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Commercial Music Production

DEVELOPMENT (ADAD7005)

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Creating a Sample Instrument Overview

In this reflective analysis, I outline the process I have undertaken to create a sample instrument. This includes; completing research, creating samples, developing the instrument, and testing to achieve the desired outcome. It also incorporates gaining feedback and applying learning to enhance the final product. Finally, I also discuss what I could have changed or would have liked to have done differently, and how I will apply this to help me mature my skills in sample instrument creation.

1 Research

The first step of this process was to carefully research the creation of virtual sampler instruments to better understand how to approach the development including the needs to create samples, as well as investigating industry leading types of software in order to select the most appropriate for me to complete this exercise.

1.1 Virtual Sampler Instruments

Having worked with sampler instruments for a number of years, throughout my production journey. I understood the various types of sampler instruments that are already commercially available, and how to leverage these capabilities within the production environment. There is a wide range of options, which allowed for a large amount of my own creative input.

1.2 Software selection

I researched industry established software options for the creation of instruments by using a variety of techniques including internet searching, reading blogs, listening to YouTube, and discussing with my peers. Three names were consistently recommended and referred to, HISE, Kontakt and Logic.

“HISE is a cross- platform open-source audio application for building virtual instruments. It emphasizes on sampling but includes some basic synthesis features for making hybrid instruments as well as audio effects” (C. Hart, 2023). I would position HISE as the most technically advanced software, it includes a scripting interface based on a slightly modified version of JavaScript, a visual GUI creator and the possibility to write specific C++ sections using the SNEX environment. Some user reviews highlighted complex challenges with the ability to accurately write code to connect controls to their parameters.

Reviewing their online support and guidance manuals I also became aware that the software was quite niche, raising concerns over the ability to quickly self-learn. I therefore felt using this software without previous experience under assignment pressures may become a time-consuming distraction on this occasion. That said, recognising the power of the software, I will certainly seek to incorporate this capability into my ability to create virtual instrument samplers in the future.

“Logic Sampler is a sophisticated software sampler with which you can quickly create multisampling instruments using drag-and-drop workflows” (S. Bennett, 2020).

Logic is a familiar software to me it is my main DAW, reflecting the majority of my experience thus far, its flexibly supports the drag and drop of samples and the creation of zones across keyboard ranges. It also has limitations with the number of parameters that are possible as well as the selection of effects, and for this reason I decided to give myself a stretch challenge to push my learning boundaries selecting an alternative software.

“Kontakt is a VST plugin created by Native Instruments. It’s the host program that powers hundreds of software instruments. It’s also a powerful sampler that allows you to create and edit your own instruments by importing audio samples” (J. Barton, 2023).

Native Instruments are a larger international company, and this is reflected in their provision of a vast amount of help guides, support material and discussion pages, which increased my confidence levels I could find the right resource should I face challenges with sampler instrument development.

1.3 Methods

When I had chosen which type of software, I was going to use I was then able to narrow my research going into more depth to better understand the software features. Native instruments have an extensive YouTube channel which provides technical insight into each product. This enabled me to watch a series of in-depth tutorials explaining and showcasing the various features and settings. I was then able to start testing out Kontakt myself before I decided which type of sample instrument I wanted to create. During this initial test phase I used various drum samples I had previously created from a selection of sample packs. I did this as I didn’t need to record anything, and I could quickly drag and drop the samples to test my ability to navigate the software.

2 Creating Samples

The ability to create professional samples is a key foundational step to developing these further into a sample instrument. Establishing a desired sound outcome, recording and critically editing in an iterative way prior to utilising the sample creation software, enabled me to concentrate on key areas of development and testing of the instrument, recognising this was an overall multi layered approach. “To create a sample instrument that sounds

natural across its full range, multiple samples must be taken. Ideally there'd be a separate sample for each note" (J. Albano, 2021)

2.1 Design Outcomes

I quickly decided that I wanted to create a more melodic instrument to enhance my portfolio capability recognising I would use this more in my production opportunities. I wanted a stretch challenge to create new types of music that could broaden my experience ultimately leading to future commercial opportunities.

I have largely focused on creating Hip-hop/ RnB genres previously which are heavily focused on utilising the drums. "We can all agree that drums gives hip-hop life, yes drums might be used differently, but their importance and prominence cannot be understated" (R. Dhaliwal, 2020).

I create my own drum patterns within logic, instead of using a drum machine, this is purely a personal preference. Recognising this trend, and the desire to create something more melodic, I consciously decided to use a small Kalimba which I owned. to create a unique instrument. I also knew this could present a challenge as the recording and editing process would be longer and need to be more detailed to make sure the implementation into the sampler was as smooth as possible.

