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Using music software in the compositional process: A case study of electronic music composition

ABSTRACT

This study explores the compositional process of writing a song, using arranging, multitrack recording, amplifier modelling software and the student experiences of music composition in a non-conventional classroom. This case study centred on one student's experiences with composition and music software. The student was 15 years old and studied guitar for four years. He received music theory instruction and composition lessons with the goal of increasing musical knowledge throughout the process. The application of the techniques acquired during weekly lessons were implemented by the student in the creation of the composition. The student was restricted from the use of commercial tracks or loops but to focus on the student's creative product. The music teacher facilitated the student throughout the project offering guidance and suggestions. The student was allowed to compose freely without regard to the finished product by the teacher. The assignment of the composition project was to create an instrumental pop song. The student and the teacher reviewed the composition, discussed the various aspects of its design, and explored the construction of the finished product. The study concluded with the construction of a professionally recorded song with the use of quality sampled instruments from different music software programs. Recording the final song completed the student's assignment.

KEYWORDS

music
software
electronic music
composition
education
music technology

INTRODUCTION

The use of technology in a compositional environment is not a new idea. Many research articles expound on the use of music technology in education (Berk 2008; Hewitt 2009; Johnston and Edmonds 2004). The practical application of various music technologies has advanced immeasurably with recent progress in technical developments of software and hardware. New software applications allow greater freedom to construct complex arrangements. The software advancements have also allowed the musician to achieve greater creativity. The modern musician has access to technology to record and distribute music. This distribution can be local or extended globally through the use of the Internet.

It is in this field that innovations are made as the boundaries for new products are being mapped. During the past decade, software music companies have made great advances in multitrack recording, software instruments and digital audio workstations (DAW). Given the rapid rate of these advances, it is impossible to keep abreast of all the different types of music software. One can only become specialized in a few of the software packages. Although, some software applications take a considerable amount of time to learn due to their complexity, most are user friendly and intuitive. With the varied choices that are at the disposal of the music teacher one can choose a system that will aid the student and create a more optimal learning environment.

Some of the developments in digital hardware include personal computers, audio interfaces, MIDI keyboards (Colwell et al. 2002: 416–18). The price of the personal computer has decreased over the past decade allowing accessibility by a larger user base. Its prevalent use has allowed many to adapt the computer as a tool in creating music.

Audio interfaces have shown remarkable improvement over previous designs. These enhancements have improved the sound quality for the musician (Dean 2009: 65). The sound systems within a personal computer only meets the minimum requirement for producing sounds such as playing music. It does not have the sophistication to record higher quality audio.

Innovations in keyboard controller design during the past decade have exhibited both new and powerful MIDI control units, thus creating a multimodal device that interfaces with the music software. Current MIDI keyboards can be a remote transfer control for a digital audio workstation.

The software available covers a range of applications such as loop base, notation base and DAW. These applications aid in different ways to in the process of composing music. While the software is very advanced in its design, it is still merely a tool and should be treated as such in the compositional process of facilitating music creativity. There are no short cuts to creating music. Even with the most modern technologically advanced software, the musician is still responsible for making the decisions in the compositional process.

The music teacher has the opportunity to guide the student into different avenues of the music creativity and at the same time allow the student freedom to express the intent of the original piece. In the field of composition, the most influential person is the teacher (Burnard 2006; Randles 2009). Barrett (2006) indicated that in a tertiary institution, compositional instruction is provided by the relationship of a composer teacher and the student composer. The music teacher changes roles to a music mentor that allows music creativity to flourish.

In modern electronic/pop music composition, changing roles by the music teacher is necessary to assist in the creativity and composition by the student.

In this process, the teacher will be the facilitator. In a study, Ruthmann (2007) outlines a model classroom where the student is learning to compose music. Rather than teaching the musical elements of composition, Ruthmann's study allowed the student the freedom to create music and explore personal musical creativity. This is similar to the informal learning model introduced by Green (2008:1). Facilitating can be accomplished by the suggestion of a different chord sequence or a different type of sound or timbre relating to the electronic instrument.

