

D2b Reflective Essay

Development

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For my instrument, I created a fun, new approach to a drum designer with samples made from kitchen items. Wishing to challenge myself creatively, I ventured into creating an instrument with items I had never recorded before, that would combine into an instrument constructed around the basics of percussive elements: which is another area I am not too familiar with. Developing from a place of feeling overwhelmed with the countless possibilities available for drum design, the instrument is constructed to be offered as an uncomplicated alternative. While also offering a unique and uncommon sound palette, that hopefully sparks creativity and originality within the users. The design is made to be as user friendly as possibly allowing for optimal practice spent experimenting with sounds, and not on trying to figure out the mechanisms of the instrument. The instrument encourages its users to think outside of the common conventions of how sounds and elements are to be used, aspiring to simply embrace whatever sounds they may create— giving way to the name *Kitchen Jam*.

The process of creating the instrument was one of many ideas. Originally, the idea of developing a physical product was enticing. The concept started from wanting to transform an everyday object into a musical instrument, using piezo discs as microphones (Constructed, 2023). I would connect the piezo discs to a digital software that would play certain sounds depending on which discs were triggered. Initially, the design was constructed around a football and would work similarly to a piano; the white squares would be the white keys and the black squares the black keys. Intently, when a square was pressed sound would be generated. On further development, the digital software connected to the instrument would rather work as a sample library, allowing for the instrument to be used in an array of ways; similar to that of a drum pad. Nevertheless, the execution of this idea is where the problems arose. Using Constructed's guide on instructable.com, I found that to create and connect the piezo discs, I would need tools and skills I currently do not have and would find difficult to obtain for the submission. Furthermore, in addition to the creation of the physical element there would also need to be a digital counterpart with a substantial sound library, that would properly connect and play together. Although I was extremely enticed by creating a physical instrument, I did not find it sustainable within the given timeframe.

However, I wanted to keep the notion of using an everyday object and turning this into an instrument somehow. Further developing into the realisation of creating a sample instrument with sounds recorded from objects one would have at home. The first thought was to develop a drum sampler, or a sampler built upon percussive elements. Initially the idea was to create a

sound pallet with warm and cosy tones – whereas the living room seemed the natural conclusion. Nevertheless, I found myself struggling to find elements within the living room that could fit into a drum sampler. Naturally, I could decide to not limit myself to one room of a house and mix elements from different areas and usages. However, I found it important to keep a sense of continuity within the sound pallet of the instrument, that I felt best accomplished by choosing elements that are used for the same purposes.

The most obvious conclusion when creating sounds by using everyday objects is to utilise the kitchen. Which is what I conclusively decided to base the sound library of my instrument on. However, using kitchen appliances to create sounds, especially percussive sequences, is a widely known and used concept (Brummer, 2014). Subsequently, ‘Echo Sound Works’ and ‘Animal Sounds’ both sell kitchen sample packs. Therefore, I wished to dig deeper and find elements within the kitchen which may not have been utilised as much and then bring those sounds to life. The ‘Echo Sound Works’ sample pack is mainly constructed towards the use of foley and percussion fillers – with sounds recorded from predominantly utensils. Similarly, with the ‘Animal Sounds’ instrument, as suggested in the title ‘Kitchen Utensils’. Analysing the sound sources from the different samples, I would find similarities between the two and decide which sounds I could possibly replace or take inspiration from; I found the kick to entertain several possibilities. In both sample packs the kick is very bright with a lack of bottom end; possibly from creating a makeshift *kick* with a *pot* and *clots* (Cummings, 2020). Experimenting with different sound sources, I established that the closing of the *oven* provided that deeper sounding *kick* I was looking for.

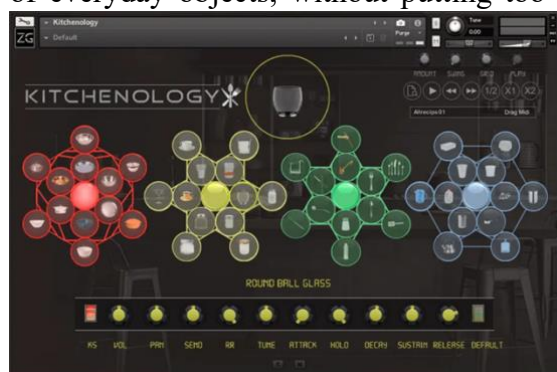
Nonetheless, as the instrument is constructed around everyday objects, the products ability to sell may depreciate. Most people reach for sample instruments when they do not have a live alternative – but most have access to a kitchen and could essentially obtain the same sounds as my instrument (Native Instruments, 2022). Furthermore, why choose a sample instrument constructed around kitchen appliances, when there are samples based upon the real instrument.