2.2 Recording

When I had made a sufficient start on the research and felt like I was ready, I started to record my samples. This was a lengthy and time-consuming process. However, ensuring I produced a high-quality recording was vital to the success of the instrument, as the samples form the core foundational sounds and characteristics that are developed into an instrument. "Sound recording has had a major impact on the business side of the industry too. The ability to mass produce and distribute has made it possible to sell on a much higher level. Therefore, now more than ever quality matters" (M. Walker, 2023).

To record the samples, I used two different types of microphones. I chose to use two so I could compare the different recordings. I also wanted two types of samples to be able to add layers into my sample instrument to improve the quality of the sounds produced and add variation. Having two microphones also acted as a safety contingency measure if for whatever reason one recording became unusable I would not have to repeat the whole recording process.

I chose to use a Rode NT1 condenser microphone, and the Sure SM58 dynamic microphone. I chose the Rode NT1 as it has a smaller frequency response and is much more sensitive to higher end frequencies. The higher end frequencies were something I was really focused on successfully capturing as part of achieving my desired outcome. "The Rode NT1 cardioid condenser microphone has become industry standard; delivering the warmth, extended dynamic range, clarity and high SPL capability typically only featured on some of

the world most expensive microphones” (M. McAllister, 2023) This is because the kalimba I have is on the higher end of the scale in terms of pitch and I wanted to accurately record these frequencies to create the best possible sound. The Rode NT1 is typically used for vocals or acoustic guitar due to its sensitive diaphragm inside the microphone which made it an ideal choice for recording these types of samples.

I chose to use a dynamic for my second microphone to add a different perspective to the recordings, and to be able to have a range of variety in the samples. The SM58 is typically used for live vocals or recording drums such as a snare. This microphone is known for adding ‘crunchy’ characteristics due to the design of the microphone. “The SM58 is so popular among musicians and speakers alike thanks to its versatility, rugged construction, built-in pop filter, cardioid polar pattern and balanced sound” (L. Glynn, 2022). I thought this would be a good alternative to the condenser microphone.

The actual recording process was relatively straight forward, I was able to record the samples using my own studio set-up. I connected both microphones into my Focusrite Interface, which in turn connected into my logic software session. I used two mic stands and positioned both microphones an equal distance apart on either side of the Kalimba. When listening back to the first set of recordings I noticed that there were some issues I needed to resolve. The first issue was that there was a quite high-end buzz/ hiss on the recording. The studio has multiple hardware synths, amps, cabs, additional interfaces and an Xbox/ Tv. I turned all these off at the wall to reduce the number of variables to help me diagnose the problem. I repeated the recordings to be able to compare the outcomes. The hiss was noticeably lower on the second recording, to an acceptable level that would enable the recording process to continue without eroding the quality. When recording the samples, I recorded each note five times, as I wanted to use round robins to help the instrument sound less static, as well as add variation to the samples. “Sampling and instrument in this way results in natural variations in otherwise static patterns. This gives the instrument a realistic feel as each repeated note has a different performance” (S. Audio, 2019) I chose to use Logic Pro X to edit and record the samples as it’s the DAW I’m most proficient with increasing my effectiveness in this stage of the process.

2.3 Editing

Once I had completed the recording process and was satisfied with the raw samples. I was able to start the editing process. It was important that I had edited the samples before loading them into Kontakt, for several reasons.

2.3.1 Noise reduction

The first part of the editing process was noise reduction. By using the RX 6 audio editor, I was able to use its noise reduction features. RX 6 is especially efficient at noise reduction when a range of samples are used to provide suitable comparators, including an example of “silence”. The RX capability can detect and reduce background hissing at certain frequencies, in order to be able to achieve this recording files are created including one that has recorded as near to a silence as possible known as a “room tone”. A frustrating “hiss” can often be created from a number of things such as the cable used, the microphone used,

the pre amp; each signal will have a slightly different sounding hiss. When selecting a part of this hiss inside an audio file I can use the 'learn' feature to eradicate this type of hiss relative to the preferred room tone sample.

2.3.2 Sizing

The second step, in editing was to cut the samples down to the correct size, I chose to use logic Pro as I knew I could do it quickly to the same quality level as any other industry software e.g., Reaper or Audacity. By cutting the samples down I can ensure that there are no spaces from when the audio file starts, and the sound plays. If a space exists when the sample is triggered it could create a delay and this could in turn hinder the user's ability to play the instrument in time, however, by editing the samples to the correct length this issue is avoided. After editing the individual samples, I was then able to add a slight fade out to each sample making the samples sound smoother when loaded into Kontakt.