Another thread of research is sound design or timbre. Moorefield (2005: 95–97) commented on a number of artists who composed music by matching the sound they heard within their head to the sound being created in the studio. This type of composition describes how Michael Jackson, composed music in his studio by recording beats from a drum machine and using synthesizer sounds. In this context, sound design or timbre becomes salient to the artist as they try to replicate in the studio, what they hear in their head. Thibeault (2012) pointed out that students creating music in the studio, should make decisions about the sound early in the creative process. Sounds or arrangement of sounds in the studio contribute to the texture of the song and adds emotional content to the recording (Zak 2001: 32–34).

Evidence of this concept is the use of modern amplifier modelling software, an innovative type of electronic sound design. This type of software allows an electric guitar to sound like different combinations of electric guitars and amplifiers. Recent interest in software for the electric guitar began a number of years ago when Line 6 offered digital modelling. While artificial intelligence is a research discipline in music technology, algorithmic programming in this case is used to model an acoustical environment. Great advances were made in the guitar acoustical modelling that a number of major software companies have products that produce sounds that are considerably close to the original guitar/amplifier setup.

This software design is called amplifier modelling. It uses algorithms to replicate the sound that the amplifier makes in a studio. There are three major companies that produce this type of software. They are Line 6's POD Farm, Waves' GTR and Native Instruments' Guitar Rig. With the recent updates to the software package, it is difficult to choose one, as all are extremely accurate at what they accomplish. For example, if I wanted my guitar to sound like a Fender Telecaster guitar from the 1950s connected to a Fender tweed amplifier, there are a number of patches (or preset sounds) that modify the parameters within the modelling software to create that sound.

PURPOSE

The purpose of the study was to explore the compositional process of the student in the recording studio. Since the student will be making musical decisions, the study investigated the activities while recording the composition during studio sessions. The design of the study will be qualitative and explorative. Case study design was chosen for the framework of this research (Patton et al. 2002). The data collected consisted of journals, informal interviews and observational notes. The question that guided this enquiry; how would music software aid the student in the compositional process?

The study used students from a private studio. About 31 students attended the studio, with about sixteen learning electric guitar while the others are studying piano. The lessons for those studying electric guitar are 30 minutes

each week with instruction in technique, songwriting and improvising. These lessons continue yearly depending on the level of experience they had before joining the studio. The students are middle school to high school students that are not enrolled in a music programme at their public school. The student in this study was selected from a group of students (n=11) that attend the studio's advanced technique and song writing group. The selection of the student for this study was based on the completion of the assignment. The other students completed the assignment after this study was completed.

METHOD

Each student was given a song writing assignment that consisted of writing a pop song that included a chord chart and an improvised melody or riff for the song. The requirement for the song structure included a verse, chorus and a bridge, and to function as a pop song. The students could choose from different musical forms such as ABA or ABAC, for the musical structure of the song. The students had six weeks to produce the chord chart and other elements for the song.

The decision to use software was to eliminate the music teacher's extrinsic incentives on the influence of the student during the creation of the composition. The incentives encourage the student to create for the teacher disregarding their own ideals. Removing this expectation and reassigning the focus to the compositional use of software should encourage personal musical creativity. Furthermore, the process of creating music will be guided by the music teacher when needed insuring that creativity would not be obstructed. In this environment, the music teacher is acting as a facilitator in the compositional process.

The studio consisted of a Windows PC running version 7. The audio interface used in the studio was a Focusrite Pro 24 DSP. The two software programs used in this study were Band in a Box, and Ableton Live version 8. An internal virtual studio technology (VST) module from Line 6 called POD Farm was used in the application of amplifier modelling. While other software exists in the studio such as sample instruments, they are identified during the narrative.

