in level Z1

*Code: Disliked the granular synthesis (Z1)*

Summarizes subjects' negative experiences with the cubes in level Z1

*Code: Constant flow of grains (Z1)*

Descriptions about how the subjects experienced the granular synthesis

*Code: Interaction with the music (Z1)*

Descriptions about how the granular synthesis interacted with the other musical elements in level Z1.

*Code: Preferred A1, but enjoyed the Artefact sounds (Z1)*

Descriptions made about the granular synthesis in Z1, even though subject preferred level A1.

### **Post-game Survey: Level preferences – Qualitative responses**

In this section the code tables from the post-game survey are presented. Subjects' responses are labelled "S-number". For example, S6 was the sixth person to participate in the experiment. Some subjects are also labelled with an apostrophe. This indicates that the specific subject was also interviewed. The full survey data is available in appendix F.

### Code Table: A1 Level Preference [Post-game Survey]

Table 6: Table displays subjects' preference for Level A1 (the level where the cubes sound was played back using looped samples). These are quotes from those subjects who preferred level A1.

Level Play Order & Level Familiarity	Artefact interaction	The Background Music	Sounddesign	Amount of level reactivity
"It was easier to understand what I had to do since I had already done it" (S4*)	" I missed that you had to shake the cubes to wake them up, so I just walked around, spinning... it also took a shorter amount of time for them to wake up. " (S6*)	"the music felt more complete" (S4*)	"I experienced that instead of increasing in small steps the big sounds came earlier with lead so a sense of overwhelm." (S2*)	"A1 gave a fuller and more complete impression and changed as the level progressed" (S4*)
" It was partly funnier to play the second level once had gotten more into it "(S6*)	" When I picked up the cube, I thought that the sound which it came from it melded more with the music in the background " (S10)	"The building synth sounds in A1 resonated more with me" (S3*)	"Not as subtle and it was bordering on taking over the experience." (S3*)	"I felt more indulged in the World in A1 than in Z1." (S13)
" In the second level I read the instructions again and understood quicker..." (S6*)		"The rhythmic aspect of the music. How it built the suspense and gave the player more satisfaction for completing tasks. " (S2*)	"There were too many sounds" (S10)	
" it also took a shorter amount of time for them to wake up." (S6*)		" I liked that the music was more up-tempo in the second level (S6*)	" Whilst in Z1, it felt "messier""(S10)	
		" It sounded like the music was more coherent in A1" (S10)		
		"A1 had (maybe) louder Music, it changed the perceived atmosphere in a good way." (S13)		

### Code Table: Z1 Level Preference [Post-game Survey]

Table 7: Table displays subjects' preference and notation about level Z1 (the granular synthesis level). Negative comments about A1 can be regarded as Z1 were more preferable in some ways (this is checked up by the subjects selected preference).

Level Play Order & Level Familiarity	Artefact Interaction	The Background Music	Sounddesign	Amount of level reactivity
"Z1 was the first level I played so it was more "interesting" to play it the first time which most likely affected my preference." (S1*)	"The music was more reactive when holding a artefact. The higher the artefact was held, the higher the pitch went up." (S7*)	"If I remember correctly there was this bass line that I really liked in Z1 that wasn't there in A1" (S1*)	"A1 also had reactive sound, but Z1 felt more cohesive." (S11)	"It felt more reactive to my gameplay." (S11)
"Had I not experienced Z1 Before, this would probably not stand out to me as much, but since I did, it felt like something was taken away." (S11)	" Though, I liked how the music built up when shaking the artefacts (S6*)	"...as previously mentioned Z1's soundscape felt very fitting and enveloping" (S1*)	"In level A1 there were some very strange noises that I wasn't very fond of" (S1*)	" Z1 felt more exciting and you had to think more about what you were doing" (S8)
	"the sound changed when you picked up an artefact" (S16)	"The Music and sound design." (S11)	"The soundscape in A1 just really felt out of place and didn't really "envelope" me into the world - the soundscape felt "unplanned" " (S1*)	
<b>(Subcategory: Artefact interaction)</b>  <b>Did not notice pitch change or held Artefact steady</b>		"The music was more reactive when holding an artefact..." (S7*)	"...there was some kind of other sound coming in when I picked up the artefacts in A1, and to me it sounded like a cue for danger!" (S9)	
"I did however like the constant tone of the artefacts in Z1...The artefacts gave a constant tone when carried around." (S14)			"The sound was more interesting in Z1" (S7)	
"I also liked that the Music was not affected when I picked up the artefacts" (S8)				
"the sound of the boxes was uninterrupted " (S15)				
"My perception was that the cubes did not sound as much as in A1" (S8)				

### Code Table: Level Z1 artefact interaction [Post-game Survey]

Table 8: Table displays a summary of answers regarding the granular synthesis and interactions in level Z1.

Liked The GS	Disliked The GS	Constant flow of grains	Interaction with music	Preferred A1, but enjoyed the Artefact sounds
"The music was more reactive when holding a artefact. The higher the artefact was held, the higher the pitch went up." (S7*)	" My perception was that the cubes did not sound as much as in A1" (S8)	"the sound of the boxes was uninterrupted..." (S15)	" Though, I liked how the music built up when shaking the artefacts (S6*)	"I did however like the constant tone of the artefacts in Z1..." (S14)
"the sound changed when you picked up an artefact" (S16)		"...The artefacts gave a constant tone when carried around."(S14)	"The music was more reactive when holding a artefact..." (S7*)	
			"I also liked that the Music was not affected when I picked up the artifacts" (S8)	

### Post-game survey analysis

The post-game survey results show that few subjects commented about the interaction itself, or explicitly noticed the pitch-change. The answers show that many of the subjects instead experienced the granular synthesis as a steady tone. Some subjects mention how the stems “build-up” influenced their level preference. Other subjects stated that they preferred the second level of play because of familiarity. Many answers show that subjects noticed differences in the versions, that are technically not true, such as the second level of play being more “up-tempo”, or that one level consisted of a sub-bas pad whilst the other one did not.

## 3.2. Interview Results & Analysis

The interview sub-transcripts were coded and categorized. In this section the interview results, analysis and codes are presented. In the tables, parts of interviews are transcribed. The first set of code-tables evaluate the musical interaction within the game and the second set of code-tables describes game-mechanics and other notations found in the interviews. This was to make it easier to distinguish between the subjects' experiences of the gameplay overall and their specific experience of certain game mechanics.

### Interview codes

Following is explanations for each code found in the interview results.

*Code: Artefact sound relationship with the background music*

If subjects regarded the granular synthesis stem as a part of the background music

*Code: Artefact-instrument*

Notions made about how the cubes might be regarded as an instrument, or if the cubes have instrument-like qualities. For example, subjects noted that you can perform various instrument-like activities with the cube, such as increase pitch over time or to turn on/off the granular synthesizer in rhythm with the rest of the music. A sub-category was created for this code for mentions of "scales and modes" specifically.

*Subcategory: Scales and modes*

Explanations about how the different notes impacted the musical structure. Notations of how the inherent scales or melodies of the cubes impacted the soundscape.

*Code: Composing with the game*

Explanations about how subjects interacted with the cube musically. Codes consist of comparisons between this game and other musical activities. Notions about how subjects might not have interacted with the cube is also presented here.

*Code: Artefact Musical exploration*

Explanations about how subjects explored the possible outcomes with the cube. Notations about how subjects would have explored further is also added.

*Code: Sounddesign*

Evaluations of the interaction in correlation to sounddesign instead of musical evaluations. For example, different non-musical sonic descriptors of the granular synthesizers within the game.

*Code: Artefact musical Complexity*

Evaluations about the musical complexity the granular synthesizers offer, or in what way the cubes work symbolically with the background music.

### **Code Set two: Other notations of the interaction**

The following codes are presented in *table 12-14*. They are used to evaluate the interaction mechanics, not the musical interaction.

*Codes: Noticed Artefact-pitch & Did not notice Artefact-pitch*

Explanations of how or why subjects did or did not notice that the artefact could change pitch.

*Code: Artefact improvements (not GS related)*

The code indicates suggested improvements to the mechanics that are not related to the different parameters of the granular synthesizer.

*Code: Artefact improvements (GS-related)*

The code indicates granular synthesizer related improvements.

*Code: Musical Progression (possible reason for preference)*

The code indicates how the vertically orchestrated musical score influenced the subjects level preference.

*Code: Game references*

references made to other games.

### **Interview: Qualitative responses**

In this section code-tables from the interviews is presented. Subjects are labelled the same way as in the post-game survey. At the bottom of each column, an analysis of that specific code is presented. The full interview-transcripts are available in appendix G.



Granular synthesis: Musical Evaluation: Set of answers 1 [Interviews]

Table 9: Table displays three set of codes of the musical evaluation. At the bottom of the table an analysis for each code can be seen.

Code: Artefact sound relationship with the BGM	Code: Artefact-instrument	Code: Composing with the game
<b>Subject:</b> I thought about when a cube... especially when it added a melody. It played a pentatonic scale. I experienced it as the background music were lydian, thus pretty levitating. The pentatonic scale enhanced that in some way... (S2:59-62)	<b>Subject:</b> Yes, it felt like an instrument in that I could in any way control it. I could choose which notes to emphasize, or strengthen dependent on how I held the cubes...The number of notes available were not very many... But from standing still and moving it up and down... It felt in some ways limited. (S7:137-146)	<b>Subject:</b> When you hold the cubes, and they make sound when you move them, it sort of becomes like you’re jamming with the game.  <b>Interviewer:</b> Can you elaborate?  <b>Subject:</b> ...The music in the plays in the background and depending on how you move thee cubes I felt like you in some way get to create with the game... (S2:108-115)
<b>Subject:</b> The first cube... I did not really think about it sounded but it was still a nice effect, feeling that something happened in the music  <b>Interviewer:</b> Okay, so you regarded the sound as a part of the music?  <b>Subject:</b> Yes, precisely. (S6:8-13)	<b>Subject:</b> If I want a specific note-progression it can mean that I for example, have a note which is when I hold it high in the air, and then I want the note when it is close to the ground. Then I will automatically scroll through the other notes which are layered in-between if I want to go there. I cannot go there directly without going through the other notes.  (S7:93-101)	<b>Interviewer:</b> Does this remind you of any other musical experience that you have?  <b>Subject:</b> A little... If I had explored it more... I am a guitarist, and then becomes a little like when I start a backing-track at home and play to it. If I had more room to explore and learn how it all sounded together...but it becomes like a backing track because there is a part that I am not controlling...So when holding them I becomes sort of like a solo-jam. (S2:158-166)
<b>Subject:</b> It fit with the background music... it became like a build-up... (S3:53)  <b>Interviewer:</b> How do you see...Do you regard the sound as part of the music?  <b>Subject:</b> Yes  <b>Interviewer:</b> In what way do you think it fits in?  <b>Subject:</b> It’s refreshing with ehm... that kind of sounddesign in games... when it adds something, and not just only some fighting music, with swishes and swooshes then and then. (S3:59-67)	<b>Interviewer:</b> In what ways did it feel like an instrument, and in what ways did it not feel like an instrument?  <b>Subject:</b> It felt like an instrument because it sounded very much like a synthesizer. But in the game, itself, it’s hard to see because you’re holding a cube...when playing you can maybe think that this is a cool synthesizer. But then I think that... It becomes abstract and hard to see because you’re holding a cube. (S2:130-138)	<b>Subject:</b> I think it was the one with the flute, like it went from a third, to a 4 <sup>th</sup> and then a 5 <sup>th</sup> , and then the octave...When I did these jumps or when you got the cube as high as possible, it becomes sort of like [hums a melody 08:14:00]. So, first there the progression is pretty...it’s pretty melodic there. (S7:123-128)
<b>Interviewer:</b> Do you think the cubes sound fit in the background music?  <b>Subject:</b> Yes. It... think it sounded coherent, good sounddesign, it felt like it fit together in a song. (S5:65-68)	<b>Interviewer:</b> Okay, in what ways did it feel like an instrument, and in what ways did it not feel like an instrument?  <b>Subject:</b> I think it could have been if... I don’t really know if it was like an instrument really when I held it. I felt more like it was an effect of what I did with it. (S6:166-171)	<b>Interviewer:</b> Did it feel like you were controlling the music when holding...say the synth-cube?  <b>Subject:</b> yes partly. It definitely felt like a control over being able...not necessary improvising because there were some scale-notes or what you can call it that it originated from. I noticed when walking. But it definitely felt like I became more part of the ongoing soundscape. (S7:70-77)
<b>Interviewer:</b> Did you regard the cubes sound as a part of the music when holding them?  <b>Subject:</b> I experience them as a part of the same soundscape. It feels like “tracks are added to the music, but it is also a soundscape. The cubes are absolutely a part of that soundscape, but maybe not a part of the music. (S1:110-115)	<b>Interviewer:</b> in what ways did it not feel like an instrument?  <b>Subject:</b> I might have, if I had been more careful with it and explored what it did when I raised and lowered it. But I did not. I just pulled it up and shook. And then a sound which sounds like “success” appears...more than why it might have felt like an instrument. instrument. (S1:154-159)	<b>Subject:</b> Mm. I noticed that. That they provided this note-element in a scale, so that the music’s feeling changed.  <b>Interviewer:</b> Was that something you played with?  <b>Subject:</b> No, I did not play with it. But I noticed it and liked in when I walked around with the cube. Like “Yes now it sounds differently”. (S5:57-63)
<b>Interviewer:</b> Did you ever feel in control of the music when holding any of the cubes?  <b>Subject:</b> No, I did not reflect over that it was just the cubes which changed the music... But I noticed that the music changed. I did not know what was doing it. (S4:99-104)		
<b>Analysis: BGM and Cube sound</b> <i>If the cube is related to the background music</i>  - The artefact noise seems to be regarded as a part of the background music.	<b>Analysis: Instrument-like interaction</b> <i>Is the cube related to instrumentation</i>  - The cube (visual) might be regarded as a visual barrier for a musical interaction  - The cube might not be identified as an instrument immediately, rather as an effect in a musical soundscape  - The cube might be identified as an instrument with limitations.	<b>Analysis: Composing with the game</b> <i>How subjects used the cube/if the used the cube</i>  - some subjects notices a musical interaction with the background music.  - Some subjects see the interaction as a possibility to exercise musical activities such as jamming or improvisation  - One subject thought that there was a limited amount of notes, thus restricting the interaction.

Granular synthesis: Musical Evaluation: Set of Answers 2 [Interviews]

Table 10: Table displays two set of codes of the musical evaluation. At the bottom of the table an analysis for each code can be seen.

Subcategory: Scales and modes	Code: Artefact Musical exploration
<b>Subject:</b> I thought about when a cube... especially when it added a melody. It played a pentatonic scale. (S2:59-60)	<b>Subject:</b> If I held the artefact by the ground or if I held towards the air it changed notes. And because of that I could hear which notes would...Yes but which would fit with these notes and those notes. (S7:83-89)
<b>Subject:</b> ...And I think that the lydian mode is very good in both video games and movies when you want a levitating relaxing feeling, but it's not quite at home. It's adventure like, and the pentatonic scale added to this. (S2:82-84)	<b>Subject:</b> A little... If I had explored it more... I am a guitarist, and then becomes a little like when I start a backing-track at home and play to it. If I had more room to explore and learn how it all sounded together...but it becomes like a backing track because there is a part that I am not controlling...So when holding them I becomes sort of like a solo-jam. (S2:162-166)
<b>Subject:</b> ... For example, this lydian mode which goes...It's pretty levitating and...nice but not quite at home still. (S2:196-198)	<b>Interviewer:</b> Was. It easy for you to find the notes who fit with the musical context?  <b>Subject:</b> No, I did not experience as such, it was hard, more like unexpected in a way. In a positive way. (S2:117-121)  <b>Subject:</b> ...If I had played it again and explored more...But I can see when you walk around, you can utilize it and jam more. (S2:126-128)
<b>Subject:</b> Mm. I noticed that. That they provided this note-element in a scale, so that the music's feeling changed. (S5:57-58)  <b>Interviewer:</b> Were you successful in finding any notes which fit in with the music for example  <b>Subject:</b> I thought that...I heard that it fit in. It felt like it was part of the same scale. But I do not know if I changed the pitch...Changed the pitch with how high I held it. I do not know if I did that deliberately. (S5:84-89)	<b>Interviewer:</b> Were you successful in finding any notes which fit in with the music for example  <b>Subject:</b> I thought that...I heard that it fit in. It felt like it was part of the same scale. But I do not know if I changed the pitch...Changed the pitch with how high I held it. I do not know if I did that deliberately. (S5:84-89)
<b>Subject:</b> ...However this pulsating tone had some scale notes, which was not part of the harmony already created by the soundstage. But it had some scale-notes which made it possible to get more tension, but like it was really out or anything. It gave a bit more depth. (S7:110-115)	<b>Interviewer:</b> Okay, but did you find notes eventually, or what did you once holding them.  <b>Subject:</b> Yes, but I did not really do that...Or yes, I did. Because the yellow cube in Z1, was when I was spinning around a lot trying to wake it up, and I really couldn't I noticed that there was different...Once I held it far down on the screen and up on the screen. (S6:152-159)
<b>Subject:</b> However, because you had to...If I wanted to go from one note to another, I had to go through all of the other notes too, So, in a way it becomes a limited form of improvisation. (S7:86-89)	<b>Subject:</b> Yes, I would rather see it as a melody [whilst holding the cube]  <b>Interviewer:</b> Like a melody?  <b>Subject:</b> Yes  <b>Interviewer:</b> Did you play with the music in any way?  <b>Subject:</b> No I did not...As I said I did not understand that you could control by yourself. (S4:152-161)
<b>Analysis: Scales and modes</b> <i>Issues related to cube scales</i>  - Three subjects noticed the different intervals  - The cubes tonal intervals are related to the musical context  - Some notes in the scales added tension  - One subject noted that the scale-interaction was limited, due to the notes are always played in the same consequent order.	<b>Analysis: Musical exploration</b> <i>How/or if the subjects explored the different notes of the cube</i>  - Most subjects did not notice that they could control the pitch (possibly a by-product because of the shaking-instruction)  - Some subjects found the pitch change, but did not act upon it or did not know what was causing the pitch to change.  - One Subject noticed immediately through exploration

Granular synthesis: Musical Evaluation: Set of Answers 3 [Interviews]

Table 11: Table displays two set of codes of the musical evaluation. At the bottom of the table an analysis for each code can be seen.

