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Master's Thesis

Music Life:
Creating and Playing Music at the Living Room
using Furniture as a Media

KEIO MEDIA DESIGN

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Graduate School of Media Design
Keio University

Gustavo Dore Rodrigues

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MASTER of MediaDesign

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Creating and Playing Music at the Living Room using Furniture as a Media

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Music Life is an application for the Media Furniture system that enables people to express themselves through music using furniture as a interface. In Brazilian culture live music inside the home during parties is a common and exciting situation where people bond by playing music. Music Life brings this experience of playing music together at home with high sound quality (timbre and pitch) without the years necessary for mastering an analog instrument . Using Design Thinking approach for innovation, this project mix music expression interfaces, game design, furniture as a media and musicality development in order to create the experience of a musical instrument that is accessible, challenging and enjoyable.

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Keywords:

Digital Music Instrument, Music Interfaces, Music Mapping, Musicality, Interaction Design, Media Furniture, Sofa

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Chapter 1

Introduction

In Brazil, people create music with almost anything they have at the reach of their hands. Brazilians would tap the tables like percussion instruments or easily create a simple rattle by adding rice into a empty can of soda in a attempt to be part of the music being played. Since childhood I was always impressed with how many sounds can be taken from a simple matchbox. This desire to enhance the music playing experience is inside brazilian culture and during home parties is common that a musician shows up with a guitar and play famous pop songs that most of the people can identify and sing together. Samba groups use to share some extra percussion instruments for whoever is around to follow together. Most of those interactions happens in the living room, where families gather in a everyday basis but it is also the main place for home parties. By participating the audience mis with the players and feel connected to the group, emerging a communication that goes beyond spoken language and affects emotions directly [94]. With this idea of communicating and bonding through music in mind the Music Life system was designed to bring the music play in the living room to other cultures.

During the 19th century, before media that could record live music, European families would have the costume of training their daughters into Piano practice as a way of showing status and to entertain home parties and visitors [67]. Before the recorded music, the piano at the living room was common, being like a piece of furniture for the European bourgeouis.

Mcluhan explains how the phonograph changed the relation of people with music in

terms of accessibility related to the time the music was created. After the phonograph people could have access to the 16th century the same way they had to the 19th century music. To this project, the most interesting insight of Macluhan is his discussion about the quest for reproducing music in a realistic form. In his book Understanding Media, he describes how the quest for realistic sound merged with the TV image as a part of a search for a tactile experience. This quest was looking for the sensation of having the performer playing close to you, in a way that it would surpass the music as a resonant sound, bringing the feeling of their touch handling instruments in a tactile and kinect experience.[65]

Nowadays, with the advance in the technology that allows high quality sound reproduction, the tacticle described by Macluhan is still missing. To address this issue we look through the lens of the design discourse developed in the late 20th century and beginning of the 21st, that enables us focus on the experience, going beyond the consumption stimulus. As Tim Brown advocates [15] the design that is done today has much more value when is not only done to generate consumption but also allowing participation. In the situations described above about Brasil, the listeners can become active participant in the song and the music experience is enhanced for all the group involved. Paul Saffo [70] explains that the consumer today, with the internet and social media, is used to participate, and the amount of participation grows if you reduce their effort to do it. In the brazilian scenario, the listeners go for the simple percussion sounds (not much learning effort) to become players, and that might be in part one of the reasons for the success of the Samba.

Looking from a global perspective, this participation culture was also stimulated by the video game as home entertainment. So far, special events were transformed into games: situations that people couldn't experience that easily in real life like fighting, racing, being a spy. Lately, researches [17] have come to learn that the engagement and motivation that attracts people are not necessarily in the contents of the story, but in how it is articulated to give you rewards, status, the feeling of achievement, self-fulfillment, competition and group work. And those are created inside the game environment by the use of points, levels, challenges, virtual trophies and leader boards. Jane Macgonigal explains that games are hard work and that's why people like them. By playing a game a

person is mentally challenged is looking forward to get into the flow state [64], where the challenges are in the right measure for the player abilities and the experience is optimal, reaching a sense of fulfillment.

Because of that special characteristic of games, other areas non related to play are investing in using game-like systems to engage their users in their experience. This process is called Gamefication[17] and has been used for companies like Nike in the Nike Run [98] project where you acumulate points and grown in levels by running in real life; or by FourSquare to create a GPS based social network with a badge system that reward the users that "check in" and tell their friends where they are [98]; and even in education inside projects like the Kahn Academy that reward students online and follow up with them in the real classroom [16]. Bringing Gamification to our home appliances and furniture would enhance our everyday life experience, adding new meanings to objects and new motivations for family communication inside the house.

Music Life is a application that creates the experience of playing music together with your family and friends in the living room, going beyond verbal communication and enabling people to express their feelings by the interaction with furniture, innovating as a new form of home entertainment for special occasions, like home parties, and also affecting the everyday life soundscape of the house being part of the children play or musicality development.

Music Life is also a Digital Music Instrument (DMI) that takes advantage of our furniture to enable people to not only play songs that already exists, but also to create music, being able to support complex and virtuosos composition for an expert but also moving beginners from the passive listeners to part of the music creation without much effort from their part. The players uses simple body movements like tapping, jumping in the sofa or shaking the cushions in order to play the assigned sounds, rhythms, or music sequences. Those sounds can be configured through a graphical user interface by connecting the system to a monitor. The simple gestures requires less motor control, making possible for wider age range to participate. The users can choose to play preset songs offered by the system (famous pop and cultural songs); or they can challenge themselves into music creation, which requires a certain level of affinity with harmonic system to make an inter-

esting music. The creation part opens space for learning and musicality improvement by dealing with music terminology and tonality. Music Life can also be used to be played together with real life instruments, where one can follow a guitar by doing drum sounds or they can be the lead melody for an accompaniment on the piano, for example.

As a Digital Music Instrument there is no limit to the sounds you can create, but the constraints of the Music Life system is what stimulates the creativity and directs the way music can be played. Music Life separates the execution in 3 musician roles: Melody, Rhythm and Extra sounds. The role depends on the place the user is sited or if he/she holds a cushion. People changing places to experiment other roles is part of the experience and if there is a musician in the group, he might easily have more control over the situation and guide beginners into playing a song together.

Figure 1.1: The Music Life Band

Chapter 2

Literature Review

Music Life enables people to play music with the furniture, creating a space where the family can express their creativity through simple interactions that are related to the furniture affordance. This research is based on the study of Digital Music Instruments, game design and the relation between music play and society,

The basic principles of the system are related to Digital Music Instruments, once Music Life proposes itself as a medium of music expression that goes beyond games and toys. Bringing music to the living room is a paradigm related to culture, high quality music appreciation and performance being reference to discussions on musicality and digital home entertainment.

2.1 Digital Music Instruments

There still a lot of space for creativity in the field of sound control. At the NIME conference, New Interfaces for Media Expression, one can experience a extensive variety of music interfaces, from using vegetables, like the Viena vegetable orchestra [1], to complex touchpad like devices like "The Air Piano" developed by Omer Yosha [2]. In this research

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[1] The Vegetable Orchestra: http://www.vegetableorchestra.org/ Accessed on June 2, 2011.

[2] The Air piano: an innovative instrument with a wealth of possibilities for live performers http://coolmusicinstrument.com/air-piano-innovative-instrument-wealth-possibilities-live-performers Accessed on June 2, 2011.

we focus on the Digital Music Instruments, DMI.