THE STORY

The participant in this study was a 15-year-old student. I have assigned the name David to insure his anonymity. David has been playing the electric guitar for about four years. During the first interview, he indicated that his first guitar teacher taught him a number of cover songs. His mom disclosed that he was never taught an entire song. He could only play the first 30 seconds of four or five cover songs. David was disappointed with his progress and wanted to learn more advanced playing techniques. He was interested in playing songs that had an outstanding lead part. He listened to songs written in the 1970s and 1980s. The electric guitar was a major part of the genre of that period. He had certain songs that he wanted to play but could not play them because of their complexity. 'Crazy Train' by Ozzy Osborurne, 'Stairway to Heaven' by Led Zeppelin, and 'Back in Black' by AC/DC were some of his favourites. His interest varied across different types of genre, but it is the lead parts that brought the most inspiration. It was during the interview that I discovered that he had this interest and that he had a strong desire to create music.

David has been my student for over three years and has learned to read notation and guitar tab. He can successfully read a guitar notated sheet of music and play it with few mistakes. His skills as a musician have improved that allowed him to play entire songs. His interest in writing music started when I saw him improvising in the studio. I asked him to explain what he was doing. He played a song that he composed himself. I was surprised how well it sounded. We spent the following lessons working on the song. David notated the song, and we made a recording of it. In the subsequent lessons, we studied the possibilities of writing a guitar lead part over the song. After several attempts he finally concluded with a lead part that he thought would work with the piece. David then practiced this part of the song by playing over a recording of the rhythm part of the song. When he was finally satisfied with the results, we made a recording for him to take home and practice.

COMPOSITIONAL PROCESS

I decided to bring the project into the studio and allow David to complete the composition and record his work. The studio experience was new to David. He has never been in a studio before, and at first, it was somewhat over-whelming. However, after I explained the different components of the recording system he gained a basic understanding of how it worked, he was less apprehensive.

David had written the chord sequence on a chord chart. The chord chart contains the chord sequence for an ABA form structure. His song was simple but the way he envisioned it was more like a 'beach song'. Enquiring further, he wanted his song to sound like Bob Marley or Jimmy Buffett. David and I discussed styles and what they would sound like in his song. David also discussed the lead sound. He wanted a sound like an electric guitar similar to rock bands in the 1950s or 1960s.

In the studio, there were a number of software programs that we could use. I decided to use Band in a Box, created by PG Music. It is an advanced software program that allows users to create an arrangement of a song based on style types. While I could suggest different styles or even arrange a bass track, it would have my style or reflection on David's music. Therefore, this piece of software was chosen because the teacher's involvement in the composition process was not necessary. Given that Band in a Box was an arranging type of music software, it contains a number of different styles that would allow David ownership of the decision process. One of the advantages of this type of software was that one could change the style while the music was playing. This offered a great advantage to make the song sound like, or close to, what the musician is looking for.

Studio time was scheduled the following week and David brought his guitar and music into the studio. My studio is setup to audition guitar patches (or preset sounds). Some of them range from the type one would hear in pop songs to more experimental types that are heard in movie soundtracks. The popular sounds are the ones heard on songs from the late 1950s to the 1980s. There are electric guitar patches that sound like a Gibson Les Paul connected to a Marshall amplifier. Other patches include the sound of the lead guitar in AC/DC's 'Back in Black'. These sounds are almost known by name by a number of the students in the studio. They have listened to these songs and read how the artist has constructed the setup to produce that sound in the song. Since David and other students

have spent a considerable amount of time listening to these songs, they are able to tell me if the sound that I selected is close to or exactly what they wanted.

David brought the chord chart and I typed them into Band in a Box. After all of the chords were entered we played it with the default style, Standard Rock. It was obvious that the style did not fit that song. We narrowed it down to Reggae and Rock Ballad. The style 'Reggae_2' was chosen for the rhythm part of the song. It was similar to Bob Marleys' 'One Life'. After the corrections were made and the song followed the chord sheet, David started to play the lead part over the song on his electric guitar. He was amazed that it fit so well. Since Band in a Box was not a multitrack recorder, we needed to move the song to a music software application that had multitrack recording capabilities.