Sounddesign	Artefact musical Complexity
<b>Subject:</b> This electronic pulsating sound melded best with the soundstage whilst the flute sounded almost like...It was the one who stuck out more because it did not have the kind of timbre which fit with the rest of the soundstage... (S7:40-42)	<b>Subject:</b> In relationship to everything else that is happening in the background music, it is still something that sticks out, which is a simple sound. But it has complexity in the form of it sticking out. It feels like there is some thought behind it. Which may make it complex. (S1:170-173)
<b>Subject:</b> But it felt “nice” in some way, and it fit in very softly with the landscape. (S1:74-76)	<b>Subject:</b> But it feels pretty simple. Or easy to digest. It was...I never felt like there was to much or too little sound. It felt very simple, very yes. (S4:118-120)
<b>Subject:</b> Ehm...The sound was a bit more intrusive, than what they were in A1, I experienced either way.  <b>Interviewer:</b> What made them feel intrusive?  <b>Subject:</b> Ehm... A bit too much happened, sort of. (S3:11-16)	<b>Subject:</b> Kind of...Maybe only the cubes sound was a bit less complex, maybe. I don’t know, It was because it fit in with the background music...which makes me think it’s complex. (S6:202-204)
<b>Subcategory</b> <b>Granular synthesis attributes</b>  <b>Subject:</b> I thought that the three cubes had three distinct sounds. One sounded almost like a flute. One had more...Like the those you have in EDM, a very electronic pulsating sound. (S7:30-32)	
<b>Subject:</b> But the green one felt very soft. (S1:22-23	
<b>Subject:</b> The purple one felt more conflicting [bothersome to pick up]  <b>Interviewer:</b> Can you elaborate on conflicting in this case?  <b>Subject:</b> Yes, it did not feel as nice to pick up in some way. (S1:24-29)	
<b>Subject:</b> Because I thought when picking up the cubes that it was kind of satisfying... A satisfying sound.  <b>Interviewer:</b> What made it feel satisfying  <b>Subject:</b> It was this sound...A pretty soft sound, the pling. I was not very sharp (S2:8-16)	
<b>Analysis: Sounddesign</b> <i>Things related to sounddesign</i>  - Most of the subjects did not have much to say about the individual sounds of the cubes.  - Some subjects found the artefacts sounds as "nice", or "pleasing".	<b>Analysis: Cube-Complexity</b> <i>Is the cubes interaction complex or simple</i>  - The cubes stand out, thus, making them complex  - The cubes sound is simple, thus easy to consume.

Granular Synthesis: Other Notations about the interaction: Set of Answers 1 [Interviews]

Table 12: Table displays two set of codes evaluating other notations made in the experiment. At the bottom of the table an analysis for each code can be seen.

Noticed Artefact-pitch	Did not notice Artefact-pitch
<p><b>Interviewer:</b> Okay...But did you notice that the pitch changed in Z1?</p> <p><b>Subject:</b> Yes</p> <p><b>Interviewer:</b> How did you figure it out? Was it easy?</p> <p><b>Subject:</b> No, but it was this that you were would shake them. First, I went there with a cube, but then nothing happened. And then I figured out that I should shake them. And then this sound came...But yes...It was not hard to reach that conclusion, but it took some time [laughs] (S2:36-45)</p>	<p><b>Subject:</b> the instructions was “lift them up high”, So I just pulled it up and shook like crazy (S1:5-6)</p>
<p><b>Subject:</b> Yes...That this cube has a little melody. That it plays with the music. I did not pair it, that it plays with the music. I did not figure out that it was how I held it. (S5:3-5)</p>	<p><b>Interviewer:</b> Did you figure out that the pitch changed?</p> <p><b>Subject:</b> No (S3:83-86)</p> <p><b>Subject:</b> I read the instructions and there it stood shake, so I walked around and [shakes the computer mouse quickly], shook the mouse. It became pretty weird but... Because I played a bit a threw the cube in the and then the cube...</p> <p><b>Interviewer:</b> stopped making noise?</p> <p><b>Subject:</b> Exactly, it stopped making sound. (S3:94-101)</p>
<p><b>Interviewer:</b> Then you noticed that the pitch changed depending on how high you hold them?</p> <p><b>Interviewer:</b> Did it then feel like you controlled the music?</p> <p><b>Subject:</b> Mm. Except that I did not move the cubes slowly, instead I...[laughs] I went up and down very quickly. (S6:136-144)</p>	<p><b>Subject:</b> ... It was hard to get them to wake up. So it was a little bit like “how should I do this?”...</p> <p><b>Interviewer:</b> How did you figure it out?</p> <p><b>Subject:</b> I don’t think I did at all. Was it towards the sun you were supposed to hold them? I did as earlier stated not notice that it was the cubes which changed the music, but it felt like there was some differences between the levels at least. (S4:4-16)</p>
<p><b>Interviewer:</b> How did you notice that the notes changed?</p> <p><b>Subject:</b> It was when I first grabbed the artefact, and something changed in the soundstage. And when I dropped the artefact, it disappears. Once I picked it up again it came back. So, I figured out that something sounds when I am holding the artefact, and the be shear curiosity I lifted it up and noticed that he notes changed, depending on where I held it. (S7:13-21)</p>	
<p><b>Analysis: Noticing pitch change</b></p> <p>- 5 out of 7 subjects did not utilize the artefacts ability to change pitch (because the ability to change pitch was not obvious)</p> <p>- The majority of the subjects discovered that the musical pitch was changing</p> <p>- The majority of the subjects did not change pitch according to the background music</p>	

Granular Synthesis: Other Notations about the interaction: Set of Answers 2 [Interviews]

Table 13: Table displays two set of codes evaluating other notations made in the experiment. At the bottom of the table an analysis for each code can be seen.

Artefact improvements (not GS related)	Artefact improvements (GS-related)
<b>Subject:</b> Hmm... I don't know, I think I thought it was good as it was... That it was on this ambient kind of level. You could all different kinds of rhythms, which would change depending on where you held the cube. Different melodies that would change...I think it worked well as it were. <b>(S5:120-123)</b>	<b>Subject:</b> ...That it would be more sensitive for when you move yourself. I think maybe you would have been more obvious if I move a little to the left it sounds more sort of. More things that happened kind off. <b>S6:214-216)</b>
<b>Interviewer:</b> How could you make this more musically interesting from that perspective? [Jam with BG-music]  <b>Subject:</b> I experienced the music as pretty loud and the other sounds, for example, when you run or jump. I think that hose too could become an element if you made those more balanced. Because then...I may be nerdy, but if there is a game similar like this, I would jump making it fit rhythmically with everything else. <b>(S2:168-176)</b>	<b>Interviewer:</b> Do you think it would be funnier if you could decide which notes and in which order you wanted... how...Or how is the interaction limited?  <b>Subject:</b> Ye, then I can have certain note-progression which can mean that if I for example, have a tone which sounds when I hold it the air, and then I want the tone which sounds down at the ground...Then I won't automatically go through the other notes in between. I cannot go there immediately without going through the other notes.  <b>(S7:93-101)</b>
<b>Subject:</b> If there was more of a purpose with the pitch change. I understand that you cannot make it really, because you had a reference which actually made the sound...The pitch-change. So, if the pitch-change would have been part of some other kind of puzzle it would have been. Sort of... In the games function simple, but technically complex. <b>(S3:121-126)</b>	
<b>Interviewer:</b> How could you make the cubes more musically interesting?  <b>Subject:</b> Ehm. Yes, maybe if you made it more obvious that it was the cubes which made the sound... Now I don't really know...Maybe mark them with a quarter note or something? <b>(S4:122-127)</b>	
<b>Interviewer:</b> How could you make the cubes more musically interesting?  <b>Subject:</b> Certainly...I probably would not have cared. It could have made anything really. But you could possibly create a bow-instrument so that you can play and look everywhere, and different sounds appear. But I don't think it adds anything to the world. <b>(S1: 175-180)</b>	
<b>Analysis: Improvements (not related to the GS)</b> <i>Things that subjects stated might improve the mechanics of the artefacts that is not related to GS.</i>  Suggestions as to what might improve the interaction  * Rhythmic elements in the soundscape that is not related to GS, such as rhythmic footsteps  * Make it more obvious that the cube is eliciting sound.  * Give the cube a meaning in the puzzle, rather than just making noise.  * Make the cube sound like a real-life instrument.	<b>Analysis: GS-improvements</b> <i>Things that subjects stated might improve the GS</i>  Suggestions  * The ability to change what notes are played back, not constricting the notes to a specific scale  * The ability to skip notes in the scale  * Make the GS change pitch easier



Granular Synthesis: Other Notations about the interaction: Set of Answers 3 [Interviews]

Table 14: Table displays two set of codes evaluating other notations made in the experiment. At the bottom of the table an analysis for each code can be seen

Musical Progression (possible reason for preference)	Game references
<b>Subject:</b> Because the one I marked in the survey intensified pretty pleasantly in a sense. (S2:66-68)	<b>Subject:</b> (speaking about world of warcraft). In Northrend there is this small part called Grizzly Hills. And in Grizzly hills the music sounds magical, so there I start the music. Because it feels so nice. There are forests and calm, some folk music sort of... I really feels like I get into an everyday mood, the Farmville sort. I don’t know. I think that’s just the sort of stuff I like. I don’t really like when it’s hectic, with big timpani and shit. Just chill. (S1:250-255)
<b>Subject:</b> I focused on once you had put the cubes in place, then a little adds. It was that which I proceeded from... That the adding of the build-up in A1 was more subtle worked better for me S3:21-24)	<b>Subject:</b> ...More like songs in the background. One game I played a lot a long time ago was Flyff, if you know it. And there it is music in the background, rather than the sounds which are playing. [referring to complete songs] (S2:183-190)
<b>Interviewer:</b> You did not experience that the sounds the cube added came from the cube itself, rather than it was a part of the music at the start...or how do you see...  <b>Subject:</b> I noticed that the music changed with time. But I thought that, that was because I put the cubes in their place. That when I put a cube in their place the music changed a little bit. Then the next one would change a little bit. Not that them themselves...Because the level progressed, the music changed more the closer I got to the end. (S4:129-138)	<b>Subject:</b> There is the exploring, which kind of feels like “No Mans Sky”. And there is not a lot else, except for a world where you can move stuff, and pick stuff up. And the music feels like, so calm. “No man’s Sky” Feels like a very calm game. S4:180-183)
<b>Interviewer:</b> Continued interview with Subject six. Why subject six preferred A1 over Z1.  <b>Subject:</b> Yes but mostly because I thought more about the music when I was holding the cubes...Because it felt like... Or noticed more that now a bass was added, now some sort of percussion came. So, it felt more like sound when it was built up, sort of.  <b>Interviewer:</b> Did you focus more on the musical arrangement because that the cubes did not sound as much then?  <b>Subject:</b> Because of how the cubes sounded more like a typical band, I think. That, now this element gets added in the song. (S6:257-268)	<b>Subject:</b> Yes, I get some “Zelda” vibes, sort like “Zelda” puzzles... Ehm...A little bit like “Half Life 2... or “Portal” maybe.  <b>Interviewer:</b> Can you elaborate on “portal”, for example?  <b>Subject:</b> The shape of the boxes [laughs], but to run around and complete puzzles (S5:129-134)
	<b>Subject:</b> I thought a little bit about portal, but that was because of the shape of the boxes, more visually sort of. (S6:226-227)
<b>Analysis: Musical progression</b> <i>Subjects whose preference was influenced by musical progression through the level</i>  Some subjects described a preference for A1 over Z1 because of how the stems was added over the background music.  - The musical build-up was more fulfilling.  - Subjects focused on the stems that was added.	<b>Analysis: Game references</b> <i>Games that subjects can refer to.</i>  - Games that was mentioned was related to in a visual/gameplay sense rather than the sounds.  - No games with musical interactions was mentioned.  - Important sounddesign in the mentioned games

## Interview analysis

The interview results show further insight into subjects' level preferences and how the granular synthesis interaction was perceived. Five out of seven subjects did not utilize the artefacts ability to change pitch because it was not obvious that it was the cubes height from the ground that changed it. Although the majority of the subjects did notice that there was a change in pitch but did not alternate it according to the background music. As a correlation to this some subjects suggested that the musical interaction should be rendered more obvious. One subject utilized the cubes ability to change pitch, and discovered the various scales implemented on the cubes. This subject also acknowledged some shortcomings in the design of interaction, such as not being able to skip notes whilst moving the cube up or down. The timbral qualities of the granular synthesis interaction seemed to be pleasing as subjects explained that many of the sound were "soft", or "nice".

### 3.3. Video Footage Analysis

The video offers some other interesting insight into the subjects' qualitative responses. For example, S11's video footage shows obvious change in pitch, however the subject made no comment about it. Same thing is shown in S15's video footage, but this subject claim that they did not notice any difference between the levels. In *table 15* the footage from level Z1 has been analysed. Video footage shows pitch change refers to the artefacts changing pitch within the game. Video footage: Cube interaction type summarizes shortly how the subject interacted with the cube in level Z1. Mentions pitch based interaction in the post-game survey, is if subject made any comment regarding the interaction. No answers from the interview has been included in the table since the subjects are shown the interaction before the interviews.

*Table 15: Summary of the video analysis.*

Subject No:	Video footage shows pitch change:	Video footage: Cube interaction type:	Mentions pitch-based interaction in the post-game survey.
1*	Not recorded	Not recorded	No
2*	Not recorded	Not recorded	No
3*	Not recorded	Not recorded	No
4*	Yes	Activated cube by mistake. Holds cube steady.	No
5*	Yes	Threw the cubes, played with pitches	No
6*	Yes	Activates cube by shaking.	Affected the music
7*	Yes	Noticed a musical interaction	Cube height = cube pitch.
8	Yes	Jumps with the cube	No
9	Yes	Moves the cube up and down to wake them up. Jumps with the cube while walking.	No
10	Yes	Jumps with the cube	No
11	Yes	Holds cube steady, wakes them up by holding them high.	Music was reactive
12	Yes	Holds cube steady, woke up by holding cubes high	No
13	Yes	Activated cube by mistake. Holds cube steady.	No
14	Yes	Activated cube by shaking. Holds cube steady.	No
15	Yes	Holds cube steady, woke up by holding them high.	No.
16	Yes	Activated cube by shaking. Holds cube steady.	Sound changed when holding artefact.

## 4. Discussion

### 4.1. Result discussion

#### Guiding the interaction

A large part of the subject pool did not notice the pitch interaction within in the game. Few subjects seemed to have a desire to explore, interacting with the cubes, which ultimately would be required to discover this musical interaction. That does not mean that these kinds of interactions have no place in a game, but successful implementation would require leading the player to the interaction and providing reasons to interact. They absolutely can but it requires careful planning and thought when setting up the interaction. It is possible that subjects failed to notice the pitch-interaction because of the in-game instructions given to them. The in-game instructions gave no indication as to what to expect from the artefacts. The instructions told the majority of the subjects to *“move them around, up and down...otherwise both you and the artefact will be bored”*, but still some subjects shook the cubes rapidly in order to wake them up and nothing more. Other subjects explained in the interviews that they discovered the “waking up” mechanic by accident, which resulted in them not knowing what was actually causing the artefacts to wake up. A possible interpretation could be that subjects were too focused on getting the artefacts to wake up, thus not paying as much attention to the actual sound of the cubes. Other subjects explained that they were too focused on completing the task and thus not noting any difference between the levels. Although, if the in-game instructions were made to be more direct, and perhaps reveal the interaction, the subjects' comparison between the two versions of the level would be more detailed. If this was the case, subjects perhaps may have been more inclined to explore the different levels features. However, this would change the experiment and the way the sound design is interpreted. This study examines and evaluates a vertically re-orchestrated score with/without granular synthesis interactions. Revealing the differences or giving more direct instructions to the subjects would make the playing experience specifically about interacting with the cubes. This might have been good for a user study, but it would also lack ecological validity for gameplay. It might have also biased subjects' level preferences, since one of the versions offers more in-depth interactions.

Another thing to consider is that it did not seem to occur to the players at all that cubes might have been interactive in some interesting way. Some held the cubes absolutely steady and proceeded to the pyramids. They likely thought the completion of the task was more important for success in the game than the way in which the task was completed. Or perhaps they were more inclined to further explore the vertical re-orchestration system. This is something for game designers to think about. Players could be given different kinds of impressions by the sight of a cube, accompanied with a vague objective.

#### Misconceptions

Some subjects expressed impressions of the game that are technically speaking not accurate. For example, some subjects experienced the level-music differently. One subject stated that there was a sub-bass pad in one level, that they did not hear in the other. Another subject noted that the music was more up-tempo in one version, which is technically not true. Two subjects (who had no level preference) experienced that the footstep foley disappeared in the next version of the level, which is also technically not true. The fact the two levels are indistinguishable from one another is interesting, as it says a lot about how a granular synthesis role in a video game can undertake different functions within a game.



### **Level Familiarity**

When people directly did not notice the granular synth interaction, subjects tended to use other factors when expressing their level-preference. When subjects were asked to motivate their level preference in the post-game survey, many answers refer to the musical background or build of the musical arrangement. The thing that differs in the levels, musically, is in which order subjects activate the various stems. This was implemented by changing the places of the cubes, as indicated by colour, between level-versions. A handful of subjects refer to the musical progression or build-up as motivation for their level preference. This might be because of level-familiarity. Although video footage was not analysed for time spent in each level, even a superficial examination would show that the majority of the players played the second level more quickly. This suggests that whenever subjects have completed the first level, they know exactly what to do in the next. This results in subjects completing the task in the second level faster. As mentioned in the method, at the end of the score, the chord progression goes into a crescendo and a diminuendo. It is possible that subjects prefer the level in which they experienced the crescendo while there were more stems audible in the mix. This might have generated a more "satisfying" or "fulfilling" crescendo

Some subjects expressed a preference for the second level they played, because they were more familiar with it. Subjects are prone to be more familiar with the mechanics and level layout the second time experiencing the game-level. Some results show that subjects enjoyed the granular synthesis, regardless of their level-preference. These results show that level-versions sometimes can be seen as indistinguishable from one another. When subjects directly did not notice the granular synth interaction, subjects tended to use other factors when expressing their level-preference.