The basic framework of a digital music instrument is explained on the model below from Wessel & Wright [34]
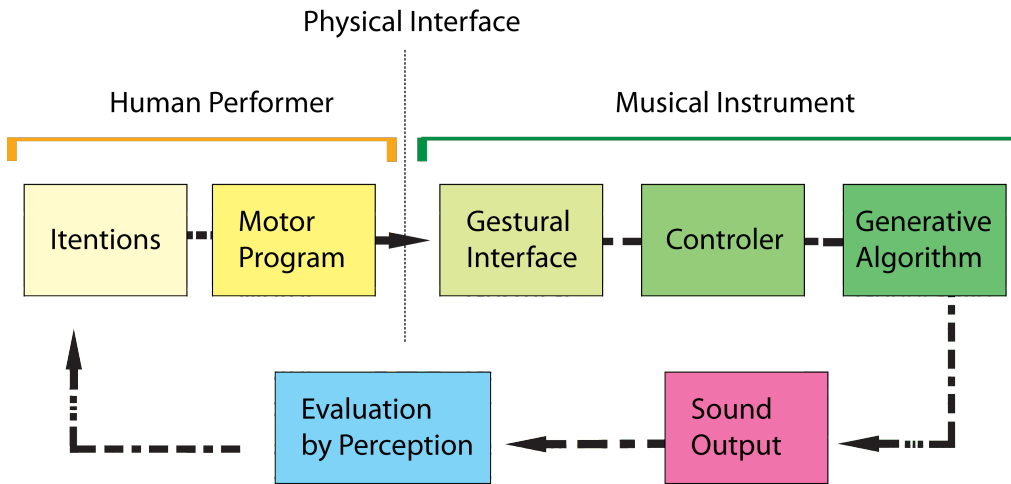
Figure 2.1: Digital Music Instruments Conceptual Framework

2.1.1   Design of a Digital Music Instrument (DMI)

The biggest difference between digital and analog music instruments is that in the analog instrument the shape of it is directly related to the sound it produces, while in digital instrument the sound is arbitrary mapped, having always a clear distinction between control interface and sound production. According to the best practices of DMI described by Sile O'Modhrain [77], DMIs should be created looking for music control intimacy, which is the point where the gesture and the sound mapping fit in a optimal way, bringing the user to want to master the skills of the instrument.

When we deal with analog instrument makers, they tend to design affordances according to their understanding of the performance or composition. The users will engage with the instrument and learn about its expressive potential through experience, building an embodied tacit knowledge of the system[60] .

With digital music instruments, even when it is presented as an one object, it is always characterized by the split between the interface and the sound engine, connected by a

mapping engine, that will be the key point for the enjoyment of the instrument.

The process of creating the musical instrument identity is a process of designing constraints. As Magnusson [60] explains, the performer of the system, when practicing and performing with it, is mentally engaging with the system's constraints rather than affordances. Sound constraints is what defines the sounds that instrument can produce, in analog instruments it is dictated by physical form while in the digital instruments it is an arbitrary choice of the designer. Boden [11] makes an appeal that the study of constraints can be beneficial to designers of musical instruments, composers, and performers. To him, constraints constitute a search space in which of creativity can take place. Thor Magnusson [60], explains that objective constraints affect creativity and the musician might even reinterpret the instrument, like was done with the "table-top guitar", which the guitar was not invented to be played lying down on a table. In a piano we have the constraint of the 12-tone system, and you can't make a note out of this scope. Also each culture use the piano with different constraints in terms of genre of music and style.
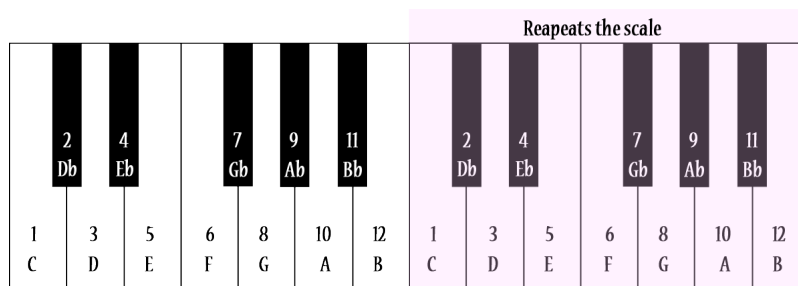
Figure 2.2: Piano Constraints, only 12 tones

Developing an instrument implies some degree of affordance design, but the core activity typically involves the iterative process of experiencing and adopting the system's constraints. In this process, the instrument is an expression of the programming language and a structure of musical possibilities emerge from the furniture.

Music Life system is created over the sofa and cushions on the living room, for this reason it already takes advantage of the affordance of those objects. The design has to engage composers and performers to understand the phisical constraints of the sofa as a musical instrument and the constraints of the music composition system offered to them.

Because it is on the living room there are also the social constraints related to the family culture at the home.

2.1.2 Designing to Engage

A designer does not create the play itself, but creates the world and the rules in which the player accepts to enjoy the play. Similar to game design, the addition and the mix of simple rules can generate a complex system [88], and that is considered Emergent behavior [45]. For example, with the 12 tone system one can generate a complex shymphony.

Sergi Jorda [46] explains that "more difficult-to-master instruments often lead to richer and more sophisticated musics (e.g., the piano vs. the kazoo), but expressiveness does not necessarily imply difficulty". So a music system should be easy-to-use and at the same time sophisticated and expressive.

Sile O'Modhrain [77] points out the reasons for a Digital Musical Instrument success. He explains that there are various reasons for the success or failure of an DMI and they can be divided in sociological or pratical reasons. From the sociological point there is the lack of developed repertoire for the DMI. In the Pratical factors we should analyse the reactive behavior of the instrument, for example the presence of latency that breaks the fluidity of the experience; cognitive model underlying the design, the ease of use, and the potential for development of virtuosity. O'Modhrain advocates that we should not assume that the players are dumb, therefore the instruments should be challenging to master and engage the players in developing virtuosity.

HCI research on the evaluation of interactive game playability is relevant in a discussion of the experience playing DMIs. The gamers engagement with hardcore games has much in common with learning to play a new musical instrument or learning to play a new piece on an instrument that has already been mastered. Like a game that grown to social context, at some point the intrument becomes more than the collection of its interactions, it becomes to be an entity on its own that has the function of expressing the intent of the musician and transmit the message to an audience.

2.2 Musical Expression Interfaces

2.2.1 The Music Pattern: A Creative Tabletop Music Creation Platform

The Music Pattern tabletop platform [72] provides an interface for realtime music creation with drawing gestures. Similar to a Rock Band game [93] the music tempo runs vertically from top to bottom and the notes are read when they reach the bottom generating the sound. There is a reference line of notes on the top following a chromatic scale, with the 12 notes in 5 octaves with different pitch. The user has to draw lines under the notes and the screen keeps scrolling and reading the notes that were draw.

Figure 2.3: The Music Pattern: A Creative Tabletop Music Creation Platform

This project address music creation in a simple way breaking from music notations and transforming the composition into a series of lines and dots. By focusing on Patterns, Tempo and Melody, the Music Pattern had a series of interest early user studies that showed that in tempo and patterns even users who have no understand of certain musical concepts were able to enjoy and to have similar achievements to the pro once visual feedback was also together with the music.

In the melody study they were faced with the challenge that to keep it musically in-

teresting and meaningful some of the non-musician users were not able to experience the whole software in a short time, once it asked for some music knowledge.

Another interesting aspect of the software is that is serves as an learning platform for music theory (concepts and terminologies) by transforming it into a visual representation. The usage of digital instruments for music learning and musicality development seems an interestng path to persue once game like devices can break the initial barrier to young begginers that wants to learn an instrument. The possibility of adding game dynamics of points and visual rewarding can be a motivator to explore the music creativity.