The idea of creating a sample instrument with sounds from the kitchen developed from a place of originality and creativity. I did not wish to develop an instrument with sounds and a design that is already widely circulated. Nevertheless, with originality also begs the question of necessity and public want. Therefore, it was important to design the instrument as something people would want to use; be that for the sounds it provides, the user-friendly design or the fun user experience. I found that the market my instrument would be most fitting, is within the electronic genres and the more electronically experimental genres as well as beginners wishing

to experiment and learn with different sounds. Due to the particular sound pallet of the instrument, it's usability might fall more towards percussion fills or doubles – rather than the main standalone percussive section – which is fitting in genres with a wide use of foley and dryer sounding drums. However, I still wished for the instrument to be versatile enough to also be used as a standalone element. The purpose of the instrument is not necessarily to perfectly recreate a drum kit. Rather, provide a fun option to personalise and create interesting sounds and sections.

The Design

Therefore, as the instrument developed, it moved further away from a recreation of a drum kit. This realisation played an instrumental part in the design of the instrument. Originally the design was constructed around a visual drum kit, much like the drum kit that is found in Logic pro x (Apple, 2023). I then tried to mimic the sounds typically found in a standard drum kit and manipulate them to fit a specific element. Nonetheless, certain elements were tedious and difficult to recreate, where I ended up manipulating the original sound so much the purpose of using kitchen appliances seemed a bit pointless. Rather, I wished to embrace the unique sound of everyday objects, without putting too much emphasis on recreating certain sounds. The



design of Zero-G's "Kitchenology - Domestic Percussion Machine" provided the realisation that I could display the different sounds with their sound origin. Providing a new approach to the design that I had not yet considered.

Being conflicted on how to display the sounds of the instruments, the design developed to include inspiration from Zero-G's "Kitchenology - Domestic Percussion Machine" usage of displaying the sounds through images of the object, combined with a traditional drum kit setup. Experimenting with taking an image of a drum kit and replacing each element with an image of a kitchen appliance; for instance, replacing the *kick* with an *oven*. As discovered previously, it became more apparent that the instrument would not be a perfect replica of a drum kit; and it would be misleading to create a design that suggested so. Nevertheless, I enjoyed the notion of replacing drum kit elements with kitchen appliances and continued developing this idea further. If each element was placed in such a manner that it would be apparent that the instrument contained percussive elements, but not claiming to replace each respective sound, it would offer the user an opportunity to be creative

with the sounds despite their ‘expected’ usage or allow them to follow more traditional arranging, while also securing the instrument’s position as a drum designer. Analysing the set-up of a drum kit, I based the positioning of each element from the perspective of the ‘drummer’ (School of Rock, 2019). Further, I would vaguely find similarities between a drum kit and the samples, for instance the *pot* and the *hi-hat*, and position them respectively. Then, when all the samples were roughly mapped out, I would experiment with spacing and levels. Resulting in an image that clearly illustrates the appearance of a drum kit, but it is not determining what sound each element represents or their expected usage. The most evident example of this would be the *fridge* and the *pot*. Positioned in a way that could suggest it to be a *tom*, the sound illustrates that it could be used as a *tom*, but it does not necessarily have the traditional tom sound suggesting it could possibly also be an alternative *kick* or *filler*. Similarly with the *pot*, it is positioned vaguely like a *hi-hat*, but traditionally one would not expect a *pot* to sound like a *hi-hat*. Thus, encouraging the user to be playful in how they wish to interpret the sounds despite the sounds positioning.

Consequently, this design idea resulted in more time having to be put into the design process of the instrument. By using non-traditional displaying methods, I was left with designing and creating custom images and ‘buttons’ for HISE. Ultimately, it was not necessary for the samples to be interactive, as they could have been displayed through a midi keyboard and still obtained their objective – omitting sound. Having the samples displayed through ‘buttons’ in HISE developed as a design choice, and from a concern of user ability. By having each sample displayed by its own, interactive ‘button’ the user would not need to blindly search through a midi keyboard to hear the different sounds, they would simply need to press the image and it would emit sound; additionally, to be used through a midi. Further creating a visual expectation where the user can easier gauge each elements sound and choose a desired sound more appropriately. This further played on the notion that although I did not want to create a replica of a drum kit, there was no denying that the *oven* sounded close to identical to a *kick*. From a design perspective, it would be pointless to try and cover each samples closeness to its respective drum kit part, most likely resulting in a less user-friendly design that would be difficult to navigate or understand. When I could create a design that would embrace each elements unique sound, while also hinting towards its drum kit heritage.