2.3.3 Pitch and Label

When finishing the editing I had a few steps to complete before loading the samples into the Kontakt software. It was important to be able to find the correct pitch of each note and to label them accordingly. Though this process was very long and tedious, it was also essential in making it a lot easier to successfully load in the samples into Kontakt and to not get them confused which could have slowed down the instrument development stage. To make sure I knew which sample was which note, I reference them against a piano keyboard. This was done by ear by playing the sample then trying to find that note on the keyboard, which was very ;laborious but vital to creating a quality product

2.3.4 Re-amping

After correctly organising an editing my samples I decided to re amp them using a Kemper Profiling guitar amp to make the samples even more unique and hopefully add new sonic qualities to the instrument which would set it apart from others. "Re-amping also encourages experimentation, as it's easy to try out effects and other outboard gear" (J. Herrera, 2020). I re-amped the samples by playing them through the Kemper amp which was then recorded into a logic session. Re-recording the samples was also time consuming however, I was confident the end result would be worth it. Having taken the time to label and organise the samples it did improve my efficiency during this re-recording. I was able to experiment with the different types of effects I could utilise from Kemper which allowed me to try different options to see which ones I thought worked best for my desired outcome. The first effect I tried was distortion, as it's a good effect for completely changing the main characteristics of the sample. When reflecting on my use of distortion I felt that it was taking the instrument into a harsher and grittier sound which was not what I initially wanted to create. However, the samples did sound warmer but with a darker tone. I wanted to capture the warmer tones, so I chose saturation instead as an alternative. When reviewing the samples, the saturation added exactly the type of warm tone I was looking for.

The next step was to find the correct parameters for the saturation to fully optimise the effect in context with the sample instrument. Once this had been achieved, I then

proceeded to start trialling more experimental modulation effects, such as Delay, Flanger, Phaser, Tremolo, Chorus etc. This process was very enjoyable as I was able to try out the different directions in which I could take this sample instrument. The one effect I didn't want to add in the re-amping phase was reverb, I knew I wanted to add this within the Kontakt software recognising I had some enveloper issues I wanted to resolve. Adding the reverb in before this stage could have made things harder and more complicated as it might not have fit when re-amping. That said, when I reflected on the newly created sounds using the Kemper, I decided that the modulation effects did not add the qualities or tones I wanted the end instrument to demonstrate. I therefore only used saturation from Kemper, to make the samples warmer in tone.

I knew I could do more with my studio capability and decided to take the re-amping phase one step further. I decided to re-record the samples again however this time through the Kemper which was connected to one of my analogue tube amps/ cab. I was hopeful that by running the samples through a tube amp this would add a more natural warmth which is typical with tube hardware. When trialling this arrangement and listening to the first set of recordings again, there was a noticeable difference in the tone of the samples. However, similar to when I added the distortion effect through Kemper, the samples now had a harsher sound to them. To resolve this issue, I simply adjusted the treble, mid, presence and gain parameters, until the overall sound of the samples was what I wanted. When I had achieved this sound, I was able to successfully record the rest of the samples.

3 Developing an Instrument

After I had re-amped the samples it was time to start moving them into the Kontakt software to start building my instrument.

3.1 Mapping Samples

The first step in building the instrument was to map the files to the correct notes on the piano roll. The Kontakt software has a feature that enabled me to link the samples to the correct key by searching the notes that I had previously labelled. The next step was to start experimenting with the enveloper which is built into Kontakt. I first wanted to adjust the release to allow the notes to ring out longer, which would in turn make the reverb I later wanted to add more effective and noticeable. I only adjusted the release by adding 3 seconds. Aside from the release the only other parameter I adjusted was the sustain, by 1 second, in order to extend the tail of the sample.

3.2 Enhancing Effects

After changing the enveloper on each sample group, I was then able to start choosing and selecting which effects I wanted to add. Adding effects into Kontakt was straight forward, as it allowed me to try and test multiple different types of effects to see which ones worked best. The first effect I knew I wanted to add was reverb, to keep as much of the original tonal qualities from the Kimba as possible, this would make the instrument sound even bigger and add more texture to the overall sound. I also knew I wanted to set a

parameter to change the amount of reverb, and the type, within the instrument to create a versatile sound that was capable of being customised to a broad range of music situations.