2.2.2 Family Ensemble: A Collaborative Musical Edutainment System for Children and Parents

Family Ensemble [76] focus in the dynamic between parents and children at home and how can they strength their bondings through music. The system is a collaborative musical edutainment with the aim to make easier for parents to correctly perform given melodies along with their child performance. Family Ensemble supports the parents and by doing that they motivate the children to practice their musical instrument. The system was developed over families that wants to interact through duo play in the piano, that is know by helping in the learning process and cooperative performance skills.

According to Chika Oshima (citrate the article) parents are eager to play together with their children that are learning piano, but the many years that take to learn makes most of the parents to give up the dream of being able to play together with their children.

The Family Ensemble system has a different interface for each player and tracks their play to synchronize them. The main player, the child, performance is tracked and by understanding where he is playing into the music score and the system adjust the sounds for the second player, the parent. Basically if the first player stop playing, the second can not go on it's on, so the music is controlled by the child. By the score tracking the second player just need to hit any note on the right time to make the right chord and the use of more than one note can give the second player separately control over volume and length of each constituent note in the chord.It does not support the children playing the music,

in that way not interfering with the kids learning process. According to Oshima, adding the parents together in the learning process works as a big motivator for the kids.

2.2.3 Freqtric Drum

Freqtric Drums [7] is a device that stimulates face-to-face communication and body contact by generating music sounds as feedback for the user's touching each others skin. The tangible interface is a round shaped piece of wood with 5 iron handlers on it. People have to be close to hold on to it and by touching each others skin while holding the handles the is a difference in the electric current that activates the sound.

The original model is based only on drums sounds and there is a new model called Zen-on, directed to kids, that has a variety of sounds linked to it, from piano to funny sounds like cat and dogs. Enjoying music together with the skin contact is what makes Freqtric Drums a new way of expression. (citate the article)

Figure 2.4: Freqtric Drum

2.2.4 Ubiquitous Drums: a Tangible, Wearable Musical Interface

The Ubiquitous Drums [90] project provides feedback sounds for natural gestures that musicians, specially drummers, do when they listen to music and follow the rhythm by tapping their knees, or lightly stomping the floor together with the tempo. By adding pressure and shock sensors under the clothes and soles of shoes, people could experience the playing drum just by tapping their bodies or stomping their shoes. The system designed for this wearable digital instruments makes reference to ubiquitous computing and can be transported to other objects besides clothes like tables and even other musical instruments.

Although the system lacks independence from a computer, it suggests a new approach to imagine sound as a characteristic of clothing, and I would extend to an approach between sound and fabric as an interesting topic for further research.

2.3 Home Entertainment and Rhythm Games

The genre "rhythm games" grew stronger in the 90's and 2000's and most of them asks for a single player or a group to perform actions according to the rhythm, timing the gesture of hitting the button with the song. With the rhythm games, the entertainment industry discovered a new market that enjoyed to bring playing music again to the living room and share it with their friends. In games like Guitar Hero [3] they could simulate playing the songs of famous artists and becoming rockstars. Music contributes to create an immersive atmosphere for gaming. Games like Guitar Hero and Rock Bank [4] focus the attention of home parties to music. Players were not only listening, but actively paying atention to the notes being played.

Khalid Aallouche[1] describes the importance of players immediately understanding the relationship between what they hear and what they see related to the effectiviness of the musical control data mapping. According to Aallouche [1], if a player knows a certain piece of music well and understands the mapping used in the game, he can anticipate some

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[3]Guitar Hero: http://hub.guitarhero.com/ - Accessed on June 10th 2011
[4]Rock Band: http://www.rockband.com/ - Accessed on June 10th 2011

of the actions that will occur and enhance the experience or enjoy in a different and maybe novel way.

Rhythm games have two main characteristics: The interactive joy of the instant feedback, your actions has an immediate response in sound and visual form, and the agency, that means that when the user has an certain level of control over the system it can experience it in a different way. Those games also became a font of innovation of controller interfaces with controllers that look like a guitars, bongos, taikos and even a dj turntable.

Figure 2.5: Guitar Hero

2.4 Meaningful play

The goal of successful game design is the creation of meaningful play and that comes from the interactions between players. Huizinga[43] brings out that in play there is something that goes beyond the immediate needs of life and gives meaning to the action itself, expanding to the idea that all play means something. Playing music is similar to games and it means making choices and taking actions, in order to create music.

2.4.1 Discernable and Integrated Play

There are two kinds of meaningful play: Discernible and Integrated. Discernible play is related to having clear connection between the actions and outcomes of the system. The action is communicated to the player in a perceivable way, like when you hit a note in a piano and sounds comes from it, or in a game when you hit an asteroid and there are explosion. The meaning of the actions resides on its feedback; Integrated means that the actions taken will reflect in the larger context of the system. This means that the action of the player has not only immediate meaning but also affects the play experience at a later point in time. Music play seems more meaningful when integrated in the aesthetics of scales and harmonics, and once you decide to play a song in the Do major tone, the rest of the notes will be better fit if they are inside the Do Re Mi Fa Sol La Si Do scale. By creating a system with those concepts in mind, one can enhance the chances of adding meaning to the player, which is the key to a sucessful design.

According to Salen and Zimmerman,[89] game design is the process by which a designer creates a context to be encountered by a participant, from which meaning emerges. With design, we have a carefully crafted experience guided by rules, which make certain forms of interaction explicitly meaningful. Inside the design of play, a simple cube can become meaningful as a box or a house depending on the context. The designer job is to design the context for this meaning to happen. To design a game is not designing just a set of rules, but a set of rules that will always be experienced as play within a cultural context.

2.4.2 Formal, Experential and Cultural in Design

Game Design should be understood in three levels: Formal, Experential and Cultural. In the Formal level there is the interaction with the set of rules. This level is also really close to the integrated technology and because the player can not create over it, but just accept it, it is consider the "low" level. In a video game, this is related with how much energy the character has or how high can he jump and even the buttons he should press. In a music instrument this levels makes reference to the shape, number of strings or sounds

and the scales in which the instrument was build.

The second level is the Experiential. It is related to the systems of play, regarding the players involvement and possible actions. In this level the experience is taken into consideration and depending on the way you frame the game, you may consider not only the strategic actions that a player has to make but also his emotional context affecting the gameplay. This level is related to the game genre and if it is made to play at home, or at an arcade. In music that is the experience that different genres provides, and also the way a musician performs an instrument regarding his emotional state.

The Cultural level is the way the game intersect with other contexts such as society, language, pop culture, etc. The basic idea here is to imagine that you should design thinking about how it will influence people's lives when they are not playing as well. By being part of a social discussion, stimulating family communication or being icons to be used in a shirt.

As an example, in a Guitar the formal level is related to it's shape that matches the leg format and it is also acostic ressonant and the six strings with the 12 tone system spread through the arm in the guitar frets; The experiential level is related to the way the musician feels like playing rock and roll or classical music in the guitar, at home or outside; The cutural level refers to the idea that he might play more songs that his friends enjoy because it's a radio hit in the moment. The three levels (formal, experiential, and cultural) exist simultaneously and it might be useful to focus on just one of them when making an analysis or solving a design problem.

2.5 Musicality

2.5.1 Music and Emotion:

As Addis's [3] explain, the importance of music for humans has to do with the connection between music and our emotions. This connection is explained by the fact that music might bring emotions to mind, being a source of knowledge of subtle differences between emotions and sensations that language describe less perfectly [78]. For one in

love, a melody about love might touch his feelings deeper than just words. Music may even present us with moods and emotions that no one has ever felt or that the listener has felt, but has not been able to name. In the realm of expression, Kivy [50]mentions that the sadness of music, for instance, is as objective a matter as the sadness of a person on the basis of her expressive behavior.

Music is build under the concept of freedom and control at the same time [78]. When people play they have the freedom of expression, but this does not mean that the concept of freedom is without limits. Playing music is the control of the tempo, the pitch, the rhythm inside the possible scope of an instrument. The word control can also designate one's control over the music instrument.