In order to create the buttons in HISE, each image had to be made with 2 ‘numStrips’, an *on*, - and *off* function, with *off* being the objects original colour and *on* given an orange hue. This

was done through Canva, by stacking two identically sized images, one for the *on*, - and one for the *off* function, and then setting them as the button image in HISE (Healey, 2023). What was problematic was to align the images in such a way that when the button was pressed the button would not appear to be moving, but simply change colour. Some objects were easier to construct than others, mainly the geometrically simple objects were easy to align for them to construct well-functioning buttons. But objects such as the *kettle* required a lot of trial and error until the functionality of the ‘button’ would be smooth.

By default, a ‘button’ in HISE is coded to emit sound when it is pressed, and when it is released. For the purpose of this instrument, I wished for there to only be sound once a ‘button’ was pressed. Which was achieved by creating a custom call-back function triggered by pressing a ‘button’ down. Nevertheless, this call-back function was only reacting to one sample and one button. To have each ‘button’ emit its respective sound, the call-back function had to be applied to include all the ‘buttons’. Nonetheless, this resulted in each ‘button’ triggering the same sample, as the code was only triggered by one `noteNumber`. The code then had to be assigned to each separate sample by creating an index variable equal to the trigger – in my case *btnTrigger*; which is the array that contains all the ‘buttons’. Then using the index of the function to find out where the ‘button’ is located in the array. As all the samples are mapped chronologically from middle C onwards, the original call-back function had to be altered to include `60 + index`, resulting in each ‘button’ triggering a specific sample based on the sounds location in the sampler (Healey, 2021).



```
1 Content.makeFrontInterface(600, 600);
2
3
4 const var btnTrigger = [];
5
6 for (i = 0; i < 9; i++)
7 {
8   btnTrigger[i] = Content.getComponent("btnTrigger" + i);
9   btnTrigger[i].setControlCallback(onbtnTriggerControl);
10 }
11
12 inline function onbtnTriggerControl(component, value)
13 {
14   local index = btnTrigger.indexOf(component);
15
16   if (value)
17     Synth.playNote(60+index, 24);
18 };
```

When deciding on what effects to include in the instrument, I was conflicted between keeping the options minimal and simple or allowing for more detailed and complex manipulation. Essentially, it came down to what would be the purpose of the instrument. Considering my target audience, I wanted to steer the instrument more into the direction of being used as a fun and educational tool. The possibility for the instrument to succeed in the electronically produced genres is poignant, but I saw a greater purpose in directing the instrument towards hobby producers, beginners, and children. Due to the design and sound origin of the instrument being a kitchen, there must be an eagerness amongst the consumers to be creative and willing to try unconventional sounds, having fun and being a bit silly with their creations. Therefore, it felt

natural to keep the editing options to a minimal to not complicate and remove the originality of the raw sounds. Further allowing the instrument to be utilised in a variety of settings regardless of the user's knowledge level.

Considering the layout of other Drum Designers, I decided to include an AHDSR and a Reverb to the instrument. Because of the simple design, the possibility to have a more personalised Reverb sound arose. Where, instead of only including a wet option, there are wet, room, damping and width editing options. Additionally, by including more Reverb options and having the fundamental AHDSR, the instrument establishes itself stronger to be used for educational purposes to teach the functionality of basic sound manipulation.

The Recording

Finding what sounds to include in the instrument, was a process of trial and error. As mentioned earlier, I wished for the instrument to include samples that had not been widely utilised and that consumers might not expect to encounter. However, when marketing a Kitchen sample instrument, there will be certain expectations concerning what objects it contains. Therefore, it was important to find a balance between finding new and unused sounds, and borrowing from what has already been done before and is expected (Dawar, 2015). Analysing other products found on the market, it became evident that most instruments were mainly focused on utensils, cups and glasses and pots and pans. There was little to no use of any appliances, except for 'The Kitchen' by Embertone which included *oven slams* (Embertones). Building on this notion the sampled items developed to include the closing of an oven door, a fridge door, hitting a pot with a whisk and a soup spoon, hitting a utensil holder with a metal spoon and a whisk, the click of turning on a kettle, running water from the tap, and a combined sound of running water and a pot being hit with a whisk.