I exported the MIDI from Band in a Box and imported it to Ableton Live. I use Ableton in the studio for compositional projects and for multitrack recording. Within Ableton there are a number of instruments that allow experimentation with the song and enable the student to listen to the changes and to produce the final product.

When the MIDI was imported into Ableton, David did not like the way it sounded. Band in a Box separated each track into bass, guitar rhythm, keyboard, strings and drums. When I played it for him, Ableton was using the general MIDI sounds for play back. With his disapproval over the sounds, I decided to change each of the tracks to a more realistic sound, either using Ableton's sampled sound library or one of my studio libraries.

The drums were first to change. I found a rock kit in one of my studio libraries to substitute the general MIDI sound. The rock kit had a weak snare drum. I changed the snare drum to another snare with more punch. This allowed the snare to come through the mix and add to the rhythmic texture of the song.

I changed the keyboard to a piano patch that made the piano sound more like a real piano sound. This improved the sound, creating a more realistic sonic landscape. This started to bring the song together. I did the same with the bass and strings. The rhythm guitar, however, became an issue. The patches in my library did not sound real enough to make the rhythm guitar track stand out. David decided to play that part of the track live. We recorded the track with David performing on his acoustic guitar. When he completed the song, he noticed a mistake in his performance. However, I insisted that it would not interfere with this song as a whole. I reminded him that many professional performers make mistakes in songs and they are produced that way. An artist could spend a year trying to bring the song to perfection.

With the rhythm track completed, we reviewed the song again. David was satisfied with the results and it was now time to move to recording the lead part that he wrote. I used software from Line 6 called POD Farm to make the lead guitar sound. After a few patches, I suggested a 1970s Electric Guitar patch. We modified it to match the style and to fit in the mix that we had completed. David recorded the lead part twice to make sure there were no mistakes in his performance.

David was happy with the results and we mixed the tracks down to a stereo wave file. I converted the file to an MP3 so that I could e-mail it to his mother. She was so excited about the finished song; she e-mailed it to everyone in her family. They responded with overwhelming accolades.

DISCOVERIES REGARDING THE COMPOSITIONAL PROCESS

The completed project brought great joy to the student and his family. Many of the stakeholders believe that the project was a success upon listening to the song and comparing it to a commercially produced soundtrack. This project proved the following three points that otherwise would not have been discovered by David: (1) the possibility of a professional sound, (2) the sounds of other instruments (3) and the impact of different types of guitars sounds.

Possibilities of professional sound

It is possible to produce a student's project to the level of a professional sound track. Although, with all of this effort, the student may still see the composed song as an amateur attempt, the professional sound can be achieved, as we discovered in the studio. The use of digital signal processing, which included compressors, equalizers and signal delay software, functions to replace some of the expensive hardware equipment in a professional studio. In modern commercial studios, the equipment is unique to the needs of the studio owner. However, the music that is produced has a similar commercial feel (Collins 2007:27–28). It is not feasible to have all of the hardware equipment that a commercial studio contains therefore the use of digital signal processing allowed the production of the music to sound as if it was recorded in a commercial environment.

The sound of other instruments

In the studio, we discovered the sound of other instruments. For example, general MIDI drums sound thin and weak. Current pop songs normally have a large drum sound. Sounds like these are created in a studio environment. When the decisions came for which drum set to use, David wanted that large drum sound. I believe that most students would choose this over other drum sounds because they spend so much time listening to the beat of the song. Those beats have strong bass drum sounds and are a major reason for listening to a song.

Different types of guitars

The Line 6 POD Farm instrument has a large number of patches. Some of the more favourite ones are the retro sounds from the 1970s. A number of my students are avid listeners of music from the 1960s and 1970s. This software contains guitar sounds from that period. In the studio, it became difficult to find patches that worked. The stock ones were great and it became arduous to make a decision on one type of sound. We finally resolved to modify one of the patches that came close to the sound that David wanted. Besides the extensive library for guitar sounds, the software allows changes to the parameters for each component in the audio chain (i.e. compressor, distortion, reverb and amplifier) that is contained in that patch.