2.5.2 Music and Community

Twenty century early books express community through music playing and sharing together and this is show as the image of a perfect place. Anne Phillips[80]shows that is commom that writers from children's books describe community through collaborative musical performance, as Madeleine L'Engle [5] wrote her vision of celestial harmony. Community and music are based upon the cooperation and commitment of the parts for the existence of the whole. In children's literature, the communication between comunity members are characterized through musical metaphors and the "musicality" of the group works as a measure of its spiritual and physical welfare.

Families playing music together is ancient, but the costume got expression in the eighteenth century when after dinner, the daughter might play a Mozart symphony in the piano or be an accompaniment for the father's violin. This custom had a important role in family communication, and nowadays there are still some families who performs at home[76]. Chika Oshima explains that the need to undertake difficult training for many years makes most parents give up the dream of being able to play duos with their children. So the lifecycle is that parents stimulate the children to play, but once they can't follow up, the children lose motivation eventually and in most cases music becomes scarsce inside

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[5]Author of young adult fiction Madeleine L'Engle: http://en.wikipedia.org/wiki/Madeleine_L'Engle

the family circle.

In Brasil, the family relationships through music works different once a low level interaction, like hitting the tables for sound, is acceptable, making the effort to interact much lower and therefore making colaborative music playing a much more commom situation.

2.6   Music Life Identity

Music Life innovates by mixing those four areas: As a Digital Music Instrument; as a digital home entertainment system; as a family communication tool; and as a musicality development device.

As a Digital Music Instrument, Music Life makes use of the furniture, the sofa and the cushions at the living room, mixing it with electric devices such as sensors and the TV to support the interaction. It makes use of the furniture affordances to offer an intuitive environment for music playing. The user can explore the system by mixing the order of the sensors or trying different ways to interact with it. The design stimulates the sound discovery and is challenging enough to engage people into the will to master it and develop virtuosis.

Music Life is also a digital home entertainment system once it is intrinsically related to the enviroment is was created for. The whole living room becomes part of the play it serves best at the moments of entertainment such as home parties or receiving visitors. It goes beyond game consoles innovating by transforming the sofa and cushions in soft interfaces, giving the furniture a new meaning to the room: Entertainment.

The project Media Furniture, which Music Life is part of, has this overall idea of enhancing communication within the family by a new design in which we mix electric appliances creation together with furniture. Music Life address this issue by bringing people together at the living room to play and enjoy music. It is open enough to play almost any genre of music and it is easy enough for beginners to interact with musicians. The furniture shape might be the main reason why it goes beyond barriers of age and

gender and it also helps to bring the family to the same space in the house to share the music playing.

As a musical instrument with a graphic user interface, the users get in touch with music notations and eventually develop some sort of knowledge about how music is composed. By adding one chord after the other in the creation mode, the players not only start to get used to the pitch of Do, Re, Mi, etc and their minor tones, but also with different instrument timbres and drum rhythms. It can be the entrance to the music world for a normal person or the refinement of pitch and harmonics for a musician. Enhancing musicality affect our brains creating new connections and new sensibilities to the world around us[87].

Chapter 3

Concept

3.1 Music Life Concept

Music Life is a application that creates the experience of playing music together with your family and friends in the living room, going beyond verbal communication and enabling people to express their feelings by the interaction with furniture, innovating as a new form of home entertainment for special occasions, like home parties, and also affecting the everyday life soundscape of the house being part of the children play and musicality development.

3.2 Music apreciation private and public

Performing is pervasive to every culture and not only seeing in the theatre, music, dance or performing arts in general but also as our roles in everyday life as fathers, sons in our private lives but also as a doctor, police, professor in our professional lives[33]. When appreciating music we evoke the role of the listener, the person who passively listen in the background or actively listen, paying attention to the notes being played. In a live concert the role of the listener goes a step further when you also participate as a member of the crowd, experience music in a social way.

Hennion and Smithuijsen talk about their observations at the Scandinavian culture. As Smithuijsen observes[84], to go to a live event, one must leave home and most of the time

accompanied by family or friends. Just by being in a concert this person will meet other people and enjoy the concert with the whole group of people at the event. Moreover, the chance of mentioning the event in a conversation is higher than with listening to music at home. Hennion talks about how one can routinely assume that listening at home is a more intimate way of consuming music and primarily serves as a solitary moment devoted to personal pleasure[84].

In Brazil, listening music at home is often a shared moment between the family, where during an activity in family like breakfast or cleaning the car is often accompanied by music that everyone can enjoy together. Manly during parties, the music at home has a different perspective from the Japanese culture. In Brazilian parties, live music is a common scenario. It is a normal situation that some musician (amateur or professional) in the group of friends would bring a acoustic guitar and play popular songs that most of the people in that environment will know and enjoy.

In Brazilian culture there is something called "batucar", which are sequences of tapping gestures with the hand into surfaces, like a table or the arm of the chair to create percussion like sounds that generates rhythm, to accompain a song, enhancing the experience of the music for everyone listening. "Batucar" comes from the substyle of samba called "batucada"[1] and it refers to an African influenced Brazilian percussive style, performed by a group of percussion instruments. The batucada is important because it represents the easy change for Brazilians in their roles as passive listeners to active players by singing along, dancing or using all the objects around to be part of the music playing, mainly at home.

3.3   A brief history of Brazilian music culture.

Before any media that was able to record and reproduce songs, playing the piano was a desirable form of entertainment for one's home, once music was appreciate only in it's live form. For that purpose, houses with pianos were common and the ability to play them

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[1]Batucada: http://en.wikipedia.org/wiki/Batucada

was cherished.

As it was described by Meyer-Frazier [67], in the western novels of the 19th century playing piano had a central role in the lives of the bourgeois family. As showed in the story "Lena Rives" by Mary J. Homes, depriving Lena of piano lessons becomes a tactic to make her undesirable or unsuitable for the most socially advantageous marriage [67]. By reading those western 19th century novels one can infer that live music was the only way to get high-quality music and that would generate a more cheerful house life once it was a commom scenario for parties or when receiving visitors. It was also a way for the woman to prove herself as a good wife to the society by showing that she is well trained in the house tasks and could also provide entertainment.

Brazil was a colony from Portugal till 1822 and has a unique history of slavery and segregation of the african descendants that led to people living at slums in bad conditions. To appreciate music they would use of simple percussion instruments like the simple tambor or rattles, common in african culture together with the "cavaquinho", an instrument that looks like a small guitar, that was used in music from Portugal. This cheap small guitar together with drums and tambourins would keep the music alive in the slums. So the rich people in Brazil would travel to europe and learn new rhythms. Back in Brazil, they would go to bars and share those rhythms with people from the slums who had the african percussion tradition and that mix would generate the samba and the samba culture.

Parallel to the samba, the piano at home remained a strong part of the bourgeois culture till the 1960's. But after the popularization of the vinyl records and the television, it lost it's influence. In the 1960's, Brazil was under a militar government and the brazilian popular music got expression as a representant of nationalism, of pride of their own culture and as a way to fight the government. The acoustic guitar spread as the main medium for those songs, influenced by american Jazz and british Rock bands, the Brazilians were creating their own songs and playing at university circles. At the higher social classes the piano playing was substituted by the guitar and till nowadays at all levels of brazilian society there is music live playing as a form of home entertainment.

3.4   The birth of the concept of Music Life.

As a musician I have experienced that being part of the music playing can be a much more gratifying and involving situation than just simply listen. In Brazil, not having formal instruments is not a barrier to start to singing and playing samba, once the simple sounds of percussion generated by the hitting of tables (batuque) can be enough to support the singing. That way, even people with less training in music can appreciate creating music to a certain level. With Music Life is possible to bring a similar idea with "batuque" with digital support to enable everyone to experience music creation.