3.3 User Interface considerations

At this stage, development of the instrument was complete for my purposes, however I recognised that if this were to be made available commercially, creating a UI (User Interface) would be beneficial, offering a more professional and unique look to the instrument. The UI could also provide the ability to vary certain parameters making it easier to alter the effects and overall sound of the instrument. Which in turn could make it more accessible and commercially viable creating an opportunity to reach a wider audience.

I therefore created UI designs to start to explore this opportunity laying foundations for further development in the future. Consideration was given to using creator tools software to develop multiple graphic and digital designs integrating this with the Kontakt software. I also created some mock designs of what the UI could have looked like. (Appendix 1)

Creator tools software contains features to support setting multiple parameters which can be routed to control various effects, modulations, and other controls of the instrument. By adding these features, it is possible to create a bespoke and unique instrument, further enhancing the commercial opportunities. It also provides an opportunity for the instrument to be more accessible to a wider range of abilities, especially to users who don't have experience creating instruments in Kontakt. The UI presents like any other digital VST or MIDI instrument, with limited but effective controls to manipulate the sound of the instrument.

4 Feedback and Learning

When initially testing the samples, I had issues making sure that they were recorded at the correct gain level. I researched various Reddit pages on Kontakt instrument development on their home website, which enabled me to experiment with multiple levels to see which level was the most effective. Another testing issue I faced was during the recording phase, however, through troubleshooting the whole signal chain I was able to successfully resolve this issue.

When creating my instrument, it was essential to gain peer feedback in order to validate my approach, the desired outcome and to gain new insight from a wider range of experiences in the music industry. This feedback allowed me to explore other options for possible sound outcome. As well as the types of effects and general design on the instrument. When I had the first prototype of the sample instrument, I was able to let the members of my band try it and give me suggestions for improvement.

The feedback that I got was mainly positive, they enjoyed using it and all agreed it was something they would use. However, the main point of feedback was that the effects

needed to be customisable to be of real value. This issue is easily resolved as any user can add their own effects in the channel which kontakt is on or within kontakt itself.

5 Future opportunities

Moving forward for my next instrument development, I intent to start developing my skills further to use HISE. The main reason is that within HISE you are able to right the actual script and coding for the instrument. This is possible in Kontakt; however, it appears to be a more efficient process in HISE. There are also many pre written scripts that are available to download, which can be used to create the base for the instrument. HISE similar to Kontakt also has its own version to Creator tools, but again, it appears more advanced in its UI creation capabilities.

The recordings could have also been improved upon if I had used a wider range of mics to get a better selection of different recordings to provide greater sample variation. This in turn could have also made a greater impact on the use of round Robins and their groupings. s. The re-amping phase could have also been enhanced. using hardware plugins to create a much larger signal flow with multiple effects. This could have generated an opportunity for even more experimentation on the possible types of sound I could create.

6 Conclusion

Overall, this project has been a very enjoyable learning opportunity. I have been able to utilise existing skills whist also developing new skills as a producer. I have gained deeper testing and problem-solving insight though exploring different solutions. During this project I have also had the opportunity to seek feedback from a wider audience of talents gaining valuable insight into instrument usability in multiple contexts. As a producer this is an important skill which will be used in most areas of production and overall, as a developing creative. Moving forward I now have a deeper understanding on sampler instrument creation and more motivation to continue my experience in this area.

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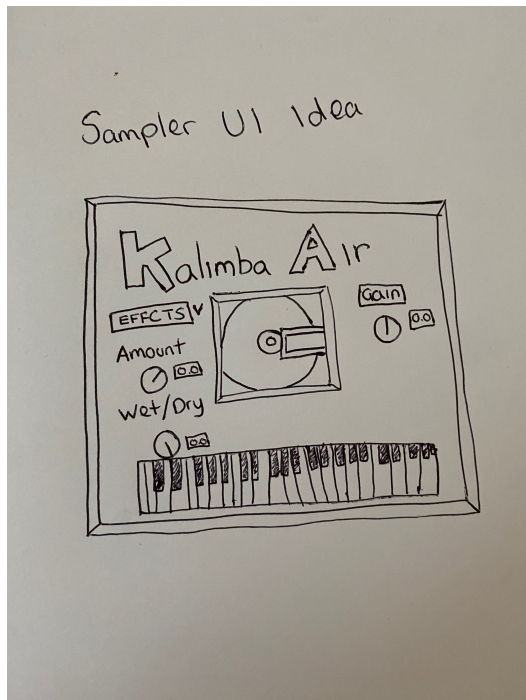
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APPENDIX

1.



FX: REVERB



GAIN