In concluding the project, the student had the final decision in the process of each step. It was rewarding to the student to have the sound that he envisioned produced in the final product. The process was enlightening to the student. He now has an appreciation of the processes that are involved in producing a pop song.

While the motivation behind writing the song was the student's responsibility, the recording and production was the responsibility of the

music teacher. The recording session was the place that many of the decisions took place that resulted in the production of the final recording.

Discussion

David experienced a number of things during this process. In his survey responses, he was surprised as to how all of the pieces came together. When the assignment was completed, he felt inspired to write another one. One of his discoveries was the speed at which the changes can be made to the song with different instruments used in the mix. The use of technology allowed rapid changes to be implemented. Given that the software has a library of instruments to choose from, the selection process becomes more straight-forward. Factors affecting the process were driven by the student's creative impulse.

David's responses to the interview revealed the progress he made while composing and producing the song. When asked about his reaction to the completed song, he replied, 'I was surprised at how well it all came together, and I felt inspired to write another song'. He was very proud of what he had accomplished.

I asked if he shared the song with others and what they said.

My Aunts, Uncles and Grandparents. They were impressed that I had written the entire song and that it sounded like I was playing with a whole band.

I enquired if he believed that he had grown from this experience, and what this did for his music abilities.

> I have matured as a musician because it opened up new opportunities for me as a performer and as a songwriter.

Thinking about other students that would attempt this project, I asked him what he would say to others that would produce a song in the future. He had great advice.

> Have a good idea of what you want the song to sound like, so that you are not overwhelmed by the large amount of instruments and styles that can be used in the song. Also, try to incorporate lyrics into the songs.

While his answers outlined the progress he made in the studio, some tasks presented difficulties. The idea of recording in a studio could be overwhelming. The decisions that were made during the recording were just as important as those made during the compositional process of the assignment. When asked what the hardest part of writing the song.

> Thinking of the music for other instruments.

Therefore, for the student the procedure to write for other instruments could become a complex undertaking. Especially if one was relying totally on the sound of the music. This could become an obstacle if the teacher and the student could not write for other instruments. Then it becomes salient for the teacher to suggest using prerecorded loops or creating the music for the track. Without the proficiency of writing for other instruments, the choice to use loop based software became prevalent. In this study, while

using the MIDI from Band in a Box, Ableton's MIDI editor allowed the student to make changes and listen to the music at the same time. This made the difficult experience less stressful and allowed the changes with minimum effort from the student.

With the current music technology, it becomes clear that a student may be overwhelmed by the number of instruments and the many styles from which one can choose. After this experience, David wanted to incorporate lyrics into the song. This was an indication that growth had occurred. His desire to verbalize his thoughts into a musical form had become the next objective in his learning development. When asked how he felt about this entire exercise, his reply was enlightening.

> This was a very special experience that taught me how to apply every-thing I have learned throughout my career playing guitar to create this song. I feel more confident as a musician and I feel inspired to write more songs.

IMPLICATIONS FOR MUSIC EDUCATION

The studio has grown to become part of the musician's personal musical environment. Musicians now use the studio not only to record the music, but also to construct and assemble the product. This has become trend for many professionals since the late 1980s. The evolution of the studio environment continues today as the studio moves from a sole commercial venture to an extension of the musicians practice space. Thus allowing the musician to interface with the studio and accept it as a meta-instrument (Moorefield 2005: 54).

In its simplistic form, the studio consists of a computer, an audio interface and software that consist of a sequencer program. The use of the sequencer in the compositional process will enable a transfer of knowledge and skills used to create music (Folkestad et al. 1997). Thus, the sequencer functions as a tool to explore musical ideas, while being transparent in compositional process. Through engagement of the software as a whole, the student was able to verbalize his thoughts and rational about the decisions made towards to final product. This agrees with conclusions of Tobias' study of songwriting and technology (2010).