In terms of music education it might also be an experimenting ground for novices to start to get in touch with music creation as a way to express their emotions. As Ning-Zhou [72] citates George Enescu: "Music is the most simple, even the primary way our emotions flow, far beyond where our language can reach."

Another aspect of music culture that could be enhanced through Media Furniture is the idea that by playing together people share something outside themselves, they have to work together for a commom purpose. This work, music play, creates a bond between those people that is hard to quantify.

3.5   Creating bonds through music

Playing Music together is a bonding experience that might overcame communications barriers related to age and gender. A common problem that we address at Music Life is the family interactions between people in different "worlds". How can a executive dad find something in common with a 5 year old daughter to play and share a moment with? Passive forms of entertainment like a Pixar movie can solve it for a couple of hours, but how to keep this interaction constant and fulfilling? Music Games like Guitar Hero are a way to create this special moments with family without being a talented musician, but they lack in self-expression and also requires a developed skill with controllers.

With Music Life, parents and kids can share music play and creation, communicating through body natural interactions with furniture and sounds, during a party or virtually

every time they get together in the living room. Even without a common talk topic people can share a moment of connection by playing music together. If feels like the sensation of going to a live concert of a band you like and while ou sing you see everybody aoround you singing together and feel a connection.

Figure 3.1: Friends playing a song together with Music Life

3.6   Designing for Musicality

Musicality is means sensitivity to or knowledge of music. Musicality refers to the state of being musical, with the ability to perceive differences in pitch, rhythm and harmonies. There are two main types of musicality, the one related to the perception of music and the other one is related to music creation.

Music Life develops both musicality types by offering the family the same structure as a musical instrument but with the advantage of the graphic user interface to allow musical notation reading development and the furniture as a way to generate sound without much

learning costs.

Music is build under the concept of freedom and control[78]: When people play, they have the freedom of expression within the limits of the instrument; Playing music is the control of the tempo, the pitch, the rhythm inside the possible scope of the instrument. By learning to control the instrument and to freely express themselves, one develops musicality.

3.6.1   Developing Musicality from Music Life

Playing an instrument is a way to challenge one's skills in a pleasure way, once music is direct connect to the idea of entertainment and joy. As Jane McGonigal explains in her book Reality is Broken[64], our life needs more play into daily basis because that is the way we fulfill our needs for challenge and connection with other people. She explains that play is hard work and the best way to make people fulfilled is through problem solution and creativity stimulus in order to get them to the flow state, that moment that the challenge and the player skills are at the best match, making work so gratifying that one may forget about time and space.

Music Life enters the realm of home entertainment offering a way of having fun that actually provokes people to participate actively on the music creation. This brings music appreciation to a whole new sphere where you can suddenly transform passive listeners into players without asking any music background from them. The Music Life system is open to enable people to reproduce and create music, allowing even virtuosis and improvisation. Another point that helps in the musicality development are the interactions with real instruments that can be made adding an esemble skill training to the music abilities of the player.

When Musicians are starting to learn improvisation is a common practice for them to play together with a playback version of the song. That way they have guidance for the improvisation and it is also a creative exercise over the limitations imposed by the song rhythm, pitch and harmonics. This kind of playfulness and creativity can also be found at

Music Life at a much lower learning time cost.

To give a clear example, it is common for people to softly tap their hands anywhere to the rhythm of the music that they are listening. One can go to a music store and observe people's feet moving unconsciously together with the beat of the music that is being played. In brazilian culture, where people have less self control of their posture in public, it becomes even more visible. An simple way to picture Music Life is the transformation of this gestures into sounds that enhance the experience of listening and creating music.

3.6.2   Game Design as a step to bring people to evolved into music

People like to be challenged and to solve puzzles. Forcing yourself to make a simple thing in a difficult way is a way to motivate and to generate ideas that the normal process would not allow you to experiment. A game sometimes has only the of making simple things hard. Imagine an Basketball game, where you have to put a ball inside an circle of arrow that is positioned 2,30 meters from the floor. Adding this obstacles to everyday life is the way humans find to create fun and entertainment, or by another point of view: humans like to work hard.

Elements from game play like rewards and self-expression are a way to keep it interesting and even motivate behavior change. As it has being used by airplanes companies and their mileage programs, adding points and rewards, like games do, can motivate somebody to use more a product or change their behavior. In the Music Life project we reinforce self-expression and the feeling of doing something together as main game like design points of the application to keep people motivated to participate.

3.6.3   Pedagogic Vectors - Interface introduces you to the music

As described in the book About Face 3[25], the interface in general has a pedagogic function that is to guide the user into using and mastering the software. Buttons and icons are really important for the beginners to understand what the software is possible of and to remind the old users that such and such functions exist in the system.

The interface aimed to suport the musician-to-be and the musician into mastering a

new music notation, recognize pitch, understand timbre and be in touch with new rhythms and songs.

At Music Life, the interface was thought in a way that the users could develop their musicality by playing and creating music. In order to achieve this goal, users ware presented with one of the simplest music notation that exists, the ABC notation. So 24 chords were listed and the user can play with the buttons and hear the sounds, connecting the sound to the notation written on the screen, developing pitch together with learning the letter correspondent to that pitch.
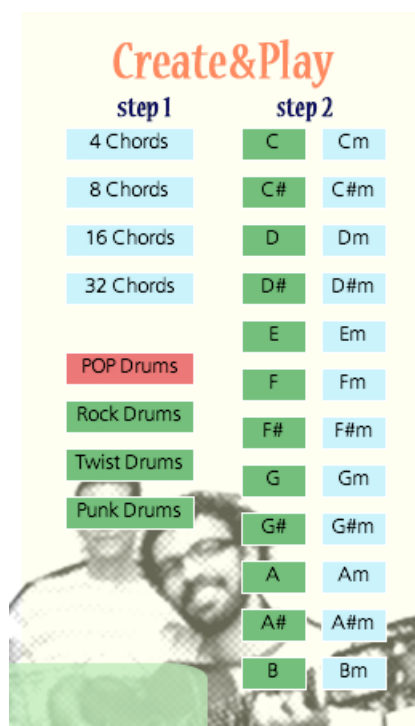
Figure 3.2: 24 Chords in the ABC notation

In another part of the interface the user can choose the number of chords they will use in a song. The design choice was to offer 4, 8, 16 and 32 chords, in a way that the users understand that multiples of four are the most commom situation for pop and rock music.

The instrument choice is another place that users can learn that different instruments has the same possibility of scales, chords and harmonics and the only thing that changes is the timbre. So for the same sequence of chords they can play around with different timbres

and discover what fits best each of their songs, opening the way to express themselves.

In the "Song" part, where they can playback music, the users are introduced with classical rhythms and famous songs for western culture. By reading the name and trying to play it the users also get in touch with learning songs and rhythms from a different culture (in case of the Japanese users).

3.7 Media Furniture Platform

The Media Furniture project offers a new lifestyle based on the usage of furniture as a media platform for the Family. Although we can have a lot of different kinds of interactions with people through Social Media like Facebook, Twitter, etc., we propose Media Furniture as a way to strength the bonds inside the family circle by enhancing communication between people at home. Furniture has an special aspect that is related to it's affordance. Humans have been trained for centuries in the usage of furniture, making it's affordance natural and simple like sitting, touching, supporting, laying. Being an essential part of a home, the furniture in the living room is usually shared by all members of a family and some of it shared with visitors as well, making it a rich media for interactions. Media Furniture is still in the beginning but it shows possibilities to support a lot of different kinds of applications, aiming to give the family a richer life. We feel fortunate to be the first ones exploring the possibilities, having Music Life as the first application for Media Furniture platform. In the future new applications will be developed to explore new concepts of entertainment and communication inside the house.