### **The Granular Synthesis interaction**

The results from the interviews show that all interview-subjects regard the granular synthesis as part of the vertically orchestrated musical score. Although all subjects did not exercise musical-like interactions within the game, some still see the granular synthesis as a part of the musical background or overarching soundscape. Some subjects made comments about liking the steady tone of the artefact, meaning that they did not notice the pitch-change but still enjoyed the cubes' sounddesign. Other subjects enjoyed that the musical background reacting whilst interacting with the cubes. Some results show that subjects enjoyed the granular synthesis, even when it was not their level-preference.

The video footage showed various kinds of interactions with the granular synths. Some footage shows subjects jumping, thus changing the pitch. Others held it steady as they traversed the area. Footage shows that the pitch definitely changes when the subjects held the cubes in various ways, although very few of them mentions in the post-game survey. The reason why so few noticed the pitch-change could be because the granular synthesizers was not cutting through the mix. Another reason could be that some subjects do not have critical musical listening skills.

Few subjects explored the cube as a musically interactive object. The interaction was not recognized as musical by everyone, but rather as an effect on the already present soundscape. However, the interaction was seen as instrument-like in several particular ways. Two subjects saw the interaction as an opportunity to jam or improvise with the game though they both noted that the interaction was limited. Both of these subjects identified themselves as guitarists. Real musical instruments give, for example, the practitioner the ability to choose

which note to play next. They can skip and repeat notes. Also, on real instruments players control how aggressively a note is played, micro-dynamic changes in play and more. In this interaction, however, the number of musical notes was limited to a pre-determined musical scale which was noted by some subjects. However, there is for example an expression in the interaction which no subject commented on, the amount of grains per second modulation. The fact that the amount of grains increases depending on the cube's velocity can also be seen as a form of emotional expression, although in this test the grains per seconds range was limited.

Other subjects did not see the cube as an instrument, because it did not visually look like an instrument. Perhaps the cube might not be regarded as a musical instrument immediately. It can be suggested that it takes some time for subjects to get used to objects like these, thus this can be accounted for by the sounddesigner when creating similar interactions. If the interaction was guided more towards the function of the cubes, more subjects might have recognized it as an expressive instrument.

One subject noted that the purple cubes timbral qualities matched better with the musical background and arrangement. The subject further explained that the "synth-like" sound of the cube made it fit better harmonically with the musical background than other cubes, such as the green one. A possible reason for this preference could be because of the synth-driven musical background allowed the purple cubes timbre to fit better. However, other subjects explained that the green cube sounded "nice" within the musical context. The timbral qualities of the granular synthesis should be considered and controlled within a gaming environment, as it may increase or decrease player interactivity.

Regardless, a handful of subjects expressed the nature of the interaction as pleasing both musically and texturally, even if they did not take advantage of the interaction. Traditionally granular synthesis is used for textural sounds in video games. However, these results show that it can also be an inherent part of the musical score in video games.

### **Game references**

When asking subjects if they could compare this game to another, some musically interactive games were mentioned, such as "Portal" or "Zelda". Both of these games have many significant musical moments, which are best shown in their puzzle-sounddesign. However, subjects also mentioned games with similar genre, games with similar genre of music or games which visuals were aesthetically in similar. However, the games mentioned by the subjects pay very special attention to detail in their sounddesign and musical score.

## **4.2. Critique of method**

### **The interaction and music**

For the game a three minutes and nineteen seconds looping ambient musical score was created. In the musical score the crescendo could be regarded as amplified, if more stems are active once the loop reaches this point, the score might seem more fulfilling. This probably might have affected subjects level preference, as it is likely that they would complete the level quicker the second time of play (thus experiencing the crescendo with more stems). If they heard the crescendo sooner, they might have been inspired to seek that point in the game faster. Certain measures could be taken in order to prohibit this, such as creating two different musical scores. The level layout or game area could also be changed in order to make the players spend an equal amount of time in each level, whilst still keeping the mechanics of the

game intact. Another solution to this might have been to introduce a training level, where subjects get to play the level without sound before experiencing both versions of the level with sound. Measures like these might have affected the subjects' preferences. However, these solutions might lead to subjects preferring one level over another because of the differences in the musical score or visuals. However, the reason for having the same musical score on both versions of the level in this study was to evaluate the differences between the cubes, in-directly. As a by-product of having the same musical score on both versions of the level, subjects may have focused more narrowly on the small differences that they might have noticed the second time of play.

Having small differences and similar sounds for the artefacts in both versions on the level may have influenced subjects level preference too. The sounds for the granular synthesizers and samples were similar in timbres' and "rhythm" (pulsating). If the timbre of the cubes was too different, subjects might have preferred the level in which they enjoyed the sound design more. Instead of creating the looped sample using granular synthesis another sounddesign could have been applied in order to make it easier for subjects to differentiate between levels. However, the study evaluates an interactive object as compared to a non-interactive object. Having similar timbre of the cubes in both versions of the level can be seen as a necessity in order for subjects to have a valuable preference

### **Demographics**

No subject was ruled out because of how many hours they play games each week or month. The reason for not having a set restriction was because many students don't have time to play games each week. The fact that the majority of the subjects (and other students at LTU) exercise musical activities in their free time is seen as valuable for this study. Musically oriented subjects are usually more prone to notice different attributes found within the music and sounddesign which were valuable when evaluating the interaction. However, more experienced or consistent players of games might have given different responses.

### **Survey questions**

When filling in the google form, subjects had played the game for a varying amount of time, ranging from 15 – 20 minutes (according to video footage). Filling out the forms after this may have been tiresome for some subjects, resulting in finishing the post-game survey as quickly as possible. It is also possible that subjects had forgotten some attributes of the levels, resulting in subjects answer quick answers for the last two questions on in the post-game survey. Due to this, some important information about the interaction may have been lost.

In post-game survey, subjects are made to choose level preference by the level name (A1 & Z1). The names of the level may have made it harder for subjects to remember the different attributes of the sound. It may have been more preferable to have the level names be "the first" and "second" level as subjects may not have paid much attention to the different level names themselves. The interviews also show that there was some confusion regarding the different level names, as some subjects explained that they did not remember in which level certain sounds appeared. However, in the manuscript, that was read for every subject before they got to play the game, notations about the level-names were made.

The post-game survey might have yielded more information about the interaction itself if questions were asked about the different cubes. One question asking "what was different about the sound in Z1" were asked. Another question could be to ask subjects to describe their experience with the cubes. This would directly allow for all subjects to evaluate the

level differences directly without them inherently knowing all of the differences between them. However, this would have led the subjects to notice difference which they may not have otherwise observed.

### **Interview questions**

After the survey and before the interview a video showcased both different interactions in the levels. Afterwards subjects were directly asked to describe the interaction in the granular synthesis level. This question revealed if the subjects had noticed a difference or not, and when they did not it was hard for subjects to elaborate on their experiences. Given the purpose of the interview, it was difficult for the interviewer to re-formulate the questions, so these subjects had more to say. Instead of having one interview-guide, another interview guide could be created, with other formulations of the questions. This would have made some of the interviews easier to conduct.

### **Ecological validity**

The post-game survey shows that both levels have coherent sounddesign, thus, strengthening the study's validity and supporting the claim that the GS stem could be used instead of a more traditional stem. For example, if the looped sample in the non-granular version of the level sounded incoherent with the rest of the musical score the results would likely be more shifted towards a preference for the granular synthesis level.

## **5. Conclusion & Further Research**

This study has evaluated a vertically re-orchestrated musical score with elements of the score being played back with granular synthesis. A game level was created where parts of the musical score utilized one granular synthesis stem, the parameters of which were controlled by the player. A user experience study was conducted to evaluate the granular synthesis interaction. The results show a wide array of user responses, opinions, impression and recommendations about how the granular synthesis interaction was musically experienced.

Some results show that the granular synthesis stem is regarded as an interactive feature and have a direct relationship to the background music. Other results show that interaction went unnoticed. In most cases, the granular synthesis score was experienced as comparable to a more conventional game score and so, granular synthesis can be seen a new interactive tool for the sounddesigner. Instead of utilizing granular synthesis as a tool to create textural ambiances it can be used to play back music within a game world. The study shows that there is more to be explored regarding musical interactions within games.

Future work would include implementation granular synthesis with dramatic intentions. This study gave subjects direct controls to the different parameters of the granular synthesizer. However, if granular synthesis had a more direct role in the ongoing drama in an experiment where players do not have direct control of the granular synth, new interactive or immersive properties may be found. Other potential for future musical interactions would also include the field of virtual reality, which offers different kind of player interaction

This study shows that there is much future work within the field of interactive audio.

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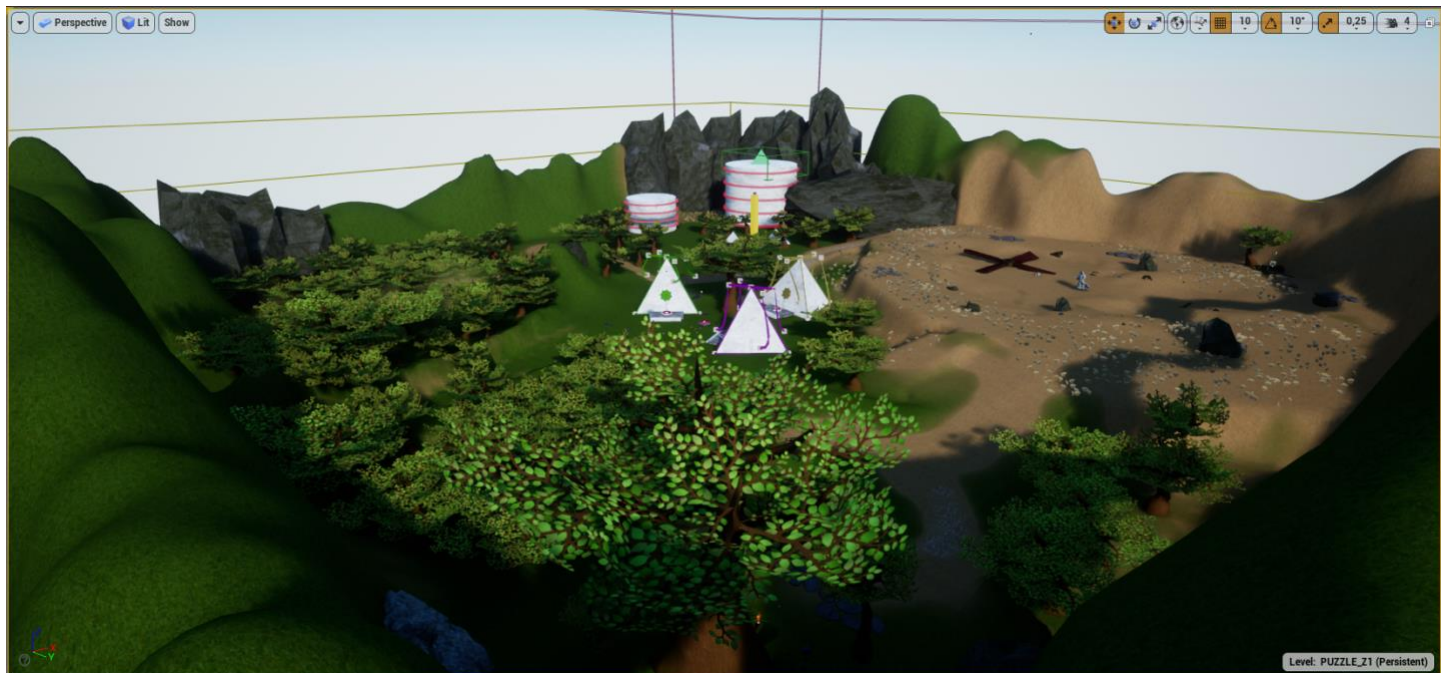
Divivor. (2020). *First Person Puzzle Template* [Unreal engine asset pack]. Available from <https://www.unrealengine.com/marketplace/en-US/product/first-person-puzzle-template>

Dragon Motion. (2020). *Particles and Wind Control System* [Unreal engine asset pack]. Available from <https://www.unrealengine.com/marketplace/en-US/product/particles-and-wind-control-system>

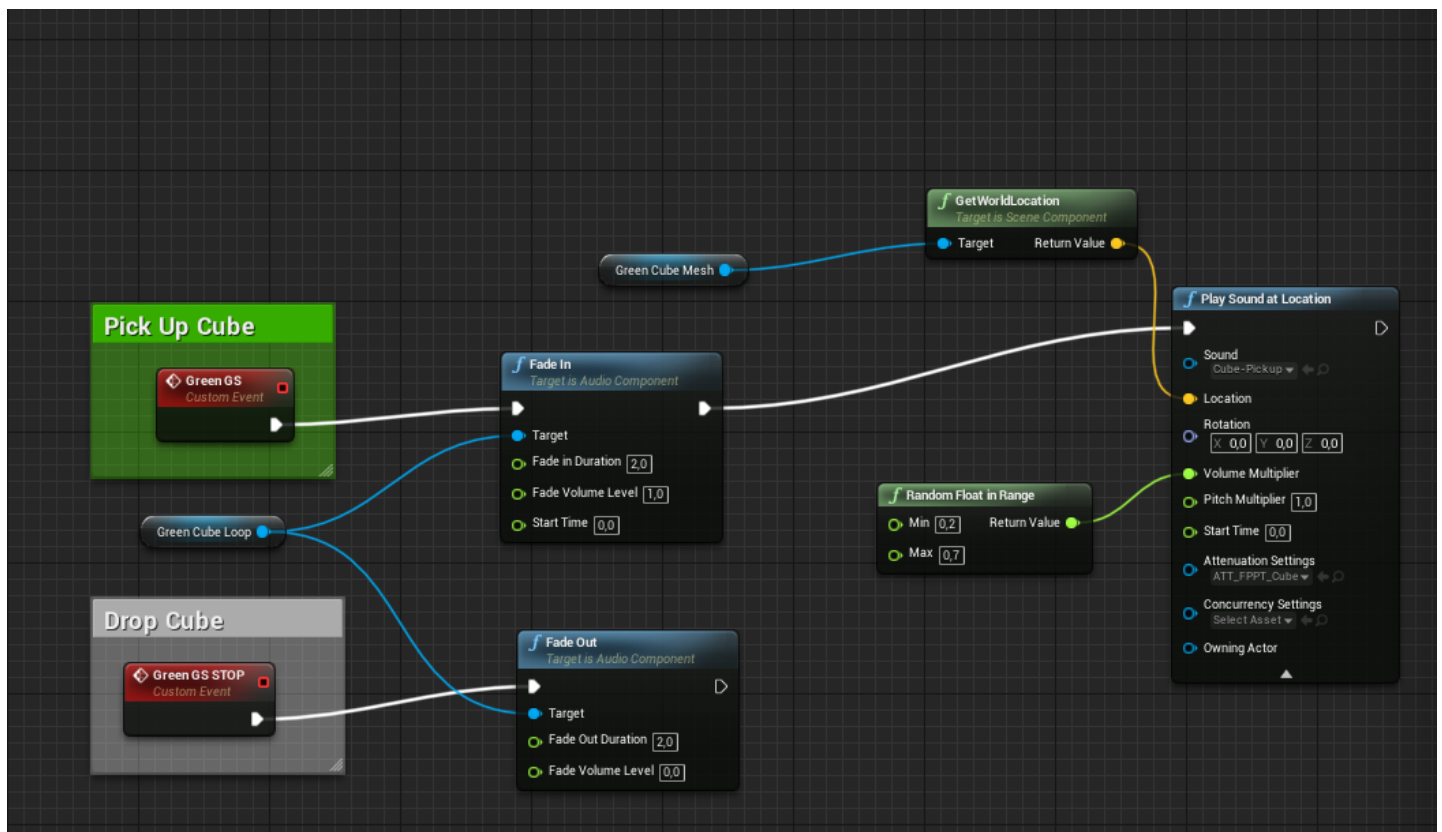
Infuse Studio. (2020). *Medieval Dungeon* [Unreal engine asset pack]. Available from <https://www.unrealengine.com/marketplace/en-US/product/a5b6a73fea5340bda9b8ac33d877c9e2>

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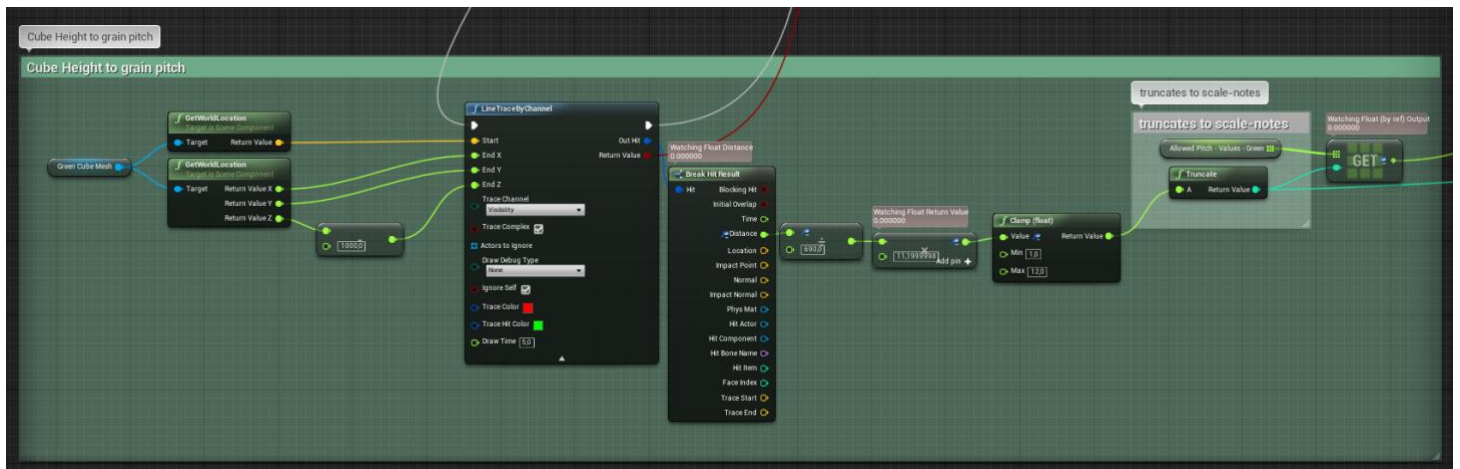
## Appendix A: Full view of the game area.