As a teacher, one must be aware of the music technological advances. Current music trends dictate the type of digital technology that could be used in the studio and the classroom. While some of the technology is simplistic, some of the more recent software developments encompass a large learning curve. Time is needed to explore the software and its application in a class-room environment. It is in this context that the knowledge of the technology will be of great benefit to the musical instruction of the student.

While the completed project was a success for the student, I however, encountered a different set of circumstances in the studio. Most of the issues I had in the studio were focused on the reduction of the number of deci-sions. While we decided on bass guitar, rhythm guitar and drum instru-ment sounds, there were actually more than enough choices from the library that came with the studio software. We had to come to a compromise, to make decisions on a basis of elimination. This presented the student with fewer choices, while elucidating the direction of the song. This finding, fewer choices leading to more creative student products, supports similar research

in the area of children's musical creativity where sound exploration does not produce musical result (Kratus 1994; Younker 2000). The first step in the compositional process involved exploration. While no music was composed in the exploration period, this period was needed to outline the characteristic of the final product.

CONCLUSION

Reviewing the original research question, how would music software aid a student in the compositional process? It can be concluded that the software did provide assistance in the compositional process that led to a final product. We able to produce the song the student had envisioned. From the notes of the interview and the survey, the student commented that he had indeed succeeded in reaching that goal. However, from this perspective, an exploration of the interaction of music software and the processes that the student encountered while producing the final musical product will be addressed.

While the software was indispensable in this project and enhanced the elements of the composition, it also became an impetus to the next stage in the compositional process. The software allows for quick changes in the sound facilitating the experimentation of the music production process. This led to quicker decisions about texture, timbre and the total mix.

While the software was a great aid in creating the product, some hindrances were encountered. It appears that the software library presented too many options to the musician. Indeed, when software engineers create applications that meet the needs of the majority of musicians, the decision process becomes increasing complex and inconclusive. However, given certain parameters, the hindrances can be minimized and the process becomes unproblematic and manageable. In commercial studios if the musician did not make a decision, the producer will. And in other cases will bypass the musician in the production phase. This keeps the studio time to a minimum and the focus of the artist on the performance of the song.

However, during the studio time the focus was no longer on the student and the lesson, but on producing the song and ways to improve the sound or timbre. Every change that was implemented to improve the product the question was asked, 'Can we do better?' This mindset to produce and improve the music became salient. In the studio, the production of the music evolved into a team effort. The ears of the student and the technical knowledge of the teacher working in unison to improve the texture of the music and bring the quality of the sound to a production level.

For all of the work involved, it was rewarding to hear the comments from those who listened to the song and gave great encouragement. The completed song, distributed throughout the family, became prominent in their discussions. The parents were impressed that their child could create music on this level. It is believed that we reached a professional studio level in the production of the song. Additionally, it was a great recording of someone who had passion for his music and it was demonstrated in the song.

There is a final point that needs no explanation from the teacher or the student. When the song was finally completed in the studio and there were no more changes to be attempted, we played the song one last time. Did I see a smile on the face of the student? Perhaps.