Taking apple iPhone-iTunes as a example, one can infer that the platform business surpass the simple product development. In this new mind-set, companies create small applications and services for niche markets and because of the applications they sell the product and make a good profit over the whole system. The application idea seems new, but it has being explored since the seventies with game consoles and after the iPhone - iTunes business model it got attention from a wilder range of technology fields.

3.7.1 Adding value through music - "Sonic Branding"

When Music Life adds music to the furniture, it deals with the way music relates to people and how it affects it's emotion. By playing music in the living room the family is making extra links to the memory of that moment, and if your hear the same tune in the future it might take you back there. Because the music played live has the kinestetic experience in it, which makes music appreciation more intense, the connection made is stronger than the playback music.

Another interesting aspect related to having a sofa and cushions as musical instruments is that the time spend in the living room to master the instrument and also to play them live to the family and visitors might increase substantially. This is important because not only Music Life take people away from the solitude of their own room and stimulate face-to-face communication in the shared space of the living room, but also the users create an stronger affective relation with a sofa that is linked with music.

Musical instruments are the tool in which musicians express their feelings. Players develop and affection to it since it enables them to express emotions that sometimes language is not enough to describe and create stronger memories of the time they played it. Having your furniture as the way to express emotions that goes beyond the forms and looks of it can be a great way to bond users to the Media Furniture brand. When we add a creative/entertainment system over furniture we are not only enhancing the experience of everyday but we are also creating new values to the same objects that were there before.

Objects that we spend more time with are the ones that we get more affection. The couch in front of the TV or the dinner table, for example. They represent a physical of a family time spent together. But the same feeling does not goes towards digital electric appliances. In general, people seems happy to update their TV while they might hesitate to change the comfortable sofa that they like to sleep in by a new one that will take years to be fluffy as the old one. So when we mix furniture are electric appliances in the Media Furniture project, we are adding more value to the furniture, since that is the form of object that dictates it's affordance.

Music Life is also offering a new lifestyle where people can enhance life through a

deeper music aesthetic experience in everyday life without having to deal with a new object at home or having to master an instruments for years. It can be a starter for kids musicalization as well as for any adult that wants to bring more music into their lives. By playing music life one can learn and understand how pop music is structured and develop a more sensible music appreciation skill in a short time.

We believe that developing that aesthetic skill for music can be a important point to explore from the Music Life. Once the user play around with the system they can explore how music is created and develop a sense of tempo, pitch, harmonics and difficulty of execution. As in any science or art, the more people understand about something, the more they can appreciate and improve their own sensitivity.

3.8 Music in your Life

Sound can be experienced in a huge variety of forms, from an ipod with earphones to a schoolgirl who puts her ear in the table to feel the vibration of the sounds around her [2]. Dane Rudhyar [3] explains that music is the relationship between musical notes and that this relationship can vary according to the culture aesthetic.

Music Life brings music to the furniture adding a new meaning to the relationship between the family and the objects around them. The system provides more chances of the family geting in touch with music during everyday life and develop their own musicality. The relationship with music is stronger once creating and playing songs becomes simple, accesible and part of the house life.

The Music Life project also has the intention to enhance the music in group experience. By enabling family and friends to share the music playing it creates new communications and strenghts the bonds between people participating. The ideal scenario is a home party where friends gets together and decide to do something together, to play or

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[2]Stephen Vitiello Musician and Instalation artist talk about Intimate Listening http://poptech.org/popcasts/stephen_vitiello_intimate_listening Accessed at June 20, 2011.

[3]When does sound becomes music: http://www.khaldea.com/rudhyar/soundbecomemusic.html Accessed at June 21, 2011.

create together, generating a new value for that moment in their memories.

In contact with the interface players will get in touch with music notation, harmonic and rhythm systems. By playing around and testing the possibilities of the system, little by little the players will start to understand more about music and develop their sensibility to pitch and harmonics. This development of musicality can enhance the communication about music inside and outside the home, once it introduces a new knowledge for begginners and also sharps the musician's skill. The use of the Music Life interface is a pedagogic entrance to the world of music.

Figure 3.3: Music with Enchanted Furniture

Chapter 4

Prototype

The Music Life system follows a DMI framework (2.1) using the sofa, cushions and a remote controller as the physical controllers, using embed piezo sensors connected to an Arduino board to capture the gestures of the player as inputs. For the generative algorithm, which maps the sounds with the interface, Music Life used "Pure Data", an open source software for sound control. The user can map the system with a graphic user interface developed with Processing language. The sound synthesizer software used is "Reason", to generate real time sound. For the stereo output speakers were embeded in the sofa.

To turn the concept into reality it was necessary to develop a working prototype, in which we used the Media Cushion and the Media Sofa input and sound output and the Furniture TV as monitor for the graphic user interface for control input and visual feedback. Since Media Furniture still does not have a common operational system, the prototype runs on a Macbook Pro connected to the TV and a wireless mouse is used as a remote controller.

The Framework is: The user turns on the Music Application and chooses the play mode. Then, by touching certain parts of the cushon or the sofa the user activates the sensors that connect to the musical mapping software that uses a synthesizer software to create the sound. The user receives the feedback of his actions in sound form and keeping doing inputs keeping the cycle.
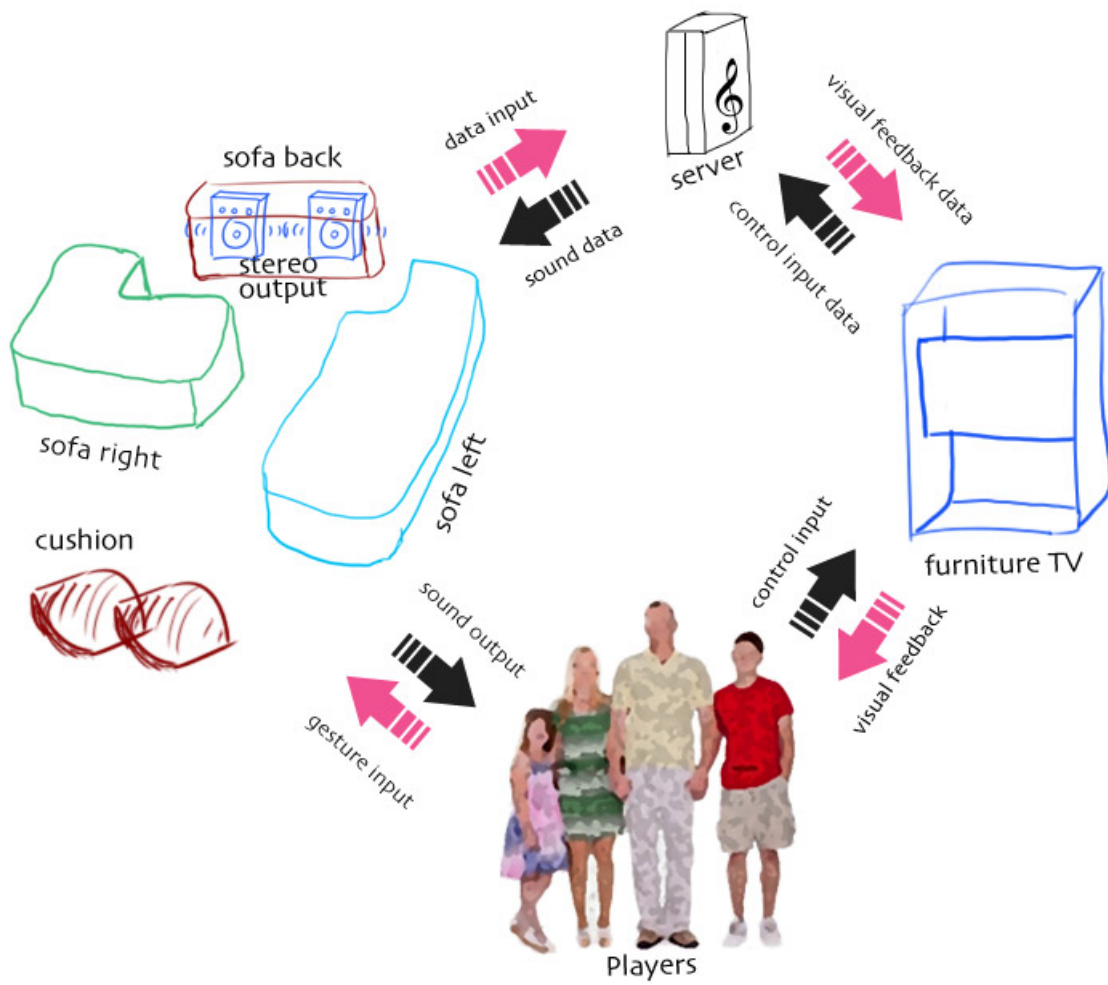
Figure 4.1: Music Life Framework