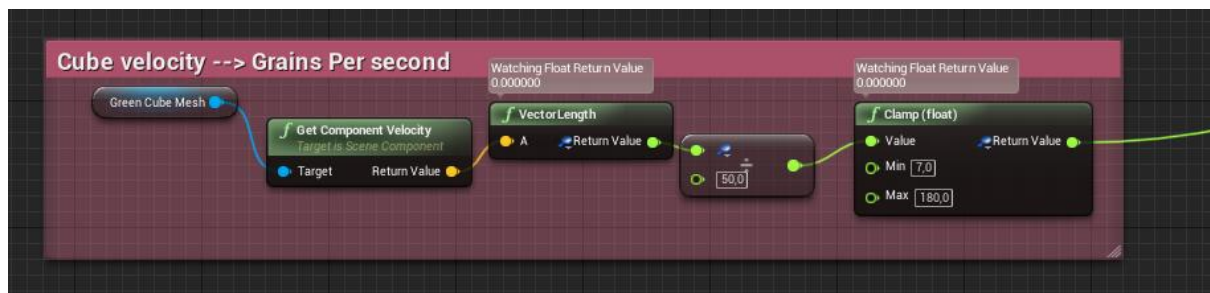
## Appendix B: Looped sample cubes blueprint.



## Appendix C = Granular pitch blueprint scheme: Ray Trace



## Appendix D: Grains per second blueprint scheme



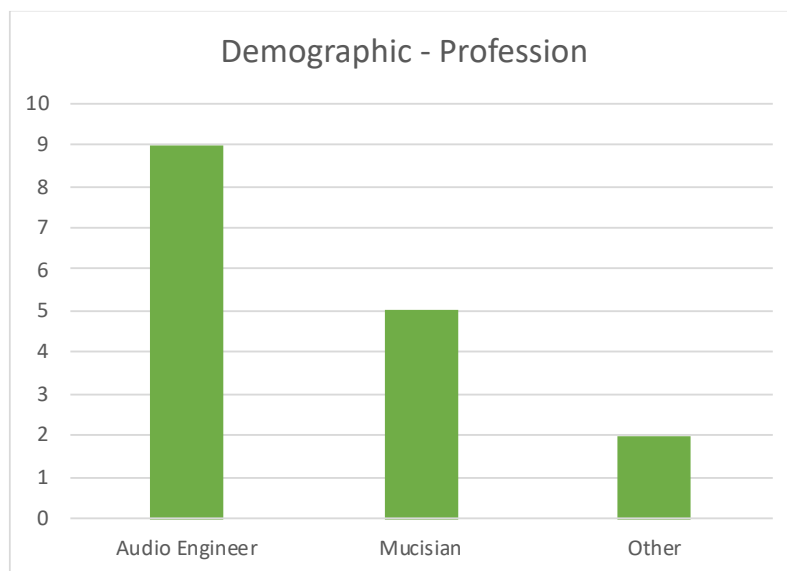


**APPENDIX E: Spawn area. To the right of the crosshair, the log with the instructions are placed**

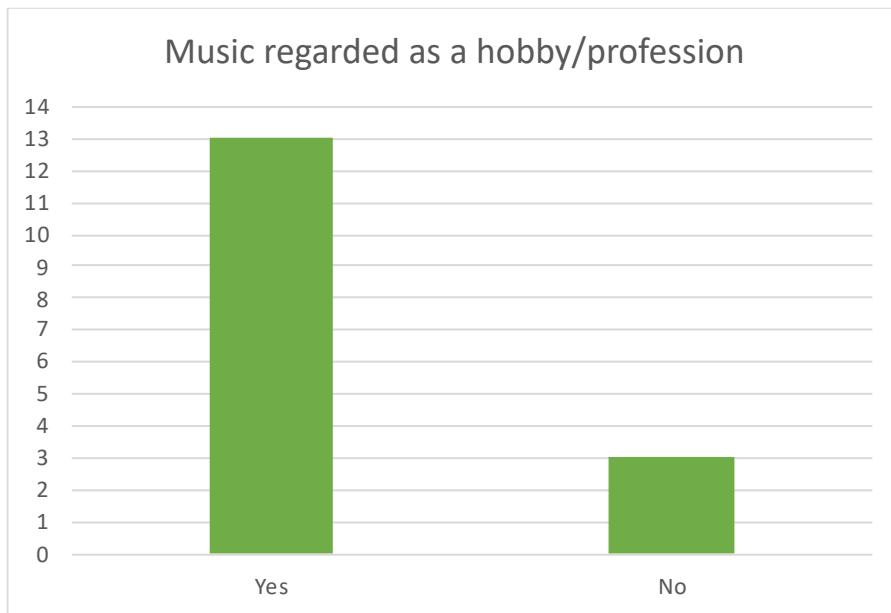


## **Appendix F: Subject demographic data/Survey Answers**

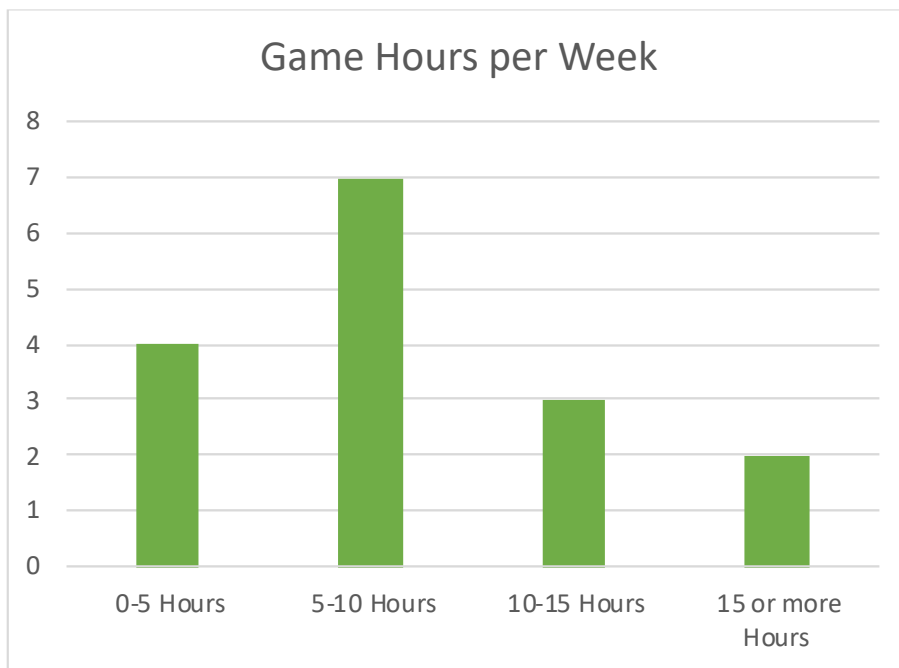
### **Subject professions**



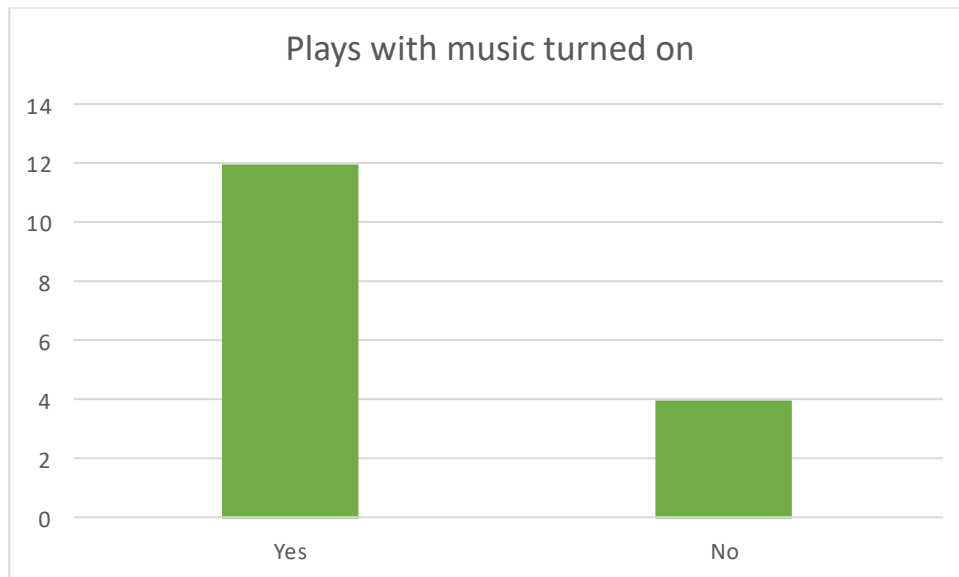
### Subjects regarding music as a hobby or profession



### Hours of games played per week



**Subject: Do you usually play with the music turned on?**



**Subject Musical activities**

Subject No:	Musical Activities
1	I play the guitar, bass, piano and drums. I'm not in a band or any thing of that sort, though I do like to play around with friends from time to time. I don't play nearly as much as I want to nowadays though.
2	I compose music as an artist but I am also interested in this kind of music aswell. Film soundtracks and gamescoring.
3	I play guitar, bass and scream in a few projects
4	Bass playing, backing vocals, playing in a band
5	Producing techno and other electronic music, studying Ljudteknik. DJ:ing.
6	Proddar till och från, inte ofta dock. Spelar gitarr, trummor och alt saxofon kanske några gånger i månaden.
7	Ensemble, learning songs, instrument practice and song writing
8	Bas, gitarr, sång
9	It mostly consists of me alone in a practice room or me together with my teacher at a singing lesson. Right now, there is a LOT of technical things I have to work on which is taking most of my focus. I have to solve the technical fundamental of classical singing to be able to express it musically. A lot of hard and focus-demanding work!
10	Jag lyssnar endast på musik g
11	I produce electronically based Music through a computer, I will sometimes rely on acoustic instruments, but I rarely play them myself.
12	Lyssnar på musik via spotify eller youtube
13	Playing instruments, hobby Music production
14	Playing drums, very occasionally Writing songs
15	playing with other students, mainly
16	I work as a sound engineer and I write and compose Music. More recently I've started composing orchestral Music and have been Writing and performing rock and metal Music, from Classic rock to prog metal for some years now

**Subject: What genre of games do you usually play?**

<b>Subject No:</b>	<b>What genre of games do you usually play?</b>
<b>1</b>	MMORPG & Moba games.
<b>2</b>	FPS, Adventure
<b>3</b>	Dark Souls
<b>4</b>	RPG
<b>5</b>	Adventure, some FPS, some strategy.
<b>6</b>	Puzzle games, mmo's, first person shooters.
<b>7</b>	FPS, Action games and RPG
<b>8</b>	RPG
<b>9</b>	Right now, I have stopped playing MMO's which I usually played a lot. Because I have very little time for games aside studying (or even other hobbies!) I now only play solo games that allow me to pick up from where I left off in the save file, like Sims 4 on the computer and Pokémon on the 3DS.
<b>10</b>	actionäventyrsspel
<b>11</b>	RPG and/or FPS
<b>12</b>	FPS, MMO, strategi.
<b>13</b>	Problem solving, adventure, fps
<b>14</b>	FPS or racing
<b>15</b>	Platform (mario maker), League of Legends
<b>16</b>	Fantasy, sci-fi, RPG, Story based. (Dark souls, Dragon age, etc)

## Subjects: Level preference and “What influenced your level preference?”

Subject: No	Preference	What influenced your level preference?
1	Level Z1	Z1 was the first level I played so it was more "interesting" to play it the first time which most likely affected my preference, but also just the music in general. In level A1 there were some very strange noises that I wasn't very fond of. The entire soundscape in A1 just kind of felt off? I don't know. It's really difficult to explain.
2	Level A1	The rhythmic aspect of the music. How it built the suspense and gave the player more satisfaction for completing tasks. It started with small changes and ended with big sounds.
3	Level A1	The building synth sounds in A1 resonated more with me
4	Level A1	It was easier to understand what I had to do since I had already done it, and the music felt more complete
5	No Preference	They seemed the same.
6	Level A1	Det var dels roligare att spela den andra leveln då en hade kommit in i det lite, jag missade att en var tvungen att skaka kuberna upp och ner bara så jag gick runt med dom och snurrade, blev lite yr. I andra leveln läste jag om instruktionerna och förstod snabbare. Gällande musiken gillade jag att den var mer upptempo i andra leveln. Det tog också kortare tid för artifactsen att vakna upp.
7	Level Z1	The sound was more interesting in Z1
8	Level Z1	Z1 kändes mer spännande och man behövde tänka på vad man gjorde
9	Level Z1	I can't remember if the text in the upper left field was there in Z1 like it was in A1, but I thought that text was a little bothersome to the gameplay. Don't know if it was a programming bug or some kind of "objective list". I also liked that the Music was not affected when I picked up the artifacts.
10	Level A1	Det lät som att musiken på något sätt smälte samman mer i A1. När jag tog kuben så upplevde jag att ljudet som kom från den smälte samman med musiken i bakgrunden mer. Medan i Z1 så kändes det lite mer "rörligt". Men på både A1 och Z1 upplevde jag en "aha"-känsla av att något höll eller håller på att hända.
11	Level Z1	The Music and sound design.
12	No Preference	Hörde inte riktigt någon skillnad mellan de båda versionerna. Skillnade i fotstegsljudet som försvann vid Z1
13	No Preference	Didn't think about any major difference
14	Level A1	A1 had (maybe) louder Music, it changed the perceived atmosphere in a good way. I felt more indulged (involverad) in the World in A1 than in Z1. I did however like the constant tone of the artefacts in Z1.
15	No Preference	both were kind of similar
16	Level Z1	That the sound changed when you picked up a artifact

Subject No:	Preference	What was different about the sound in level Z1?
1	Level Z1	Level Z1's soundscape was a lot more enveloping and really hyped me up. If I remember correctly there was this bass line that I really liked in Z1 that wasn't there in A1. As previously mentioned as well there were some not so pleasing sounds in A1. The soundscape in A1 just really felt out of place and didn't really "envelope" me into the world - the soundscape felt "unplanned". While on the other hand, as previously mentioned Z1's soundscape felt very fitting and enveloping.
2	Level A1	I experienced that instead of increasing in small steps the big sounds came earlier with lead so a sense of overwhelm.
3	Level A1	Not as subtle and it was bordering on taking over the experience.
4	Level A1	I don't think it changed much throughout the level, the music in A1 gave a fuller and more complete impression and changed as the level progressed
5	No Preference	I don't know exactly, maybe I was too much focused on the puzzle to hear the difference.
6	Level A1	Lugnare, jag tror att jag tyckte att den var mer påtaglig också, med en mer statisk ambience av synthar men är inte helt säker. Jag gillade dock hur musiken byggdes upp när en skakade artifactsen.
7	Level Z1	The music was more reactive when holding a artefact. The higher the artefact was held, the higher the pitch went up.
8	Level Z1	Min uppfattning var att kuberna inte lät lika mycket jämfört med A1
9	Level Z1	The main difference was that there was some kind of other sound coming in when I picked up the artifacts in A1, and to me it sounded like a cue for danger! Like a monster would come to chase me for picking the artifact up. Because there in fact was no monster, I preferred that there was no sound change when carrying the artifacts.
10	Level A1	Att det på något sätt var för många ljud. Det var inte i sig jobbigt att lyssna på, men det kändes rörigt. Sedan tyckte jag om att bakgrundsmusiken ändrades i bakgrunden för varje gång man la en kub på sin plats. Då kändes det som att "nu är man nära".
11	Level Z1	It felt more reactive to my gameplay. A1 also had reactive sound, but Z1 felt more cohesive. In A1, the Music that would be added when I picked up a cube was not Always the same as the track that would keep playing once I put it down in its shrine.  Had I not experienced Z1 Before, this would probably not stand out to me as much, but since I did, it felt like something was taken away.
12	No Preference	Jag vet inte riktigt. Var svårt att hitta skillnader i ljudet på båda. Men framförallt att ljudet av fotsteg försvann i Z1. Annars var det svårt att se.
13	No Preference	No footstep sound I think?
14	Level A1	I Think the Music was quieter. The artefacts gave a constant tone when carried around.
15	No Preference	the sound of the boxes was uninterrupted (I can't say much more, my attention was on completing the level's task)
16	Level Z1	the sound changed when you picked up a artifact

## Appendix G: Full transcripts of interviews.

### Subject 1: Interview

18/3/2020

Start Level: Z1

Preference: Z1

- 1 **Intervjuare:** Kan du berätta för mig om den första upplevelsen du hade när du plockade  
2 upp en av kuberna i level Z1.  
3
- 4 **Subjekt:** Jag hittade en kub men det tog lite tid för mig att veta vad jag letade efter.  
5 Men det var väldigt satisfying. Sen så, jag vet inte. Instruktionerna var "lift  
6 them up high", så jag drog ju bara upp den och skakade om fan. Men jag vet  
7 inte, det var väldigt satisfying iallafall  
8
- 9 **Intervjuare:** Vad var det som var satisfying i det här fallet?  
10
- 11 **Subjekt:** Jag vet inte... jag skulle tippa på att det var både att det visuella rent glittrade.  
12 Jag tänkte nog inte på hur det lät när jag gjorde det. Men det kändes väldigt  
13 som en fin känsla på något sätt.  
14
- 15 **Intervjuare:** Upplevde du att det var någon skillnad mellan kuberna i den nivån?  
16
- 17 **Subjekt:** Inte någonting som jag kanske... Jo ändå men jag har jättesvårt att veta om det  
18 berodde på... vart du plockade upp dem ifrån.  
19
- 20 **Intervjuare:** Kan du utveckla?  
21
- 22 **Subjekt:** Det är ju väldigt olika miljöer på så sätt. Men typ den gröna kändes väldigt  
23 väldigt mjuk, och liksom såhär. Nu blir det väldigt typ flummiga förklaringar  
24 men den kändes väldigt mjuk och vänlig medans den lila kändes mer typ  
25 motsträvande.  
26
- 27 **Intervjuare:** Kan du utveckla motsträvande i detta fall?  
28
- 29 **Subjekt:** Jo men den kändes inte lika trevlig att plocka upp på något sätt [skrattar]  
30
- 31 **Intervjuare:** Jo men vi kan nöja oss där  
32
- 33 **Subjekt:** [skrattar] jo men det är jättesvårt att förklara men såhär det var bara det jag  
34 reagerade på tror jag. Och sen den sista rosa kuben, som droppade ner. Den  
35 var najs, jag vet inte.  
36
- 37 **Intervjuare:** Den tyckte du om?  
38
- 39 **Subjekt:** Ja  
40
- 41 **Intervjuare:** Varför då?  
42
- 43 **Subjekt:** Eller, var den alltid på toppen av det gula?