During the recording process, the question of why certain items had not been widely sampled arose. What is beneficial with utilising the smaller objects, such as utensils and cups, is the portability of the objects. It offers the choice to move away from the kitchen to record the sounds, resulting in cleaner samples. Kitchen appliances emit a lot of noise, where studies show a fridge have decibel levels of up to 50 (Lodato, 2020). Therefore, by having to sample certain objects in the kitchen, there ended up being a lot of time having to be spent on cleaning up. This was especially evident with the fridge and the oven. In order to achieve the desired sound from the items, the closing of the *fridge*, - and *oven* door had to be done relatively gentle. If not, the action would create unwanted textures and noise that sounded more like someone slamming a door shut, than a usable production element. Therefore, I had to get very close to the sound

source to capture quality samples – consequently resulting in a lot of noise being picked up by the microphone. There had to be a compromise where, by using stationed items I had to accept that some samples would require more thorough editing.

Although I wished to contain as much of the raw sound as possibly, I found this to be unattainable in some instances. Rather focusing on finding the key sound of the item, I would scoop out frequency ranges leaving just the main, fundamental sound. For the *oven* this entailed scooping out the mid's, and removing unwanted metal sounding artefacts, creating this low, deep, and punchy sound. With the *fridge* something similar was done, but rather removing the high-end and boosting some of the low and low-mid frequency ranges. Further, with the *utensil holder* hit with a *spoon*, there was unwanted and unnecessary rumble in the lower frequencies so everything below 500hz is cut out. This technique proved to be important in defining certain samples, by highlighting the core textures of each element – giving the items a purpose and their own defined space within the instrument. Nonetheless, I did only do this extreme editing with certain, more problematic items: the rest are left mostly untouched, apart from some slight reverb being applied to the sample of hitting a *utensil holder* with a *spoon*; to further enhance some of the already present room. And some slight surgical EQ on the sample of a *utensil holder* hit with a *whisk*, removing some bothering frequencies around 800-1khz. Contemplating, it could be discussed if the addition of the reverb was strictly necessary or not. The raw audio was by no means poorly sounding and could have been left untouched. Especially given that the instrument has a Reverb function. However, I found that the natural reverb tail of the audio was unpredictable and contained conflicting dissonates creating unwanted differences between the Round Robins¹. Therefore, I found the best solution to be to shorten the natural reverb tale with a noise gate and replace it; resulting in more unison between the RRs.

Experimenting with the positioning of the microphone to best avoid clipping and unwanted room noise, I would then record each sample with a substantial amount of time between each hit of an item. Timewise, the recording process was fairly quick and straightforward. The recording of the click of the *kettle* was the only lengthy process with unforeseen difficulties. As constructed to do, when the kettle is pressed, the water will start to boil. And as I needed to get several recordings, the time spent from pressing the button to the water boiling became shorter with each take as the water got hotter. As a result, I had to wait a substantial amount of time between each recording to not catch the sound of boiling water. However, this item was one of the easier ones to create RRs for due to its naturally repetitive

¹ From here on I will refer to Round Robins with the abbreviation RR

sound. Similarly, the *sink* also provided easy samples to create RRs with. I would turn on the sink and record the running water for a few seconds with the same water flow. Then cut up the recording creating short, staccato samples, similar to the sound found amongst shaker instruments.

The items dependent on me hitting two objects together or using any form of strength to generate sound proved difficult to create RRs for. Often, there would be inconsistency with how hard I hit an object, or unintentionally hitting the object in different locations, thus creating slight tonality differences. Originally, I wished to create as many RRs as possible to avoid machinegunning (Computer Music, 2015). Nonetheless, it proved difficult to obtain more than 3 similar samples for specific items, mainly the oven and utensil holder hit with a whisk. So, although there were items that could have had 7 RRs, it felt inconsistent to have the samples displayed with a differentiating number of RRs. Therefore, the final instrument has 3 RRs for each sample as this is the lowest amount of repetition required before the brain starts to easily recognize a pattern – and the number I could obtain without having samples that were too different and clashing (Computer Music, 2015). Admittedly, I do believe some of the RRs could have been better executed to obtain an even more cohesive sound pallet. In further developing the instrument, I would do more research into creating good working RRs and spend more time in perfecting each recording. Personally, there are flaws with some of the RRs that I did not have the tools and knowledge to perfect. On later consideration, the instrument would benefit from having help from an audio engineer cleaning up the samples and ensuring that the tonality and key is consistent.