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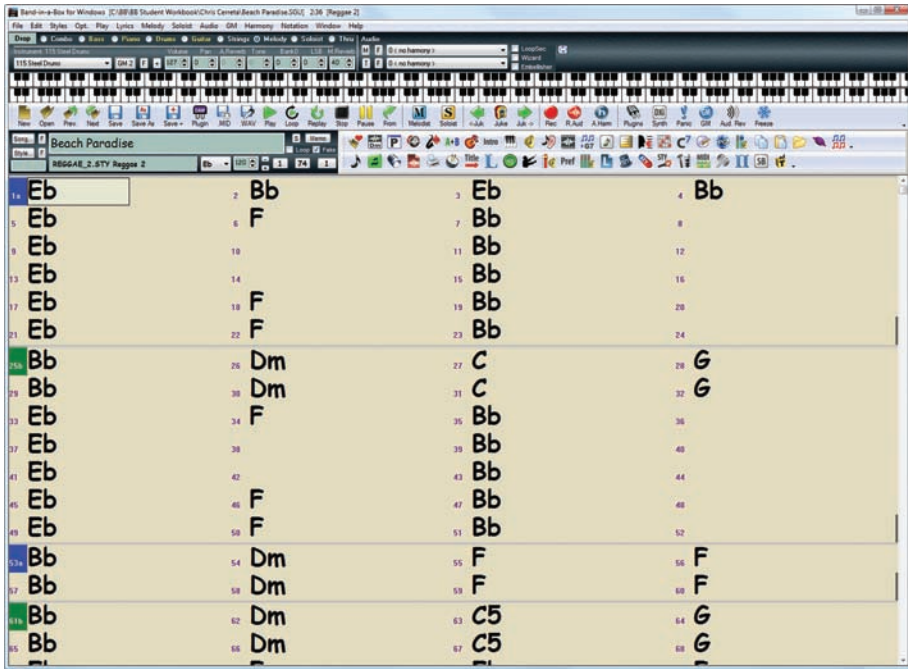
APPENDIX I: SCREEN SHOTS
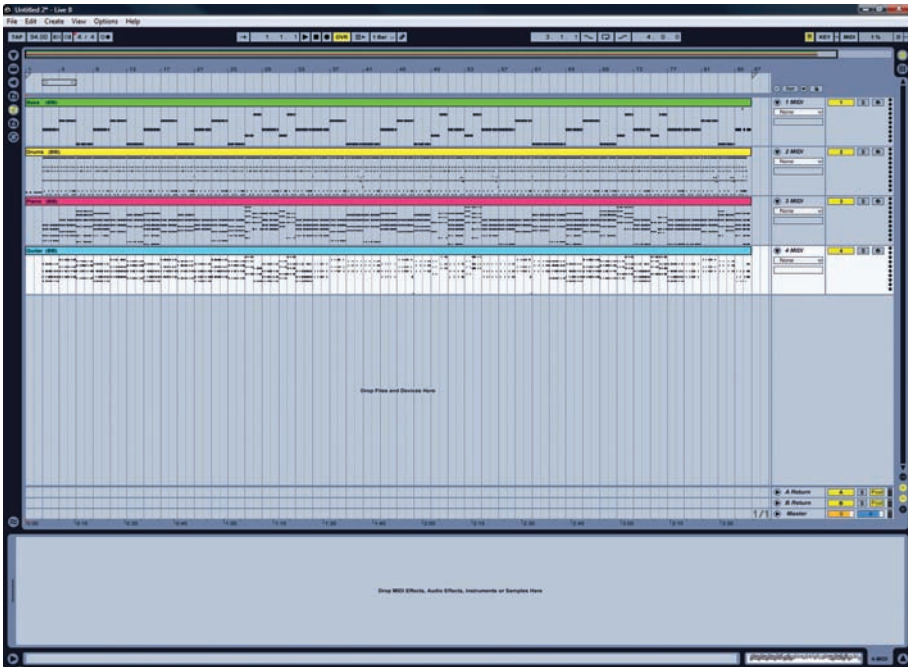

Figure 1: Band in Box screen shot.