44

45 **Intervjuare:** Den släpptes ner när du...

46

47 **Subjekt:** jo precis och så när jag såg den trillade den... för att jag kollade runt så föll

48 den ner och jag bara "what". Jag vet inte... det kändes väldigt "completing"

49 att plocka upp den.

50

51 **Intervjuare:** Var det lätt för dig att lista ut hur kuberna reagerade plockade upp dem, om vi

52 bortser från dem uppenbara instruktionerna?

53

54 **Subjekt:** Nej det tycker jag inte. Jag tycker inte det fanns någon tydlig lixom. Jag

55 uppfattade det nog inte som att kuberna hade någon relation till mig. [skrattar]

56

57 **Intervjuare:** Okej. Kan du beskriva relationen mellan kubernas ljud och

58 bakgrundsmusiken?

59

60 **Subjekt:** Relationen mellan kuberna och bakgrundsmusiken... Det är nästan så att man

61 skulle vilja känna efter igen. Med relation menar du hur dem passar

62 tillsammans eller menar du hur de passar in i hela "soundscapet"?

63

64 **Intervjuare:** Det får du definiera.

65

66 **Subjekt:** Överlag tyckte jag det kändes som att det passade... passade väl in, det var ett

67 väldigt mjukt landskap och relativt mjuka ljud. Jag vet inte...mjuka på något

68 sätt. Det här pulserande som du visade, jag hörde inte det och jag vet inte om

69 det var i Z1 alls.

70

71 **Intervjuare:** Nej, i Z1 förändras kubernas beroende på hur högt du håller dem.

72

73 **Subjekt:** Ja men precis. Det var väldigt "pleasing" på så sätt. Men jag tror också... jag

74 kastade runt kuberna väldigt mycket [skrattar], det var min grej. Men det

75 kändes "nice" på något sätt och dem passade in väldigt mjukt och fint, i

76 landskapet. Då i kontrast till A1, som jag även skrev innan, kändes saker

77 väldigt "out of place". Det kändes väldigt typ opassande på något sätt. Utan att

78 ha reflekterat speciellt mycket om kuberna tror jag att det är en stor del av att

79 det kändes snett.

80

81 **Intervjuare:** Så det kändes snett i A1 jämfört med Z1?

82

83 **Subjekt:** Ja, jag hade jättekul i Z1 och det kändes väldigt bekvämt.

84

85 **Intervjuare:** Finns det någon relation mellan musiken och kuberna i Z1?

86

87 **Subjekt:** Jag skulle tippa på det?

88

89 **Intervjuare:** Tycker du det?

90

91 **Subjekt:** Ja, det skulle jag väl ändå säga att det gör. Men det kanske inte någonting som

92 jag... lyssnade jättemycket efter. Det är det som är det svåra. Jag var väldigt

93 inne i soundscapet och lixom bara köra. Men som sagt... Dem kändes najs att



94 plocka upp och hela soundscapet kändes najs. Så det finns en reaktion där...  
 95 Allting matchade och kändes korrekt.  
 96

97 **Intervjuare:** Du har väl redan svarat på detta men tycker du att kubernas ljud passar in  
 98 med bakgrundsmusiken?  
 99

100 **Subjekt:** Ja.  
 101

102 **Intervjuare:** Kändes det på något sätt som att du kontrollerade musiken?  
 103

104 **Subjekt:** Ja, till viss del. Men jag vet inte om det var för att jag lyssnade på andra  
 105 grejer. Därför att när jag gick upp på sandplotten så kändes det som att jag  
 106 fick en annan upplevelse om hur ljudet lät. Och när jag ner i det mörka  
 107 skogen, det var lite eld och skit så kändes det som att det blev lite mer dark på  
 108 något sätt. Men det kan också varit en visuell sak...  
 109

110 **Intervjuare:** Upplevde kubernas ljud är en del av musiken när du höll dem?  
 111

112 **Subjekt:** Jag upplever att de är en del av det ljudlandskap... Det känns som att det är  
 113 "tracks" som ligger på som är som musik. Men det är också ett ljudlandskap.  
 114 Kuberna är absolut en del av det ljudlandskapet men kanske inte en del av  
 115 musiken.  
 116

117 **Intervjuare:** När du kastade runt kuberna... gjorde du någonting för att få det att passa in  
 118 med musiken?  
 119

120 **Subjekt:** Nej det var nog bara "gameplay" för mig.  
 121

122 **Intervjuare:** Det var nog bara "kasta runt" liksom?  
 123

124 **Subjekt:** Ja precis.  
 125

126 **Intervjuare:** Men påminner detta... Kasta-runtandet eller spelet egentligen om någon typ  
 127 av musikalisk erfarenhet som du har haft?  
 128

129 **Subjekt:** I musikalisk... menar du då som jag har spelat själv  
 130

131 **Intervjuare:** Någonting som du har upplevt.  
 132

133 **Subjekt:** Jag fick jättemycket vibbar från musik från ett spel som jag spelade när jag var  
 134 jätteliten.  
 135

136 **Intervjuare:** Vilket då?  
 137

138 **Subjekt:** Det är det som jag inte kommer ihåg och jag stör mig jättemycket på det. Men  
 139 är ett spel som jag spelade på gamla Xbox, innan det blev xbox360.  
 140 Fortfarande trådkontroll... Men jag kommer inte ihåg vad det är för  
 141 någonting...  
 142

143 **Intervjuare:** Kan du beskriva musiken eller ljudlandskapet?

144  
145 **Subjekt:** Jo men det var väldigt mjukt och trevligt, verkligen ”kids-game”. Jag kanske  
146 var 8 år gammal. Överlag påminner det mig om det här på grund av det gröna  
147 landskapet. Med en mjuk soundscape tune över det...  
148  
149 **Intervjuare:** Om vi går tillbaka till kuberna... upplevde du att det kändes som ett  
150 instrument?  
151  
152 **Subjekt:** Nej det tror jag inte.  
153  
154 **Intervjuare:** På vilket sätt kändes det inte som ett instrument?  
155  
156 **Subjekt:** Det kanske hade gjort det ifall jag själv hade varit försiktigare med att  
157 verkligen utforskat vad det gjorde när jag höjde och sänkte. Men det gjorde  
158 ju inte. Jag drog ju bara upp och skakade. Och då kommer det ett ljud som  
159 någon ”succes” grej... mer än vad det kanske känns som ett instrument. Jag  
160 tänkte aldrig på det som ett instrument, därför kändes det inte som ett  
161 intrsument.  
162  
163 **Intervjuare:** Om du skulle betygsätta kubernas ljud från 1 till 10 där 1 är simpel och 10 är  
164 komplex...  
165  
166 **Subjekt:** Vad räknas som simpelt, men jag skulle nog sätta en 7a.  
167  
168 **Intervjuare:** Varför då?  
169  
170 **Subjekt:** I förhållande till allt annat som händer i bakgrundsmusiken så är det  
171 fortfarande någonting som sticker ut, vilket är ett simpelt ljud. Men den har en  
172 komplexitet i form av att den form av att det sticker ut. Det känns som det  
173 har... en tanke bakom sig, vilket kanske gör det komplext.  
174  
175 **Intervjuare:** Kan kubernas göras mer intressanta rent musikaliskt?  
176  
177 **Subjekt:** Säkert... Jag hade nog inte brytt mig. Det hade kunnat göras vad som helst  
178 tänker jag. Man hade ju kunnat göra det som en stråke...ett stråkinstrument  
179 och så kan man spela runt och kolla överallt och så blir det olika ljud. Men jag  
180 tycker inte att det tillför någonting till hela världen, det kändes som att det var  
181 väldigt ”fitting”  
182  
183 **Intervjuare:** Påminner någon av dessa nivåer om något kommersiellt spel som du tidigare  
184 spelat? Eller om du kan jämföra det mot något?  
185  
186 **Subjekt:** Jag får ju lite Minecraft vibbar.  
187  
188 **Intervjuare:** Varför då?  
189  
190 **Subjekt:** Men man går ju runt i en värld, i first person och så har man det lilla kryset i  
191 mitten. Man är inte så mycket mer än en dude i en värld. Det är lite såhär halv  
192 goofy grafik, alltså inte superrealistiskt men det är jättetrevligt.  
193

194 **Intervjuare:** Brukar du spela med musiken av eller på?  
195  
196 **Subjekt:** Jag brukar spela med musiken av för det mesta men på grund utav att jag  
197 spelar spel som world of warcraft och league (league of legends), där man  
198 bara lyssnar på polare som pratar istället.  
199  
200 **Intervjuare:** Finns det någonting som skulle få dig att starta musiken igen?  
201  
202 **Subjekt:** Har du spelat world of warcraft någon gång?  
203  
204 **Intervjuare:** Ja  
205  
206 **Subjekt:** Då vet du att i Northrend så finns det en liten del som heter Grizzly Hills. Och  
207 Grizzly Hills är helt magiskt så där slår jag igång musiken. För att det är så  
208 jävla skönt. Där och skog och lugnt, och lite folkmusik typ... Det känns  
209 verkligen som att jag kommer in i det vardagliga typ Farmville aktiga. Jag vet  
210 inte. Jag tror det är sånt jag gillar. Jag gillar inte när det ska vara typ hektiskt  
211 och hypat av tunga timpani och skit. Utan bara chilla.  
212  
213 **Intervjuare:** Jag tror vi bryter där... Tack så mycket!  
214  
215 **Subjekt:** Ja!

## Subject 2: Interview

18/3/2020

Start Level: Z1

Preference: A1

1 **Intervjuare:** Kan du berätta för mig om den första upplevelsen du hade när du plockade  
2 upp en av kuberna i level Z1?  
3

4 **Subjekt:** Ja tyckte det var ganska... Asså den andra?  
5

6 **Intervjuare:** Du hade level Z1 först.  
7

8 **Subjekt:** För det jag tänkte när jag plockade upp kuberna var att det var ganska  
9 satisfying... ett tillfredsställande ljud. Det kändes typ som att man var på väg  
10 framåt. Alltså när man plockade upp kuberna man, okej det är rätt, det här ska  
11 jag fortsätta med.  
12

13 **Intervjuare:** Vad var det som gjorde att det kändes "satisfying"?  
14

15 **Subjekt:** Det var ju det här ljudet... Det var ett ganska mjukt ljud, det här plinget. Det  
16 var inte så skarpt.  
17

18 **Intervjuare:** Om vi tänker oss det konstanta ljudet som de gör.  
19

20 **Subjekt:** Exakt.  
21

22 **Intervjuare:** Okej, upplever du att det var någon skillnad mellan kuberna i Z1?  
23

24 **Subjekt:** Ja, fast det jag upplevde var att musiken runt om stegrade när man tog upp fler  
25 kuber.  
26

27 **Intervjuare:** När du placerat ner dem?  
28

29 **Subjekt:** Exakt. Ja det var väl det jag tänkte på.  
30

31 **Intervjuare:** Om vi tänker på ljudet som de gör, tänkte du på någon konkret skillnad där?  
32

33 **Subjekt:** Nej, jag tror inte jag tänkte på det för att jag var så fokuserad på skillnaderna  
34 jag märkte av... Så det upplevde jag inte.  
35

36 **Intervjuare:** Okej... men upptäckte du i level Z1 att pitchen förändrades...  
37

38 **Subjekt:** Ja  
39

40 **Intervjuare:** Hur listade du ut det? Var det enkelt?  
41

42 **Subjekt:** Nej, men det var ju det här med att man skulle skaka dem. Först gick jag dit  
43 med en kub men då hände ingenting. Och då kom jag på att jag skulle skaka  
44 den. Och då kom ju det här ljudet. Men ja... det var ju inte svårt att komma  
45 fram till med det tog lite tid [skrattar]

46  
47 **Intervjuare:** Det var alltså inte uppenbart från början att de lät olika lixom och förändrades.  
48  
49 **Subjekt:** Exakt, men det kom jag fram till sen man gjordes som spelet sa åt en.  
50  
51 **Intervjuare:** Kan du beskriva kubernas ljud, när du håller dem, i relation med  
52 bakgrundsmusiken?  
53  
54 **Subjekt:** De jag upplevde var att... jag vet inte hur ljudtekniskt det blir, det blir väl mer  
55 konstnärligt.  
56  
57 **Intervjuare:** Det är det jag är ute efter.  
58  
59 **Subjekt:** Jaha, okej! Ja det jag upplevde var att, eller. Jag tänkte på en kub speciellt när  
60 den la till en melodi lixom. Att den spelade en pentatonisk skala. Det jag  
61 upplevde i bakgrundsmusiken var att lydiskt, så det var ganska svävande.  
62 Pentaskalan förstärkte det på något sätt.  
63  
64 **Intervjuare:** Tycker du det tillför mycket på spelet?  
65  
66 **Subjekt:** Ja det tycker jag för att... det känns ju som... just varför jag också i enkäten  
67 tog den ena som favorit var att jag tyckte det stegrade ganska behagligt i det  
68 här... in the sense, nu tappade jag det svenska ordet.  
69  
70 **Intervjuare:** Ta det på engelska ifall det känns bättre  
71  
72 **Subjekt:** I hur nivån gick framåt. Det började ganska lugnt och så kom det in lixom ett  
73 rytmiskt element efter den första kuban.  
74  
75 **Intervjuare:** Vilken kub var det du la ner då om du minns.  
76  
77 **Subjekt:** När man gick till vänster ut till stugan...  
78  
79 **Intervjuare:** Den lila?  
80  
81 **Subjekt:** Exakt. Och då kom det något sånt här [imiterar en shaker]. Och det stegrade  
82 ganska jämt lixom. Och jag tycker att det lydiska modet är så himla bra i spel  
83 och filmer när man vill ha lite svävande lugn feeling, fast det är inte hemma  
84 ändå, det är ändå äventyr. Och det bidrog den här penta skalan också.  
85  
86 **Intervjuare:** Med den gula kuban?  
87  
88 **Subjekt:** Exakt.  
89  
90 **Intervjuare:** Anser du att det ljudet, som den gula kuban till exempel, och de andra...  
91 Skulle du anse de som en del av musiken?  
92  
93 **Subjekt:** Ja.  
94  
95 **Intervjuare:** Kan du utveckla?

96  
97 **Subjekt:** För alla bidrog med sitt element. Var det den gröna kuben som hade någon  
98 bas?  
99  
100 **Intervjuare:** Den lät som... [visar film för hur den gröna kuben lät].  
101  
102 **Subjekt:** Ja, det var den.  
103  
104 **Intervjuare:** Anser du att de är en del av musiken eller att de bidrog till musiken?  
105  
106 **Subjekt:** Jo men det tycker jag. Det blir lite kul när man spelar ett spel för det man inte  
107 tänker på att det är ju musik. Och då får man ju typ... Det här låter ju jätligt  
108 flummigt men typ... som i det här när man håller kuberna och dem gör ljud  
109 när man rör dem blir det ju som att man jammar med spelet.  
110  
111 **Intervjuare:** Kan du utveckla?  
112  
113 **Subjekt:** Jo men det blir ju liksom. Musiken går ju i bakgrunden och baserat på hur man  
114 rör dem här kuberna så upplevde jag att på ett sätt får man ju skapa med  
115 spelet. Olika ljud och bilder och sånt.  
116  
117 **Intervjuare:** Var det enkelt för dig att hitta de noterna som passade med den musikaliska  
118 kontexten?  
119  
120 **Subjekt:** Nej, upplevde inte att det var svårt, snarare att det var lite oväntat typ. På ett  
121 positivt sätt.  
122  
123 **Intervjuare:** Hittade du melodier när du höll på med detta? Om vi utgår från att du jammar  
124 med spelet.  
125  
126 **Subjekt:** Inte som jag tänkte på. Den här jam delen är väl lite såhär... Hade jag spelat  
127 det igen hade jag nog utforskat det mer. Men kan se det framför mig att när  
128 man går runt där så kan man utnyttja det och jamma mer.  
129  
130 **Intervjuare:** På vilket sätt kändes det som ett instrument, och på vilket sätt kändes det inte  
131 som ett instrument?  
132  
133 **Subjekt:** Det konkreta, så kändes det som ett instrument för att det lät väldigt mycket  
134 som en synt. Men just i spelet så blir det ju svårt att se det så eftersom man  
135 håller i en kub så... Om man tänker lite nördigt när man spelar då kan man  
136 nog tänka sig att detta är en häftig synt. Men sen tror jag att... Det blir lite  
137 abstrakt och svårt att se det när man spelar just för att det är en kub man håller  
138 i.  
139  
140 **Intervjuare:** Tycker du att responstiden var skön? Om vi tar stegen mellan de olika  
141 tonerna? Upplevde du att det funkade bra eller var det ansträngande att göra  
142 ljuden?  
143  
144 **Subjekt:** När jag upptäckte hur dem gjorde ljuden var det inte det. Men att komma fram  
145 till det var lite ansträngande. Det kanske var just omständigheten också men

146 min första kub den lixom aktiverades när jag var på väg tillbaks. Utan att jag  
147 lixom behövde att, det blev mer när jag kollade runt. Sen när jag tog den andra  
148 då blev det ansträngande ”just det hur aktiverade jag kubén” men det stod ju  
149 att man skulle skaka dem för att väcka dem. Så då tog det väl en liten stund att  
150 komma på hur jag skulle skaka den.