4.1 Software

For the software we worked linking Arduino language to connect to the sensors, Processing language for the Interface, Pure Data as the mapping tool and Reason as the sound synthetizer. The goal was to be as invisible as possible to the user in a way that he would receive a perfect feedback from his actions, feeling that the sound, the furniture and his gestures were fully connected.

4.1.1 Underlying system and Feedback

The most important part of a Digital Music Instrument is the mapping. Since the possibilities are almost unlimited, the arbitrary decisions of mapping is what differentiate each DMI from the analog instrument. In the Music Life case, the mapping decisions were based on observing people's behavior in a couch. So the software was made to be triggered by simple actions like tapping the hand at your site or jumping on the sofa.

Most of the work was done under the Pure Data interface, that enables work with generative music in a visual way. For this project it was really important that the sound was generated in real time and not a playback sound. Sounds generated in real time can be manipulated in real time too according to the action of the user. For example, if the player hits harder you can get a louder sound and even add some effect to it direct related to his action. If the system was based in playback, the designer would have to create a sample of all the possibilities of music mixing he wanted to achieve, limiting the means of expression and the amout of work would be so huge that the project would not be viable.
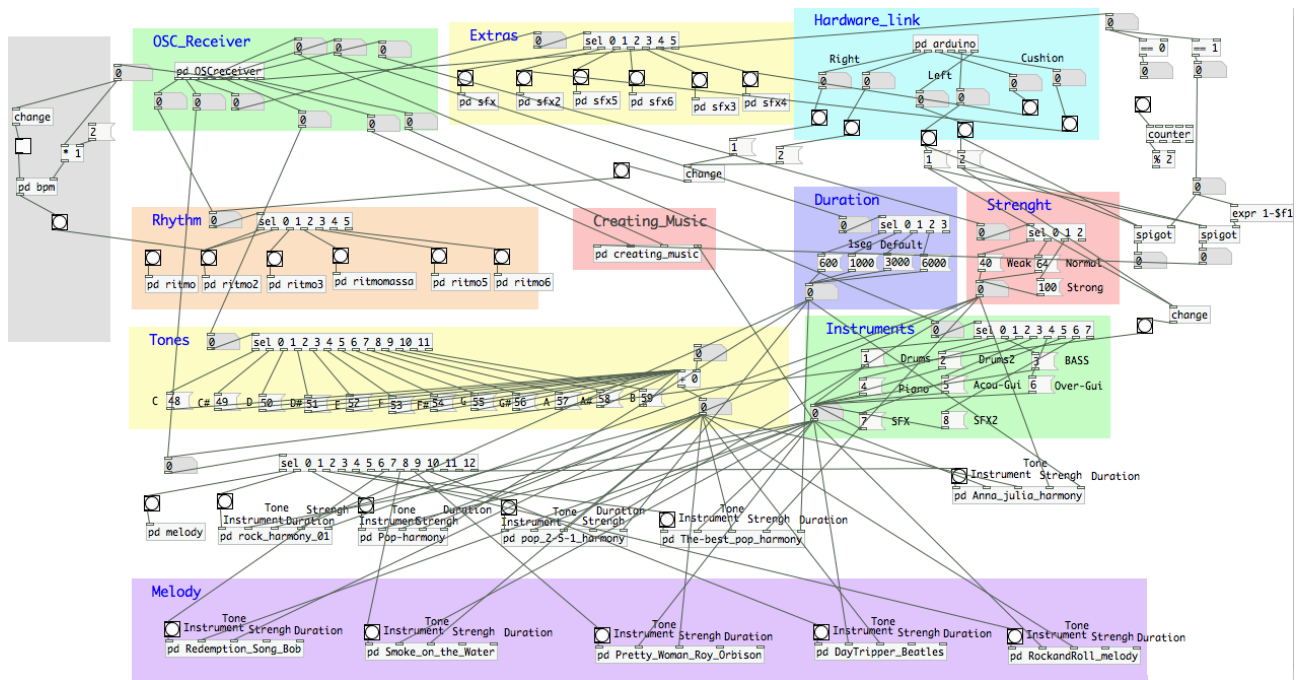
Figure 4.2: Pure Data Mapping

An big advantage of the real-time generated sound is that because it is MIDI information transformed by the synthesizer under some instructions of the mapping software, you can change instruments right way and enrich the experience by playing the same music and chords in a variety of timbre options.

Pure Data has a limitation of just allowing 2 MIDI outputs, each one with 16 channels on it. So 32 is the max number of channels, what means that you can use a max of 32 instruments. The Music Life prototype uses 16 instruments, being 4 of them different drum-set sounds, 2 of them for general sound effects like alarms or explosions, 3 of them for low sound instruments (Acoustic Bass, Electric Bass and Violoncello), and the other 7 channels are fulfilled with melodic instruments (2 kinds of Piano, 3 kinds of guitar, 2 kinds of metals)

At the prototype stage, the three softwares, Pure Data (mapping), the Music Life Interface (in processing) and Reason (synthetizer), are working at the same time, which consumes a lot of energy and processing power of the hardware.