Figure 2: Ableton screen shot. Band in a Box MIDI import tracks into Ableton Live.
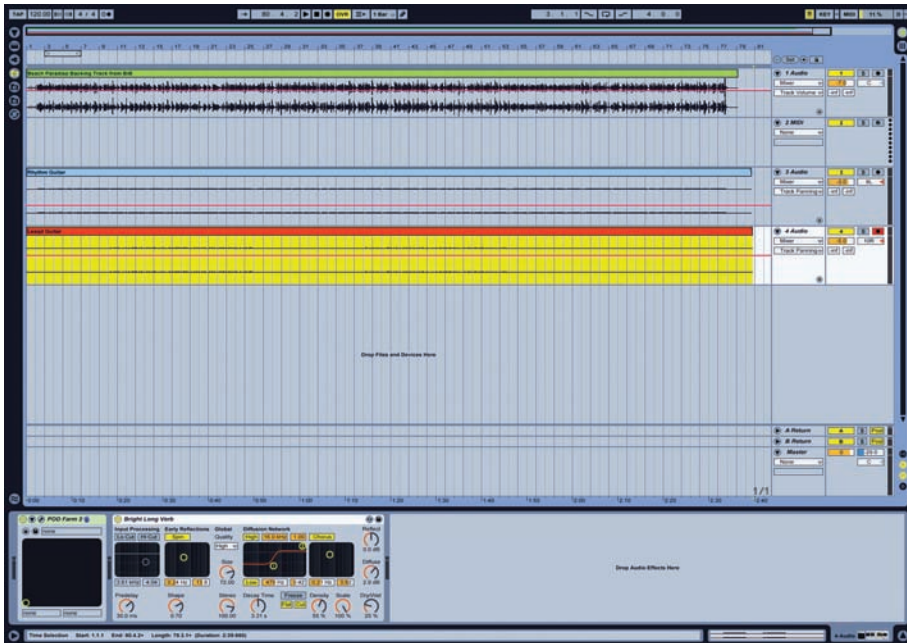
Figure 3: Final song mix.

APPENDIX II: SURVEY QUESTIONS FOR STUDENT

1. What was your reaction to the finished song?

   I was surprised at how well it all came together, and I felt inspired to write another song.

2. Did you share this song with others?

   Yes.

3. Who?

   My aunts, uncles and grandparents.

4. What were their reactions to your song?

   They were impressed that I had written the entire song and that it sounded like I was playing with a whole band.

5. Do you think that you have grown as a musician because of this experience?

   Yes. I have matured as a musician because it opened up new opportunities for me as a performer and song writer.

6. What did you learn the most?

   I learned how to create and blend different parts of the song and how to write solos that fit into the song.

7. What was the hardest part of writing your song?

Thinking of the music for the other instruments in the song.

8. What did you think of the music technology used in the studio to create your song?

I was surprised and fascinated by how much detail went into each instruments part and how all of the pieces of music could be combined to form the song with only the click of the mouse.

9. Did you believe that the technology existed to create parts of your song?

I knew it existed, but I didn't think Mr Nevels had it in his house, or that I would ever use it.

10. Now that the song is finished, what would you do different for the next song you write?

I would try to think of lyrics and try to come up with more complex chords sequences to make the song sound even better.

11. What would you do different in the studio?

I would listen to the music throughout the creation of the piece more often now that I know it's easy to fix any mistakes.

12. What do you have to say to those who will do this in the future? For example what advice would you offer them?

I would tell them to have a good idea of what they want the song to sound like, so that they are not overwhelmed by the large amount of instruments and styles that can be used in the song. Also try to incorporate lyrics into the songs.

13. Use this page for any comment you would like to share –

This was a very special experience that taught me how to apply everything I have learned throughout my career playing guitar to create this song. I feel much more confident in myself as a musician and I feel inspired to write more songs.

SUGGESTED CITATION

CONTRIBUTOR DETAILS

Daniel Nevels is a third year doctoral student studying Music Education at the University of South Florida. His research interest includes music technology, software composition and education. He received a B.A. from the University of Tampa (2008) and a M.M. in Composition from the University of South Florida (2010).

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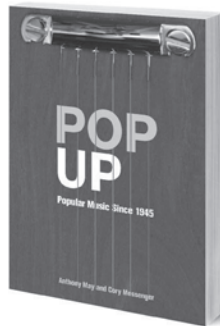E-mail address: dnevel@gte.net

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Pop Up
Popular Music Since 1945

By Anthony May and Cory Messenger

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In film, television, and advertising, a few bars from a pop song can evoke a moment in time – a singular intersection of personal memory and public history – with unparalleled intensity. In the years after World War II, the recording industry ushered in a new version of popular music, supplanting the big bands and crooners that had dominated the airwaves and dance halls of previous decades. In its various forms – singles, albums, and compact discs – the sale of pop music on disc became a central feature of western life until the shift to the mp3 in the new millennium.