151  
152 **Intervjuare:** Du sa innan att det kändes som att jamma?

153  
154 **Subjekt:** Ja

155  
156 **Intervjuare:** Om du skulle sätta det i kontext till någonting, hur skulle du göra då... Eller  
157 kan jämföra det med något liknande... Eller låt oss säga såhär, jag har en  
158 annan fråga här. Påminner det här om någon annan musikalisk erfarenhet som  
159 du har?

160  
161 **Subjekt:** Men lite... om man skulle utforska det mer... Jag är ju gitarrist, det blir ju lite  
162 som när jag slänger på ett backing-track hemma och spelar till. Om jag skulle  
163 få mer utrymme att utforska och lära mig hur allting låter ihop blir det ju som  
164 ett backing-track för att det blir en del av det som jag inte styr. Och så blir det  
165 som ett element när man håller i det, som man jamar med. Det är ju ett Solo-  
166 jam på ett sätt.

167  
168 **Intervjuare:** Hur skulle man kunna göra det mer intressant rent musikaliskt från det  
169 perspektivet?

170  
171 **Subjekt:** Det jag upplevde var att musiken var ganska stark och de andra ljuden till  
172 exempel, när man sprang eller hoppade. Jag tror att de också skulle kunna bli  
173 ett element om man gjorde så att det var mer balanserat. För då... det kanske  
174 är jag som är nördigt, men om det är något sånt här i spel kan jag ofta göra så  
175 att jag hoppar så att det passar in rent rytmiskt med det andra... Typ sådana  
176 saker?

177  
178 **Intervjuare:** Kan du jämföra någon av nivåerna, den med statiskt ljud och den med  
179 förändrande ljud mot något annat kommersiellt spel som du tidigare stött på  
180 eller spelat?

181  
182 **Subjekt:** Alltså inte nu på rak arm. Dem ända jag kommer på just nu är ju spel som det  
183 ofta brukar vara något... Alltså bakgrundsmusik ofta inte den här benämningen  
184 utan mer låtar i bakgrunden. Typ ett spel jag spelar väldigt mycket förut  
185 väldigt längesedan är Flyff om du känner till det?

186  
187 **Intervjuare:** Ja det känner jag till [skrattar].

188  
189 **Subjekt:** Och då är det ju lixom musik som går i bakgrunden till skillnad från ljudet  
190 som spelas?

191  
192 **Intervjuare:** Brukar du spela med musiken av eller på?

193  
194 **Subjekt:** Ja, Alltid på. Lika som i filmer så är det ju en stor del av det. Till exempel  
195 skräckfilmer... om man hade lyssnat med ljudet av blir ju inte läskiga alls. Så

196                    tycker jag det är med spel också. Man får ju en känsla av det, till exempel det  
197                    lydiska modet som går... Det blir ju väldigt svävande och... Snällt men ändå  
198                    inte helt hemma typ. Sånt bidrar ju det med.  
199

200 **Intervjuare:** Är det något mer du vill tillägga eller som du känner att du inte fått uttrycka?  
201

202 **Subjekt:**        Nej men väldigt fina ljud.....  
203

204 **Intervjuare:**    Tack skaru ha!



### Subject 3: Interview

18/3/2020

Start Level: A1

Preference: A1

1 **Intervjuare:** Kan du berätta för mig hur det var att plocka upp den första kuben i nivå Z1?

2  
3 **Subjekt:** Ehm... Det var annorlunda från A1.

4  
5 **Intervjuare:** På vilket sätt?

6  
7 **Subjekt:** Jag vet inte... Jag tyckte att det var... Tyckte inte det var inte lika subtilt typ.

8  
9 **Intervjuare:** På vilket sätt var det inte lika subtilt?

10  
11 **Subjekt:** Ehm... Ljuden var lite mer påträngande, än vad det var i A1, upplevde jag i  
12 alla fall.

13  
14 **Intervjuare:** Vad gjorde att dem upplevdes som påträngande?

15  
16 **Subjekt:** Ehm...Det var lite väl mycket som hände typ.

17  
18 **Intervjuare:** På vilket sätt hände det mycket saker?

19  
20 **Subjekt:** Ehm... Jag kommer ju typ inte ihåg någonting från den första nu men jag har  
21 ju skrivit att jag föredrar den. Men det var typ... Mitt fokus låg på efter man  
22 hade lagt kuberna på plats, så läggs det ju på lite. Det var det jag utgick ifrån,  
23 att det var, ehm... Att dem tilläggen och uppbyggnaden i A1 var mer subtila  
24 funkade bättre för mig.

25  
26 **Intervjuare:** Okej. Upplever du att det fanns någon skillnad mellan kuberna i Z1? Jag  
27 kommer bara prata om level Z1 i det här. Men upplever du att det fanns någon  
28 skillnad mellan dem?

29  
30 **Subjekt:** I Z1, jo, dem gjorde ju lite olika ljud

31  
32 **Intervjuare:** Kan du beskriva?

33  
34 **Subjekt:** Nej [skrattar]

35  
36 **Intervjuare:** Okej ehm.. Eller kändes dem olika?

37  
38 **Subjekt:** Ja, det blev liksom... Om dem hade varit likadana hade jag ju märkt det tycker  
39 jag i alla fall. Jag kan inte riktigt sätta en punkt i det var skillnaderna var, men  
40 dem var annorlunda.

41  
42 **Intervjuare:** Listade du ut att pitchen förändrades?

43  
44 **Subjekt:** Nej.

46 **Intervjuare:** Men tycker du att dem hade någon relation till bakgrundsmusiken?  
47  
48 **Subjekt:** Jo... Det var ju intervaller.  
49  
50 **Intervjuare:** Kan du utveckla?  
51  
52 **Subjekt:** Det passade till bakgrundsmusiken, det blev som en uppbyggnad. Ett pålägg.  
53  
54 **Intervjuare:** Då du höll i kuben?  
55  
56 **Subjekt:** Ja.  
57  
58 **Intervjuare:** Hur ser du... Skulle du betrakta kubens ljud som en del av musiken?  
59  
60 **Subjekt:** Ja  
61  
62 **Intervjuare:** På vilket sätt tycker du det passar in?  
63  
64 **Subjekt:** Det är ju uppfriskande med ehm... sån ljuddesign i spel där... Det... läggs till  
65 och inte bara är någon tråkig fightingmusik och så hör man lite swish och  
66 swoosh lite då och då.  
67  
68 **Intervjuare:** Menar du då du lagt kuberna vid pyramiderna då eller när du håller i kuberna?  
69  
70 **Subjekt:** Både och.  
71  
72 **Intervjuare:** Hur skulle du beskriva dess relation i förhållande till musiken... Kubens  
73 ljud... Vad har den för plats liksom?  
74  
75 **Subjekt:** Den är ju lite där för att... signalera för spelaren att man gör någonting rätt,  
76 tycker jag. Man plockar upp den kuban ock sen så... Jag tänker lite, det var  
77 säkert inte så i spelen men att man plockar upp som i "shadow of the colossus"  
78 när man ska leta efter monster så håller man ju upp svärdet. Det är ju inte  
79 baserat på ljud utan det är ju baserat på vad man ser. Men det kändes lite så  
80 även om det inte var riktat.  
81  
82 **Intervjuare:** Kan du fortsätta... eller kan du... Jag vill spinna vidare på "Shadow of the  
83 colossus" för det är en intressant referens tror jag. Märkte du någon mer likhet  
84 mellan det spelet och någon av dessa nivåer?  
85  
86 **Subjekt:** Ehm... inte rakt på sådär. Utan det var väl lite såhär. En indikator, vare sig  
87 det är en visuell indikator eller en ljudindikator att man är påväg åt rätt håll, att  
88 man gör något rätt.  
89  
90 **Intervjuare:** Okej! Om vi går tillbaka till kubernas ljud. Kändes det på något som sätt som  
91 att du kontrollerade musiken...Nu kanske du missade att...  
92  
93 **Subjekt:** Ja jag missade ju det helt och hållet. Jag läste ju instruktionerna och så stod  
94 det shake så jag gick runt och [skakar på datormusen snabbt] Skakade musen,

95 men. Det blev ju lite knasigt men, men ja ändå. Att för att... Jag höll på och  
 96 latchade lite och slängde kuben upp i luften och då slutade det ju att...  
 97

98 **Intervjuare:** Att låta?

99

100 **Subjekt:** Precis då slutade det att låta.  
 101

102 **Intervjuare:** Okej... Ehm. Det blir svårt att ställa frågor. Ehm... Men om vi... Skulle det  
 103 här på något sätt kunna påminna dig om någon annan musikalisk erfarenhet  
 104 som du har haft.  
 105

106 **Subjekt:** Jo men visst. När jag tänker på uppbyggnad och sånt ehm tillägg av  
 107 instrument och så tänker jag ju ofta på "Swans" ehm... eller typ "Anna Von  
 108 Hausswolff". Att det är lixom... Det är bara uppbyggnad men inte som i pop  
 109 musik som att det är uppbyggnad och kollaps, utan bara uppbyggnad hela  
 110 tiden, tills ett stort kollaps mot slutet. Men ah... Det är ju stencoolt tycker jag.  
 111

112 **Intervjuare:** Nu vet att det förändras i pitch.  
 113

114 **Subjekt:** Ja  
 115

116 **Intervjuare:** Men om du skulle betygsätta den typen av funktion eller typen av interaktion  
 117 från simpel till komplex. Skulle du då säga då att det är... vart passar det in  
 118 lixom... om det är en logisk fråga.  
 119

120 **Subjekt:** Om det hade varit lite mer... Ett lite mer utav ett syfte med pitchändringen  
 121 lixom. Jag förstår att man inte riktigt kan göra det för att du hade en referens  
 122 och en som faktiskt gjorde ljudet... Pitch ändringen. Så om pitch ändringen  
 123 hade varit del av något slaggs pussel så hade det ju varit... lixom... i spelets  
 124 funktion simpelt, men tekniskt komplext.  
 125

126 **Intervjuare:** Jag tror jag förstår vad du menar... Brukar du spela med musiken av eller på?  
 127

128 **Subjekt:** På. Om det inte är så att jag spelar någonting med skräpmusik eller något sånt.  
 129 Men ja aboslut.  
 130

131 **Intervjuare:** Jag tror jag har slut på frågor med tack!

#### Subject 4: Interview

18/3/2020

Start Level: Z1

Preference: A1

1 **Intervjuare:** Kan du förklara för mig hur det kändes när du plockade upp vilken av kuberna  
2 som helst i level Z1 för första gången.

3  
4 **Subjekt:** Ehm... Ja dem kändes väl. Jag förstår att dem skulle paras ihop med dem här  
5 pyramiderna typ. Det var svårt att få dem att vakna typ. Så det var lite typ "hur  
6 sa jag göra det här"...

7  
8 **Intervjuare:** Hur listade du ut det?

9  
10 **Subjekt:** Jag tror inte jag listade ut det alls. Var det mot solen man skulle peka dem?

11  
12 **Intervjuare:** Ja, egentligen bara hålla dem långt upp.

13  
14 **Subjekt:** Okej så det var bara så. Najs. Nämen det kändes väl, jag la inte som sagt inte  
15 märke till att det var kuberna som förändrade musiken men det kändes att det  
16 var skillnad mellan de två nivåerna i alla fall.

17  
18 **Intervjuare:** Men när du höll kuberna, då kom det ett visst ljud. Upplevde du någon  
19 skillnad mellan kuberna då?

20  
21 **Subjekt:** Nej, det tror jag inte jag reflekterade över.

22  
23 **Intervjuare:** Föredrog någon över någon annan... Det kanske är...

24  
25 **Subjekt:** Någon av kuberna?

26  
27 **Intervjuare:** Ja

28  
29 **Subjekt:** Nej det tror jag inte håller riktigt... Kanske den... Jag kanske föredrog den  
30 lila... Ja det skulle jag nog tro.

31  
32 **Intervjuare:** Varför då?

33  
34 **Subjekt:** Vet inte jag tror det var... Fast det var iför sig på nivå A1. Men det var då jag  
35 la märke till att... alltså musiken hade förändrats litegrann. Så det kanske  
36 därför, det var nytt liksom.

37  
38 **Intervjuare:** Okej, men gillade du lilas ljud bättre än dem andra kuberna.

39  
40 **Subjekt:** Ja jag tror det.

41  
42 **Intervjuare:** Gäller det för Z1 också då eller var det bara i A1?

43  
44 **Subjekt:** Jag reflekterade inte så mycket över kubernas olika ljud i Z1. Så jag vet inte  
45 om jag kan uttala mig om det.

46  
47 **Intervjuare:** Okej. Upplevde du att det fanns någon relation mellan kubernas ljud och  
48 bakgrundsmusiken?  
49  
50 **Subjekt:** Hmm... Inte jättemycket, kanske att bakgrundsmusiken  
51  
52 **Intervjuare:** Eller ah kubernas ljud då, menar jag då.  
53  
54 **Subjekt:** Ja kubernas ljud.  
55  
56 **Intervjuare:** Ja  
57  
58 **Subjekt:** Nej... jag reflekterade inte över det.  
59  
60 **Intervjuare:** Upplever du att det passar in med bakgrundsmusiken?  
61  
62 **Subjekt:** Jo bakgrundsmusiken passade in, absolut.  
63  
64 **Intervjuare:** På vilket sätt... Eller jag menade kubernas ljud och bakgrundsmusiken.  
65  
66 **Subjekt:** Det kändes som att bakgrundsmusiken var lixom så, det var ganska neutral på  
67 något sätt. Så att när man la på kubernas ljud så, blev det mer av en helhet. Det  
68 blev lixom fylligare på något sätt.  
69  
70 **Intervjuare:** Menar du efter att man har lagt ner kuberna på pyramiderna?  
71  
72 **Subjekt:** Ja, eller när man håller i dem.  
73  
74 **Intervjuare:** När du håller i dem också i level Z1?  
75  
76 **Subjekt:** Ja, jag tror det.  
77  
78 **Intervjuare:** Kan du beskriva hur det var att hålla kuberna i Z1. Bara ha dem...  
79  
80 **Subjekt:** Det var... Det kändes som att man var... som att jag hade ett mission. Eller  
81 såhär ehm... Jag vet inte hur jag ska förklara det.  
82  
83 **Intervjuare:** Det går jättebra att använda kreativa uttryck, och musikaliska uttryck också.  
84  
85 **Subjekt:** [skrattar] ja. Det kändes typ "fullfilling" såhär i spelets kontext.  
86  
87 **Intervjuare:** Okej, kan du utveckla?  
88  
89 **Subjekt:** ehm... Men lite såhär, det här är mitt mål. Nu håller jag i målet och nu har jag  
90 lixom. Satt det på sin plats.  
91  
92 **Intervjuare:** Okej. Kändes det under någon stund, under spelets gång i Z, som att du  
93 kontrollerade musiken.  
94

95 **Subjekt:** Jag tror inte det. Möjligtvis att jag upplevde att det lixom... Att i slutet när  
96 lixom man skulle upp på den där rampen, eller vad man ska säga. Att det  
97 kändes mer "complete" då typ.  
98

99 **Intervjuare:** Kände du att hade någon typ av kontroll över musiken när du höll i någon av  
100 kuberna?  
101

102 **Subjekt:** Nej, jag reflekterade inte över att det var just kuberna som förändrade  
103 musiken... Men jag märkte att musiken förändrades. Visste bara inte vad det  
104 var som gjorde det lixom.  
105

106 **Intervjuare:** Okej. Påminde det här spel, eller denna nivå om någon annan musikalisk  
107 erfarenhet som du har haft?  
108

109 **Subjekt:** Jag tror inte det... Nej inget som jag tänkte på i alla fall.  
110

111 **Intervjuare:** Okej, men om vi tittar på kubernas ljud i sig. Skulle du säga ljudet är simpelt  
112 eller komplext? Svår fråga...  
113

114 **Subjekt:** [skrattar]  
115

116 **Intervjuare:** Men ur ett musikaliskt perspektiv kanske.  
117

118 **Subjekt:** Men det känns ganska simpelt. Eller lätt att smälta typ. Det var... det kändes  
119 aldrig som att det var för mycket ljud eller för lite ljud. Eller såhär. Det kändes  
120 ganska simpelt. Väldigt ja.  
121

122 **Intervjuare:** Tror du att man skulle kunna göra kuberna mer intressanta rent musikaliskt?  
123

124 **Subjekt:** Ehm. Ja kanske, kanske man skulle göra det mer uppenbart att det var kuberna  
125 som lät. Nu vet jag inte... Det kanske bara är jag som är trög [skrattar]. Men  
126 ja, kanske göra det mer uppenbart att det är kuberna som förändrar ljudet. På  
127 något sätt, man kanske markerar dem med en liten not eller någonting.  
128

129 **Intervjuare:** Men du tolkade lixom... Du tolkade det inte som att ljudet kuberna la till kom  
130 från kuberna utan att det var en del av musiken från början typ. Eller hur ser du  
131 på...  
132

133 **Subjekt:** Eller att jag kände lixom. Ja la märkte till att musiken. Att musiken förändrade  
134 med tiderna. Men jag tänkte att det var för att jag la kuberna på plats lixom.  
135 Att när ja la en kub på plats så förändrades musiken lite grann. Sen nästa så  
136 förändrades den också litegrann. Så att det var själva... Iut med att nivån  
137 lixom fortsatte så förändrades musiken mer och mer ju närmare man kom  
138 slutet.  
139

140 **Intervjuare:** Okej, upplevde du... för när kuberna, när du håller i kuberna då... Gud jag  
141 tappade frågan precis...  
142

143 **Subjekt:** [skrattar]  
144

145 **Intervjuare:** Ehm... Skulle du se musik ljudet som kommer av ljudet som en stämma i  
146 musiken?  
147

148 **Subjekt:** Ja kanske  
149

150 **Intervjuare:** Just när du håller och är på väg till pyramiderna säger vi.  
151

152 **Subjekt:** ja, jag skulle nog se det snarare som melodin.  
153

154 **Intervjuare:** Som en melodi?  
155

156 **Subjekt:** Ja  
157

158 **Intervjuare:** Spelade du någonting med dem... spelade du med musiken på något sätt?  
159

160 **Subjekt:** Nej det gjorde jag inte...jag fattade som sagt inte att man kunde styra den på  
161 egen hand.  
162

163 **Intervjuare:** Om du skulle jämföra någon av båda dem här två nivåerna mot ett  
164 kommersiellt spel. Ser du någon likhet där?  
165

166 **Subjekt:** Du tänker specifikt på musiken nu?  
167

168 **Intervjuare:** Ja eller... egentligen vad som helst som du kan likna.  
169

170 **Subjekt:** Jag får lite såhär ”No Mans Sky” vibbar typ. Och jag vet att ”No Mans Sky” är  
171 kontroversiellt men jag tycker det är ett skitbra spel så det är en bra  
172 jämförelse, det är en jättebra jämförelse.  
173

174 **Intervjuare:** Jag vet om ”No Mans Sky” grejen, den är jättekul [skrattar]  
175

176 **Subjekt:** [skrattar]  
177

178 **Intervjuare:** Vad är det för likheter du ser?  
179

180 **Subjekt:** Jomen just det här utforskandet, kändes lite som ”No Mans Sky”. Det är inte  
181 så mycket annat än en värld. Där du kan, flytta på grejer och plocka upp grejer  
182 och sånt. Och musiken kändes så som att den var så... lugn. Och ”No Mans  
183 Sky” känns som ett väldigt lugnt spel.  
184

185 **Intervjuare:** Alright, jag tror jag har fått... Har du något mer att tillägga?  
186

187 **Subjekt:** Nej jag tror inte det!