Consequently, my main objective with this instrument was to create something unique, fun, and user-friendly, while also encouraging creativity and experimentation. There is great emphasis on letting each separate sample thrive without the need, or expectation, surrounding what the sound should be used as or that it needs to be manipulated. By only including limited processing options within the instrument, the user is pushed to step into the more basic and fundamental principles of production. Hopefully, the instrument will surprise with how many different sounds one can create with kitchen items, while only using a reverb and an AHDSR. Furthermore, by adapting a simpler design the instrument becomes more accessible to amateurs and beginners who are wanting to learn the fundamental principles, while also offering a unique sound pallet.

Reference list

Apple (2023). *Drum Kit Designer Overview in Logic Pro*. [online] Apple Support. Available at: <https://support.apple.com/no-no/guide/logicpro/lgsi2fb2509e/mac> [Accessed 24 Mar. 2023].

Audioanimals (n.d.). *Kitchen Utensils*. [online] Audio Animals Ltd. Available at: <https://www.audioanimals.co.uk/shop/sample-shop/kitchen-utensils> [Accessed 10 Mar. 2023].

Brummer, L. (2014). *52 Homemade Musical Instruments to Make*. [online] FeltMagnet. Available at: <https://feltmagnet.com/crafts/Music-Instruments-for-Kids-to-Make> [Accessed 24 Mar. 2023].

Computer Music (2015). *How to Avoid the Machine Gun Effect Using round-robin Sampling*. [online] MusicRadar. Available at: <https://www.musicradar.com/tuition/tech/how-to-avoid-the-machine-gun-effect-using-round-robin-sampling-632302> [Accessed 22 Mar. 2023].

Constructed (n.d.). *Turn Nearly Anything into an Instrument*. [online] Instructables. Available at: <https://www.instructables.com/Turn-Nearly-Anything-Into-an-Instrument/> [Accessed 16 Jan. 2023].

Cummings, A. (2020). *Make a Sampled Drum Kit from Objects around the House*. [online] MusicTech. Available at: <https://musictech.com/tutorials/make-sampled-drum-kit-household-items/> [Accessed 21 Mar. 2023].

Dawar, N. and Bagga, C. (2015). *A Better Way to Map Brand Strategy*. [online] Harvard Business Review. Available at: <https://hbr.org/2015/06/a-better-way-to-map-brand-strategy> [Accessed 24 Mar. 2023].

Echo Sounds Works (n.d.). *Echo Sound Works Kitchen Foley Pack*. [online] Echo Sound Works. Available at: <https://www.echosoundworks.com/kitchenfoley> [Accessed 9 Mar. 2023].

Embertone (n.d.). *Kitchen*. [online] www.embertone.com. Available at: <https://www.embertone.com/instruments/kitchen.php> [Accessed 23 Mar. 2023].

Healey, D. (2021). *How to Use Buttons to Trigger Samples in HISE*. [online] www.youtube.com. Available at: https://www.youtube.com/watch?v=5PmEgPVsGvA&ab_channel=DavidHealey [Accessed 17 Mar. 2023].

Healey, D. (2023). *HISE: How to Set an Image for a Button | Button Filmstrips*. [online] www.youtube.com. Available at: https://www.youtube.com/watch?v=d77QJfEMGms&ab_channel=DavidHealey [Accessed 15 Mar. 2023].

Lodato, R. (2020). *Appliances Decibel Ratings Infographic - with Soundproofing Tips*. [online] Residential Acoustics®. Available at: <https://residential-acoustics.com/soundproofing-appliances/> [Accessed 22 Mar. 2023].

Native Instruments (2022). *What Is Sampling in music?* [online] Native Instruments Blog. Available at: <https://blog.native-instruments.com/what-is-sampling-in-music/> [Accessed 24 Mar. 2023].

School of Rock (2019). *Beginner's Guide for Setting up a Drum Set*. [online] School of Rock. Available at: <https://www.schoolofrock.com/resources/drums/beginners-guide-for-how-to-set-up-a-drum-set> [Accessed 24 Mar. 2023].