## Subject 5: Interview

19/3/2020

Start Level: Z1

Preference: No preference

1 **Intervjuare:** Kan du förklara för mig gången du plockade upp en av kuberna i level Z1.

2  
3 **Subjekt:** Ja. Jag minns nog en av... att jag trodde att. Ah den har nog en liten melodi  
4 den här kuban. Att den spelar med i musiken. Jag kopplade inte ihop det med  
5 det var hur högt det var jag hade den.  
6

7 **Intervjuare:** Så du kopplade inte att det var höjden som påverkade melodin då liksom?

8  
9 **Subjekt:** Nej, jag var nog för fokuserad på något annat typ.  
10

11 **Intervjuare:** Okej, kan du förklara hur melodin lät för dig i det här fallet?

12  
13 **Subjekt:** Minns inte exakt, men jag minns att... Jag noterade att kuberna hade ton-  
14 sekvenser liksom. Ehm... och det var sannolikt när jag typ viftade omkring  
15 dem. Som det kom en sekvens av toner liksom.  
16

17 **Intervjuare:** Hur listade du ut att det var en sekvens av toner?

18  
19 **Subjekt:** Jag hörde det bara. Sådär det var det bakgrundsljudet och sen så... Ehm. Jag  
20 förstod att kuban gjorde ett ljud när man höll i den. Men inte var den här  
21 melodin kom sig av.  
22

23 **Intervjuare:** Tycker du att melodin kommer från kuban?

24  
25 **Subjekt:** Ja, jomen det märkte jag att kuban gjorde den musiken.  
26

27 **Intervjuare:** Upplevde du någon direkt skillnad mellan kuberna i level Z1? Det är den  
28 nivån vi kommer att prata om. Så vi kommer inte prata så mycket om den  
29 andra.  
30

31 **Subjekt:** Jo... jag har för mig att dem lät olika. Men framför allt noterade jag nog att  
32 när man la dem lät dem här central grejerna...  
33

34 **Intervjuare:** Pyramiderna?

35  
36 **Subjekt:** Pyramiderna! Dem lät olika.  
37

38 **Intervjuare:** På vilket sätt lät dem olika?

39  
40 **Subjekt:** Det var en som hade en subbas ton. En som gjorde lite hi-hat, percussion ljud,  
41 och en som gjorde någonting annat.  
42

43 **Intervjuare:** Märkte du någon distinkt skillnad mellan kuberna i sig? Var det någon du  
44 föredrog mer än den andra?  
45



46 **Subjekt:** Nej... jag förhöll mig nog ganska neutral till kuberna. Kanske inte noterade  
47 jättemycket deras olika ljud och egenskaper lixom.  
48

49 **Intervjuare:** Kan du utveckla på neutralt?  
50

51 **Subjekt:** Ehm... att jag inte hade någon såhär "oh den här kuban lät extra najs" utan det  
52 var mer att "dem låter".  
53

54 **Intervjuare:** Okej! Kan du beskriva relationen mellan kubernas ljud och  
55 bakgrundsmusiken?  
56

57 **Subjekt:** Mm. Jag märkte att. Jomen dem bidrog med såhär ton-element i en skala. Så  
58 att musikens känsla förändrades lixom.  
59

60 **Intervjuare:** Var det någonting du lekte runt med?  
61

62 **Subjekt:** Nej, jag lekte inte runt med det. Men jag noterade och tyckte om det när jag  
63 gick med kuban lixom. Såhär "ja nu låter det annorlunda".  
64

65 **Intervjuare:** Tycker du kubernas ljud passar in med bakgrundsmusiken?  
66

67 **Subjekt:** Ja, visst. Jag tycker det var sammanhållet lixom, bra ljuddesignat så det  
68 kändes så att det passade ihop i en låt.  
69

70 **Intervjuare:** Så det kändes som att det var en del av samma arrangemang lixom?  
71

72 **Subjekt:** Ja definitivt.  
73

74 **Intervjuare:** Kändes det som att du kontrollerade musiken när du höll i kuberna?  
75

76 **Subjekt:** Hm... Nja till viss del alltså. Jag märkte att om jag släppte den så slutade det  
77 men det var inte något jag... lekte runt med riktigt på det viset.  
78

79 **Intervjuare:** Kan du utveckla tror du?  
80

81 **Subjekt:** Hm... jag provade inte att till exempel att släppa dem i rytm lixom, eller ta  
82 upp dem i rytm. Utan jag gick bara dem till dit dem skulle.  
83

84 **Intervjuare:** Okej. Lyckades du hitta några noter som passade i musiken till exempel?  
85

86 **Subjekt:** Jag tyckte nog att... Det jag hörde lixom passade in. Det kändes som att det  
87 var en del av samma skala. Men jag vet inte om jag ändrade den här...  
88 ändrade pitchen med hur högt jag höll kuban. Jag vet inte om jag gjorde det  
89 medvetet.  
90

91 **Intervjuare:** Så du gjorde allt det omedvetet isådanafall lixom.  
92

93 **Subjekt:** Jo men det får man väl säga.  
94

95 **Intervjuare:** Vad tycker du... Jo men vi säger såhär, påminner det här... detta spel, eller  
96 denna nivå om någon annan musikalisk erfarenhet som du har haft?  
97

98 **Subjekt:** Hm... Ja men typ det påminner mig om ambient musik som jag ibland lyssnar  
99 på. Därmed lixom ackord som läggs på, läggs på, läggs på. Um... Mer vet jag  
100 inte...  
101

102 **Intervjuare:** Om du skulle betygsätta kubernas ljud från skala 1 till 10 säger vi. Där 1  
103 symboliserar simpel och 10 symboliserar komplex. Vart hamnar din  
104 bedömning då?  
105

106 **Subjekt:** Hur komplext jag kände att ljudet från kuberna var?  
107

108 **Intervjuare:** Ja.  
109

110 **Subjekt:** 6  
111

112 **Intervjuare:** Varför då?  
113

114 **Subjekt:** Dem hade ju... ett speciellt timbre, klangfärg. Och speciella toner och dem var  
115 lixom deras ljud passade ihop med den övriga musiken.  
116

117 **Intervjuare:** Känner du att kuberna kan göras mer intressanta rent musikaliskt? Om vi  
118 tänker väldigt brett lixom.  
119

120 **Subjekt:** Hm... Jag vet inte, jag tyckte nog det var ganska bra som det var. Att det var  
121 på en lite såhär ambient nivå. Man skulle ju kunna göra såhär olika rytmer  
122 som... som förändras beroende på vart man är med kuberna. Olika melodier  
123 också som också förändrades... tycker det funkade bra som det var.  
124

125 **Intervjuare:** Kan du jämföra någon av dessa spelnivåer mot ett kommersiellt spel, och då  
126 syftar på också den andra nivån som du spelade också, och inte bara den  
127 första.  
128

129 **Subjekt:** Ja men jag fick lite såhär "Zelda" vibbar, lite såhär "Zelda" pussel. Ehm...  
130 Lite "Half Life 2"... eller "Portal" kanske.  
131

132 **Intervjuare:** Kan du utveckla på portal till exempel?  
133

134 **Subjekt:** Lådornas utformning [skrattar], att springa runt och göra pussel.  
135

136 **Intervjuare:** Någoting du tänker på med ljudet som påminner... eller som man kan likna  
137 mot något av det.  
138

139 **Subjekt:** Ja kanske... Gemensam nämnare att det är såhär ganska elektronisk musik. I  
140 båda dem... ja, what else...  
141

142 **Intervjuare:** Känner du att det är likheter i ljuddesign och så eller är det mer såhär, overall,  
143 atmosfärs känsla lixom.  
144

145 **Subjekt:** Den likheten är nog mer det här pussel tänket och att det är FPS, och att man  
146 lixom triggar olika mekanismer genom att lägga saker på saker. Ja men som  
147 sagt också den elektroniska touchen på musiken.  
148  
149 **Intervjuare:** Den här frågan har jag redan ställt. Men brukar du spela med musiken av eller  
150 på?  
151  
152 **Subjekt:** På.  
153  
154 **Intervjuare:** Varför då?  
155  
156 **Subjekt:** Jag tycker nog oftast att den bidrar positivt till spelupplevelsen och att det är  
157 lixom ett helhetskoncept... i vissa fall, om det är en väldigt tjugig låt eller om  
158 det är ett spel som... kanske handlar mindre om "immerssion" och mer om  
159 tävlingsmoment, då kan jag stänga av musiken och lyssna på annan musik.  
160  
161 **Intervjuare:** Jag tror det var allt jag hade att fråga. Tack så mycket.  
162  
163 **Subjekt:** Tack själv.

## Subject 6: Interview

19/3/2020

Start Level: Z1

Preference: A1

1 **Intervjuare:** Du får jättegärna förklara för mig hur det var att plocka upp den första kuben i  
2 level Z1.

3  
4 **Subjekt:** Okej

5  
6 **Intervjuare:** Din första upplevelse

7  
8 **Subjekt:** Den första kuben... Ja alltså jag tänkte väl inte riktigt på hur den lät, men det  
9 var ändå en najs effekt av att känna att någonting hände i musiken liksom.

10  
11 **Intervjuare:** Okej, så du betraktade ljudet som en del av musiken?

12  
13 **Subjekt:** Ja precis.

14  
15 **Intervjuare:** okej, fortsatt gärna!

16  
17 **Subjekt:** Och sen så...det jag gjorde liksom... den första kuben aktiverades ganska lätt  
18 också.

19  
20 **Intervjuare:** Vilken var den första du plockade upp?

21  
22 **Subjekt:** Det var den som var vid stugan...

23  
24 **Intervjuare:** okej, den lila?

25  
26 **Subjekt:** Mm. Jag testade aldrig att gå liksom att kolla upp med den, alltså upp och ner  
27 väldigt mycket utan jag skakade snabbt där.

28  
29 **Intervjuare:** Okej, var det lätt att upptäcka att du skulle skaka förutom instruktionerna?

30  
31 **Subjekt:** Ehm... nja just eftersom jag ändå vet inte om det var för att jag läste  
32 instruktionerna lite snabbt. Men jag snurrade ju runt som galet. Ehm... jag  
33 höll i den och så... i alla fall på dem andra. Särskilt på den sista, den gula som  
34 tog jättelång tid för mig för att jag snurrade runt och liksom gick runt.

35  
36 **Intervjuare:** Att hitta den på banan liksom?

37  
38 **Subjekt:** Nej alltså jag hittade den. Jag menade att aktivera den liksom. Du snurrade jag  
39 verkligen runt skitmycket men ja [skrattar]

40  
41 **Intervjuare:** Så du upptäckte aktivering av misstag?

42  
43 **Subjekt:** Mm, ja typ.

44  
45 **Intervjuare:** Upplevde du någon speciell skillnad mellan kuberna? I level Z1 då.

46  
47 **Subjekt:** Jag märkte ju att det var olika ljud. Som triggades.  
48  
49 **Intervjuare:** Kan du utveckla?  
50  
51 **Subjekt:** Det är som att jag har den...A1 nu i huvudet för att jag märkte bas som  
52 triggades och trummor och sådär. Men i första leveln så tänkte jag väl bara på  
53 att det var som att syntarna ändrades.  
54  
55 **Intervjuare:** Jag syftar mer på kubernas ljud i sig.  
56  
57 **Subjekt:** Jaha.  
58  
59 **Intervjuare:** Om vi tar ljudet som kuberna låter. Märkte du någon direkt skillnad där?  
60  
61 **Subjekt:** På dem olika kuberna?  
62  
63 **Intervjuare:** Ja  
64  
65 **Subjekt:** Hm... Inte något som jag tänkte på riktigt.  
66  
67 **Intervjuare:** Var det någon kub du föredrog över någon annan? Var det någon som stack ut  
68 lixom?  
69  
70 **Subjekt:** Ja... Den gröna vill jag minnas tyckte hade trevligt ljud.  
71  
72 **Intervjuare:** Varför då?  
73  
74 **Subjekt:** Jag minns inte [skrattar]  
75  
76 **Intervjuare:** Den hade trevligare ljud?  
77  
78 **Subjekt:** Ja, jag vet inte om det var för att jag började tänka på det mer, att det faktiskt  
79 förändrades. Det var som en liten, en liten sekund av att det blev tyst i  
80 musiken också när jag plockade upp den gröna. Vilket var lite effektivt  
81 tyckte jag, just eftersom den bara låg som en matta lixom typ.  
82  
83 **Intervjuare:** Kände du då att den uppfyllde någon annan funktion då eller?  
84  
85 **Subjekt:** Ja jag kände väl att det var typ... fast det hände ju fan med den första också,  
86 den lila vid stugan. Jo men typ att det blev tyst. Det var lite effektivt bara när  
87 hände någonting drastiskt lixom.  
88  
89 **Intervjuare:** Kan du förklara relationen mellan kubernas ljud och bakgrundsmusiken?  
90  
91 **Subjekt:** Det kändes som att den adderade, alltså som att det började med...  
92  
93 **Intervjuare:** Jag tänker då du håller i kuben, i sig.  
94  
95 **Subjekt:** Ja, Hur menar du? [skrattar]

96

97 **Intervjuare:** Relationen mellan bakgrundsmusiken och stunderna då du sprang runt med

98 kuben.

99

100 **Subjekt:** Ja det kändes som att det adderades mer och mer lixom.

101

102 **Intervjuare:** Kan du utveckla?

103

104 **Subjekt:** Jo men som att det blev mer som en låt.

105

106 **Intervjuare:** När du höll i kuben lixom?

107

108 **Subjekt:** Ja, lite så.

109

110 **Intervjuare:** Hur passar kuben in i låten för dig?

111

112 **Subjekt:** Hm. Det blev som en till synt.

113

114 **Intervjuare:** Som en till synt?

115

116 **Subjekt:** Mm.

117

118 **Intervjuare:** Så ser du kubens ljud som en synt lixom? Om du fick placera kuben in i det

119 musikaliska arrangemanget, vart skulle den hamna då?

120

121 **Subjekt:** jo men som en synt skulle jag säga, som någon slags pad.

122

123 **Intervjuare:** Tycker du kubernas ljud passar in med bakgrundsmusiken?

124

125 **Subjekt:** Mm.

126

127 **Intervjuare:** På vilket sätt?

128

129 **Subjekt:** Dem smälte in väldigt bra

130

131 **Intervjuare:** På vilket sätt smälte dem in?

132

133 **Subjekt:** Dem var ändå subtila men...man märkte att det blev en skillnad. En gradvis

134 skillnad lixom. Så det var snyggt.

135

136 **Intervjuare:** Då märkte väl då av att pitch förändrades beroende på hur man håller dem, det

137 stämmer?

138

139 **Subjekt:** Ja

140

141 **Intervjuare:** Kändes det då som att du kontrollerade musiken?

142

143 **Subjekt:** Mm. Förutom att jag inte gick så långsamt när jag rörde på kuberna utan jag....

144 [skrattar]Jag gick upp och ner skitsnabbt.

145

146 **Intervjuare:** Var det någonting som var kul med det tycker du?  
147  
148 **Subjekt:** Nej det var för att jag inte fattade att man kunde göra det långsamt tror jag. Så  
149 att det var att jag tänkte att bara att jag ska göra det snabbt för att väcka dem  
150 lixom.  
151  
152 **Intervjuare:** Okej, men hittade du noter då eventuellt eller hur gick du till väga när du höll  
153 dem?  
154  
155 **Subjekt:** Ja alltså jag gjorde ju inte riktigt det... eller jo det gjorde jag föreseten. För att  
156 ja, det gula kuban den första... i Z1... var, det var lixom när jag höll på att  
157 snurra runt en massa och försökte väcka den och det gick verkligen inte, så  
158 märkte jag att det var lixom olika då, när jag höll den långt ner på skärmen och  
159 upp på skärmen...  
160  
161 **Intervjuare:** Okej...Upplevde du att responstiden mellan dem ton förändringarna... märkte  
162 du någonting speciellt där?  
163  
164 **Subjekt:** Nej, det var inte någonting jag tänkte på.  
165  
166 **Intervjuare:** Okej, på vilket sätt kändes det som ett instrument, och på vilket sätt kändes det  
167 kanske inte som ett instrument?  
168  
169 **Subjekt:** Jag tror att om det hade varit... jag inte att det var som ett instrument riktigt  
170 när jag höll i kuban. Jag kände mer att det som en effekt av vad jag gjorde  
171 med den.  
172  
173 **Intervjuare:** Okej. Kan du utveckla?  
174  
175 **Subjekt:** Som att... lite flummigt lixom... Drömligt, bara låter på olika punkter  
176 [skrattar].  
177  
178 **Intervjuare:** Kändes du inom kontroll av det ljudet, eller... om du fick betygsätta från 1 –  
179 5, hur i stor kontroll kände du dig av ljudet?  
180  
181 **Subjekt:** kanske alltså. Eftersom det inte gick så långsamt när jag skakade den, så tror  
182 jag att jag kände typ 2 kanske.  
183  
184 **Intervjuare:** Tycker du kubernas ljud är simpelt eller komplext? Så att om 10 är komplext  
185 och simpelt är 1 lixom. Vart skulle du gradera kubernas komplexitet?  
186  
187 **Subjekt:** Mm... Ändå ganska komplext. Kanske typ 7.  
188  
189 **Intervjuare:** Varför då?  
190  
191 **Subjekt:** För att det kändes som att det var mycket som hände.

192 **Intervjuare:** Kan du utveckla?  
193  
194 **Subjekt:** Alltså jag upptäckte inte att... eller jag tänkte inte... det kändes inte som att  
195 det var ett ljud som triggades utan det kändes som att det var flera saker som  
196 hände. Men jag är osäker på det såhär i efterhand.  
197  
198 **Intervjuare:** I förhållande till bakgrundsmusiken eller tänker du bara kubens ljud då?  
199  
200 **Subjekt:** Typ... ja alltså bara kubens ljud kanske var väl lite mindre komplex kanske.  
201 Jag vet inte alltså, det var just för att den smälte in väldigt mycket med  
202 bakgrundsmusiken som jag ändå tycker att den är komplex. För att jag inte  
203 tänkte på den så mycket, så jag skulle ändå säga 7.  
204  
205 **Intervjuare:** Okej. Kan kuberna göras mer intressanta rent musikaliskt tror du?  
206  
207 **Subjekt:** Mm...Bra fråga. Det kanske om det skulle vara mer distinkt, beroende på,  
208 alltså mer känsligt beroende på position typ. Kanske.  
209  
210 **Intervjuare:** Kan du utveckla? Eller förenkla kanske?  
211  
212 **Subjekt:** Jo men typ... Att den skulle vara mer känslig för när man rör sig, så att jag  
213 märker kanske mer tydligt att om jag bara rör mig lite till vänster så låter den  
214 mer liksom, eller att det är mer som händer typ.  
215  
216 **Intervjuare:** Så att du menar att man kanske inte ska behöva överdriva rörelserna lika  
217 mycket?  
218  
219 **Subjekt:** Kanske?  
220  
221 **Intervjuare:** Schysst. Om vi tänker på båda spelnivåerna nu, kan du jämföra någon av dem  
222 mot ett kommersiellt spel som du spelat?  
223  
224 **Subjekt:** Jag tänkte på... oh my god vad fan heter det... Jag tänkte lite på "Portal" men  
225 det var väl för kuberna liksom, mera visuellt liksom. Men jag tänkte väldigt  
226 mycket på ett spel som jag inte kommer ihåg namnet på just nu. Man är en  
227 robot i någon slags pusselmiljö, liknar "Portal" ganska mycket. Och det är  
228 som en gud som pratar med en typ.  
229  
230 **Intervjuare:** Okej... jag känner faktiskt inte igen det. Men var det några likheter i ljudet där  
231 eller hur...  
232  
233 **Subjekt:** Ja, ganska likt... lite drömligt, och väldigt så statiskt typ. Alltså bara ligger.  
234 Och just det här att med att man ändå reagerar när det blir tyst typ.  
235  
236 **Intervjuare:** Brukar du spela med musiken av eller på?  
237  
238 **Subjekt:** Brukar spela med ganska låg musik...  
239  
240 **Intervjuare:** Varför då?  
241



242 **Subjekt:** Jag vet inte [skrattar]  
243  
244 **Intervjuare:** Finns det någonting som skulle få dig att höja den?  
245  
246 **Subjekt:** Ja, om jag hade en sjukt bra dator och gaming system, skulle jag säkert gotta  
247 mig i ljudet. Men nu är det att spela på laptoppen och det är lite B.  
248  
249 **Intervjuare:** Nej men tack så mycket, jag har inga fler frågor ifall du inte har något att  
250 tillägga?  
251  
252 **Subjekt:** Nej...  
253  
254 **Intervjuare:** Tack så mycket

*Inspelning stoppades men startades igen*

255 **Intervjuare:** Fortsatt intervju med Cathrine. Varför Cathrine föredrog A1 över Z1.  
256  
257 **Subjekt:** Ja men alltså det var mest för att jag tänkte mer på musiken när jag höll i  
258 lådorna för att det kändes... eller jag märkte av mer att nu kom det en  
259 basgång, nu kom någon slags percussion. Så det kändes mer som att en låt  
260 som byggdes upp typ.  
261  
262 **Intervjuare:** Fick du mer fokus på det musikaliska arrangemanget på utav grund av  
263 kuberna inte lät lika mycket typ då?  
264  
265 **Subjekt:** På grund utav att kuberna lät mer som ett typiskt band tror jag. Alltså nu  
266 kommer det här elementet typ in i låten.  
267  
268 **Intervjuare:** I level A1?  
269  
270 **Subjekt:** Ja.  
271  
272 **Intervjuare:** Så du fick du mer fokus på det musikaliska arrangemanget?  
273  
274 **Subjekt:** Ja, jag tänkte ju på det i Z1 också men det var som att... jag tror att jag kanske  
275 uppskattade det mer i A1. För att... jag inte om det var för att jag fått en  
276 försmak för det eller för att jag tänkte mer på att nu kommer basen, nu  
277 kommer trummorna liksom.  
278  
279 **Intervjuare:** Okej coolt tack!

## Subject 7: Interview

19/3/2020

Start Level: A1

Preferens: Z1

**Intervjuare:** Berätta om din första upplevelse när plockade upp en av kuberna i level Z1.

**Subjekt:** I Z1?

**Intervjuare:** Jajamän.

**Subjekt:** Ja det var ju typ att jag reagerade på att... när man ändrade höjden på när man höll i artefakten och då dessutom olika ljud för olika artefakter. Men det var helt enkelt att dem gick upp i tonläge ju högre man höll dem. Det var till och med då jag höll i en artefakt och hoppade från en klippa och då... for den lite all over the place.

**Intervjuare:** Hur upptäckte du att ton-läget förändrades?

**Subjekt:** Det var helt enkelt att det var att jag först grabbade tag i artefakten och att det var någonting som förändrades i ljudbilden. Och sedan så släppte jag artefakten, och då försvann det ljudet och sen när jag plockade upp den igen då kom den tillbaka. Så det var ändå så jag märkte att okej det låter ändå någonting när jag håller i artefakten. Och sedan blev det då bara av ren nyfikenhet att jag då lyfte upp den och märkte att den förändrade i tonläge, beroende på vart jag höll den.

**Intervjuare:** Okej, så du upptäckte det liksom genom att bara plocka upp den direkt?

**Subjekt:** Ja.

**Intervjuare:** Du sa att det fanns lite skillnader mellan kuberna, kan du beskriva dem?

**Subjekt:** Ja det var någon... jag kommer inte ihåg exakt nu vilken kub som lät vad men... jag tyckte ändå att dem tre kuberna hade tre olika distinkta ljud. En lät nästan lite som en flöjt typ. En hade mera, typ som ett... som man har i EDM eller något sådant där... ett väldigt elektroniskt och pulserande ljud. Den tredje kan jag tyvärr inte riktigt komma ihåg hur den exakt lät, men jag vet i alla fall, om det ändå har varit två distinkta ljud för dem två andra kuberna måste det ha varit ett annat distinkt ljud för den tredje också.

**Intervjuare:** Var det någon som du föredrog över någon annan?

**Subjekt:** Ja, generellt till den musiken som var i spelet så tyckte jag att den som hade det här elektroniskt pulserande ljudet gifte sig bäst liksom med ljudbilden, medans flöjten lät nästan som... det var den stack ut mer för att den inte hade den typen av klang som var riktigt överens mer resten av ljudbilden tyckte jag.

**Intervjuare:** Okej. Kan du beskriva relationen mellan kubernas ljud och bakgrundsmusiken?

- 46  
47 **Subjekt:** Ja. Det var intressant för själva ljudbilden i spelet var ju väldigt såhär  
48 ”spacigt”. Väldigt mycket såhär synt-mattor. Det var någon gång det dök upp  
49 en liten sådan här subbas grej som låg och pulserade lixom. Det är ju nästan  
50 sådan här typ av musik man skulle typ lyssna på ifall... men ”well being”,  
51 man kan typ sitta ute i skogen och lyssna på någonting sådant här. Lite mera  
52 såhär ”Aah”. Skön känsla men. Men däremot som jag beskrev nu tidigare så  
53 tyckte jag väl att den här olika... olika ljuden från de olika kuberna gav  
54 definitivt sin karaktär. Den som jag beskrev som passande bäst in i den  
55 ljudbilden som redan var blev nästan lite mer som en utsmyckning medans.  
56 Till exempel den som lät mer flöjt liknande blev nästan som ”Oj, vad gör den  
57 här” eller inte som att den var så mycket annorlunda egentligen men det var  
58 någonting med klangen om den där flöjten som bara gjorde att den stack ut  
59 mer från ljudbilden.  
60
- 61 **Intervjuare:** Du benämnde att den du tyckte om hade en viss utsmyckning, vad var det som  
62 gjorde det lixom?  
63
- 64 **Subjekt:** Ja dels den pulserande... själva pulserandet av den, det ljudet den hade. Och  
65 dels för att den hade nästan lite som en synt klang, som nästan passade direkt  
66 med den här... ”Swell synten” som var en del av själva ljudet som pågick hela  
67 tiden under spelets gång.  
68
- 69 **Intervjuare:** Upplevde du någon gång... Kändes det som att du kontrollerade musiken?  
70 Eller förlåt låt mig omformulera. Kändes det som att du kontrollerade musiken  
71 när du höll... säg den syntiga kuberna?  
72
- 73 **Subjekt:** Ja till viss del. Det kändes definitivt en kontroll över att kunna... inte  
74 nödvändigtvis att improvisera det för att det fanns ju ändå bara vissa skaltoner  
75 eller vad man ska kalla det som den utgick ifrån. Märkte jag när man for  
76 omkring med den. Men det kändes definitivt som att jag blev lite mera som en  
77 del av ljudbild som redan skedde så att säga.  
78
- 79 **Intervjuare:** Du nämnde improvisation, kan du utveckla på det?  
80
- 81 **Subjekt:** Ja helt enkelt att det kändes som att beroende på vart jag... placerade  
82 artefakten eller beroende på vart på hur jag höll den. Framför märkte man om  
83 det var i... om jag höll artefakten vid marken eller om jag höll upp den mot  
84 luften att den då ändrade toner. Och jag kunde utifrån det höra vilka toner  
85 som...Ja men här skulle det passa med dem här tonerna och här skulle det  
86 passa med dem tonerna. Däremot eftersom du var tvungen att... om jag ville  
87 gå från en ton till en annan så var du ju tvungen att gå igenom dem andra  
88 tonerna också. Så på sätt och vis blir det en ganska begränsad form av  
89 improvisation för att då blir det som att den... den följer hela tiden lixom dem  
90 givna tonerna som har angivits beroende på vars du håller artefakten. Så du  
91 inte kan hoppa över utan den kommer alltid att fara emellan.  
92
- 93 **Intervjuare:** Tror du att det hade varit roligare om du själv kunde bestämma vilka toner i  
94 vilken följd du skulle haft då eller hur... På vilket sätt är det begränsande?  
95

96 **Subjekt:** Ja då blir det att om jag vill ha en viss ton-följd kan det ju innebära att om jag,  
97 till exempel, har en ton som är när jag håller upp den mot luften och så vill jag  
98 ha den tonen som är när jag håller den nere mot marken så kommer jag ju  
99 automatiskt att gå igenom dem andra tonerna som då är här emellan om jag  
100 ska dit. Jag kan så att säga inte gå direkt dit till här utan att behöva gå alla dem  
101 andra tonerna  
102

103 **Intervjuare:** Om du fick betygsätta kubernas komplexitet från simpelt till komplext. Så att  
104 om komplext är 10 och simpelt är 1. Vart skulle då kubernas musikaliska  
105 ”komplexighet” hamna?  
106

107 **Subjekt:** Jag tror att den som var med flöjten var väl den som jag skulle klassa som...  
108 jag skulle ändå säga 2, den höll sig väldigt mycket inom lixom den skalan eller  
109 inom den musiken som redan var trots klangen som ändå, som sagt inte  
110 stämde kanske helt och hållet med resten av ljudbilden. Däremot den med den  
111 pulserande tonen hade vissa skaltoner som, inte som att den inte tillhör den  
112 harmoniken som redan är skapad av ljudbilden bakom. Men den hade vissa  
113 skaltoner som den som den gjorde att man kunde få lite mer ”Tension” men  
114 inte så att det var någonting såhär att det lät jätte ”Out” eller så men den gav  
115 lite mer djup. Så att den kanske jag ändå skulle sätta som kanske en femma.  
116

117 **Intervjuare** Hittade du melodier någonsin med kuberna?  
118

119 **Subjekt:** Ja det gjorde jag.  
120

121 **Intervjuare** kan du beskriva?  
122

123 **Subjekt:** Ehm... Jag tror att det var den med flöjten, så var det typ att den gick från ters,  
124 kvart och kvint och sedan upp till oktaven eller vad det nu var. Och det var  
125 egentligen när jag gjorde dem här hoppen eller som när man lixom fick upp  
126 kuban så högt som möjligt där det blev som lixom [nynnar en melodi  
127 08:14:00] så redan bara den följden har ju som en ganska... är ju ganska  
128 melodiskt där för att då blir det som en [nynnar en annan följd 08:25:00] till  
129 kvinten och sen går [nynnar en ton 08:29:00] till grundton eller oktaven men  
130 den får som en ganska stark känsla av lixom att det händer någonting och  
131 sedan är man ”hemma” igen.  
132

133 **Intervjuare** Kändes det som ett instrument skulle du säga? Eller låt oss säga såhär: På  
134 vilket sätt kändes det som ett instrument och på vilket sätt kändes det inte som  
135 ett instrument? Kuben då.  
136

137 **Subjekt:** Ja det kändes ju som ett instrument i det att jag kunde ändå på sätt och vis  
138 styra lixom dem vilka toner jag ville ”empasera” eller förstärka beroende på  
139 hur jag höll...kuben. Men till viss del så är det ändå... så märker man att  
140 beroende på hur man håller den så kan du ju... märkte jag att det var lixom  
141 inte så att själva ton-förådet var jättestort, iut med att man inte kunde röra den  
142 så pass mycket än. Det mesta man kunde göra var om man höll i kuban och  
143 hoppade från ett högt ställe, för då märkte man hur det lixom... att det hände  
144 mer grejer. Men bara från att stå stilla och kunna röra den upp och ner... så det

145 gick ju att göra lixom det man kunde inom det. Men på sätt och vis kändes det  
 146 lite begränsat.

147

148 **Intervjuare** Okej. Påminde det här spelet dig om någon musikalisk erfarenhet som du har  
 149 haft?

150

151 **Subjekt:** Ehm... ja den... den påminde litegrann om... Det finns inget konkret exempel  
 152 som jag tänker att "Det här är det som jag kan koppla till". Men om jag bara  
 153 ska koppla till själva känslan jag får av den här typen av musik, som pågår i  
 154 spelet så... kan jag ändå koppla det till när jag gick mitt sista folkis-år innan  
 155 jag började här uppe i Piteå. Och det var på den folkhögskolan så sysslade vi  
 156 med att ta låtar och sen kasta in dem i en annan genre. Med en helt annan typ  
 157 av ljudbild som att... man huvudsakligen behåller kärnan i låten, dvs det som  
 158 är ackorden och melodi alltså... ryggraden i låten men man bara ändrar...  
 159 allting runt omkring. Det är som man ändrar hur man kompar, man ändrar  
 160 soundet i instrumenten, man ändrar i tempo...

161

162 **Intervjuare** Om du kopplar det till...

163

164 **Subjekt:** Då var det en av dem här låtarna då som vi gjorde då som vi ändrade om till  
 165 att bli lite mer..."Spacig" eller vad man ska kalla det. Så att till exempel, jag  
 166 fick ju göra mycket såhär "swells" där jag hade väldigt mycket delay och  
 167 reverb på gitarren. Så att när jag drog ut ackord blev det som ett [blåser med  
 168 munnen] stort... rum som bara fylldes lixom. Det är väl lixom det jag kan  
 169 koppla till det här.

170

171 **Intervjuare** Okej, två till frågor. Kan du jämföra någon av dessa spelnivåer mot något  
 172 kommersiellt spel som du har spelat? Med kanske fokus på kuberna och  
 173 musiken då egentligen.

174

175 **Subjekt:** Inte på rak arm men jag har säkert spelat något sånt spel men just nu är det  
 176 inget spel jag kan tänka mig är som... Det var längesedan nu... Det var mera  
 177 förut så att säga men... på rak arm kan jag inte komma på något spel som jag  
 178 spelat som ändå ligger... av den här typen som är lixom ta saker och ta  
 179 tillbaka dom till där dem är. Det närmaste jag kan koppla det till är väl spelat  
 180 vissa spel som kanske har en del pussel-element. Men det är mera i form av  
 181 okej nu får du den här koden som du då ska försöka knäcka eller du ska vrida  
 182 dem här... materialen på ett visst sätt så att dem då slår samman och öppnar  
 183 sen öppnar upp en dörr eller någonting sådant. Så att det är isådanafall ett mer  
 184 avancerat än vad det är här, att helt enkelt bara leta upp ett föremål och placera  
 185 det på rätt ställe.

186

187 **Intervjuare** Ja okej! Nej men jag tror att vi har pratat om väldigt mycket bra saker. Stort  
 188 tack

189

190 **Subjekt:** Tack!