4.1.2 Interface.

The interface had three main goals: Not distract people from looking at each other when playing. This would limit the interactions between people that are sitting close, since they would be all looking to the TV, giving an aspect of a videogame; Be fast enough to keep the talk flowing. The way to best experience the system is within a group of people of 3 to 8 people in the living room. If it would take too much time to setup a song, the dynamic of the party would be broken; Enable people to create their own songs, record and share it.
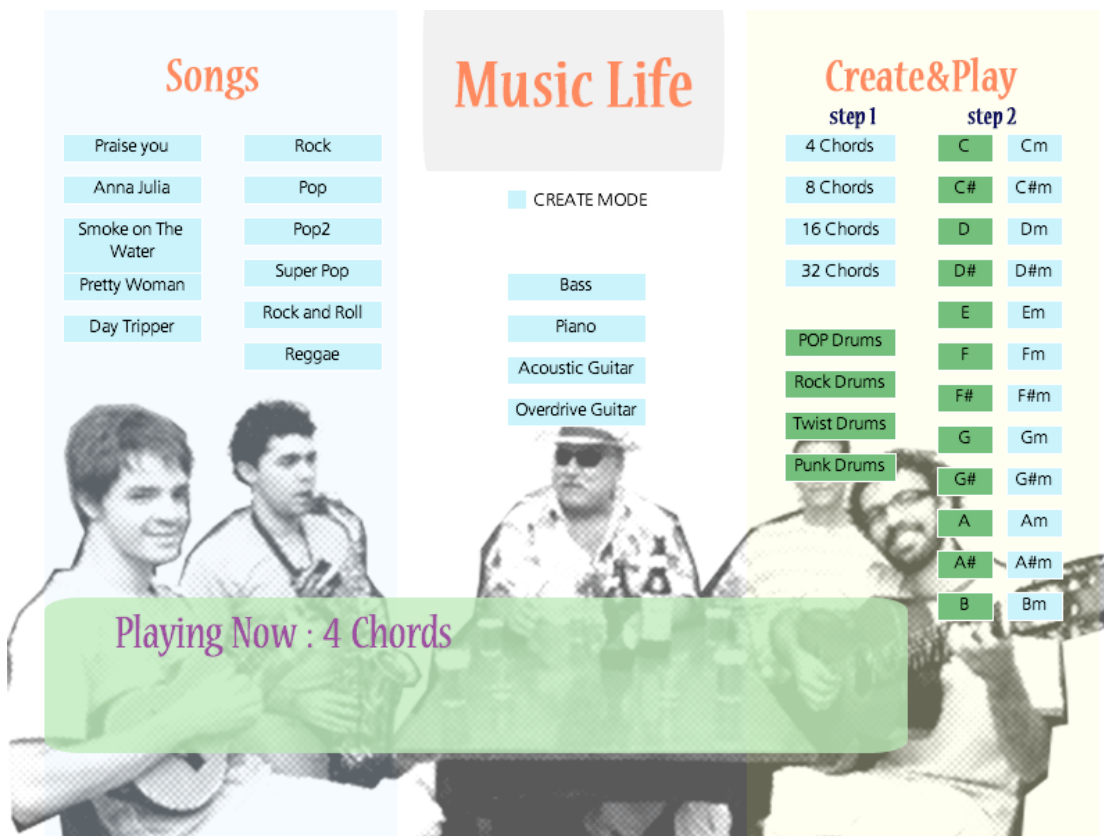
Figure 4.3: Music Life Interface - Prototype

4.1.2.1 Play Modes

The interface was divided into two play modes. One related to the playback of songs at the left part and the right part related to music creation. The middle part is related to both play modes and enables the change between them.

The playback part has the title of "Songs" and is a setup of read-made famous songs and rhythms according to name or genre. For the prototype there were 11 presets with 5 songs and 6 genre related riffs. If a person chooses a song, all the 6 inputs are reconfigured to that preset. This was created to help people in their first contact with the system, since there is no music knowledge required.

In the creation mode, named "Create & Play", there is some guidance related to the order clicks should be made. The player first needs to click to the number of chords beyond the "step 1" and then choose the chords under the "step 2" guide. The drum set are free to choose without following any order.

The section in the middle has the "Create mode" button that changes the system between "Songs" or "Create & Play". If marked the system is working under the "Create and Play". If not marked, the system is automatically working under "Songs". Since the Instrument choice could be used in both modes the same way, the decision was to let it in the middle, so players could understand that they could access it anytime during play.

4.1.2.2 Buttons and Visual Feedback

The buttons were created under the graphic user interface library Interfascia [1]. The collors were chosen for the visual aesthetic of the interface. Blue and Green represents no difference in function, but they help to separe the buttons in the visualisation of the chords because there are too many on the screen. The red collor represent the choice made so the user has a feeback or what was clicked and in which song is configured at the time.

At the bottom of the interface there is a space to show which chords are installed in the system and how many chords can be played in loop at the same time. In the picture

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[1]Interfascia - Graphic User Interface Library for Processing Language: http://www.superstable.net/interfascia/ Accessed on May 05, 2011.

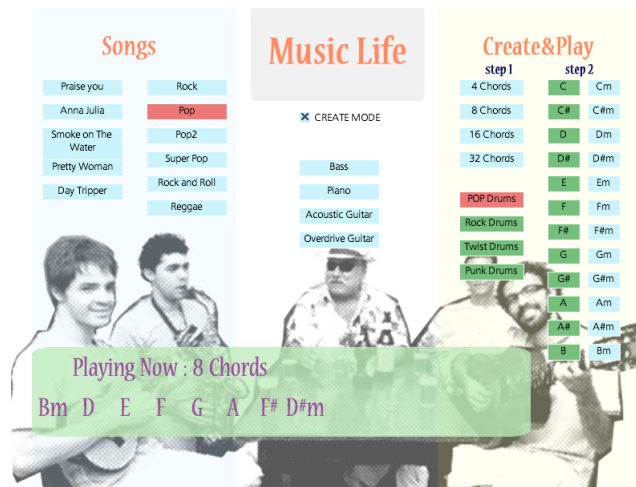below you can see that 8 chords are being looped and the chords chosen are Bm, D, E, F, C, A, B and Dm.

Figure 4.4: Music Life Interface - Create Mode Prototype

4.2 Hardware

The hardware had the concept of not interfering with the decoration of the house, and at the same time make clear to the players which parts of the furniture are reative to their actions.

The Media Sofa and the Media Cushion were used as a platform to embed the hardware. Six piezo sensors were installed according to the observation on how people sit on a sofa and use a cushion. Because we also wanted to make people interact with each other, some sensors were added to places were the person needs to be with their bodies inclined up to front in order to keep them concentrated.

To connect the sensors to the computer software we use an Arduino UNO interface. As a supporting system we are using a MacBook Pro with a 2.53 ghz Intel Core 2 Duo processor running over Mac OS X 10.6.7.

Figure 4.5: Playing Music Life (Cushion, Left and Melody, Right)

4.2.1   Sensors for Input

Condenser Microphones were tested as a substitute to the Piezo sensors but the noise response was poor, not detecting all the actions of the player. A similar problem happened with the pressure sensors, that had slow response in the soft surface of the sofa. The piezo sensors had a problrem of triggering more than once at a time: it sends data when hit and the softness of the sofa work like a spring, making it to send the data again once you take your hand out of it, sending the same action two times. Although this was solved with a fine tuning in the software, the same code privates the system of actions over a certain speed, or some input combinations.
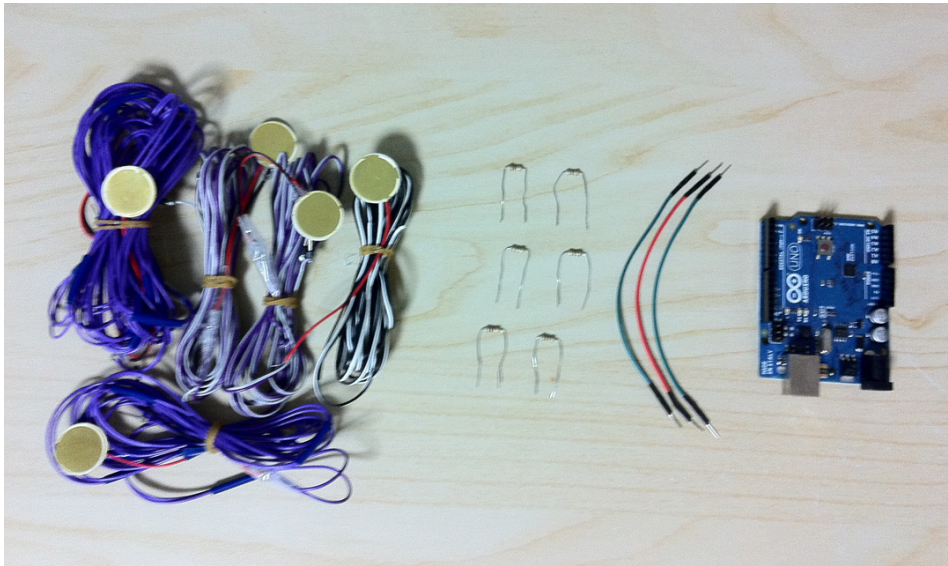
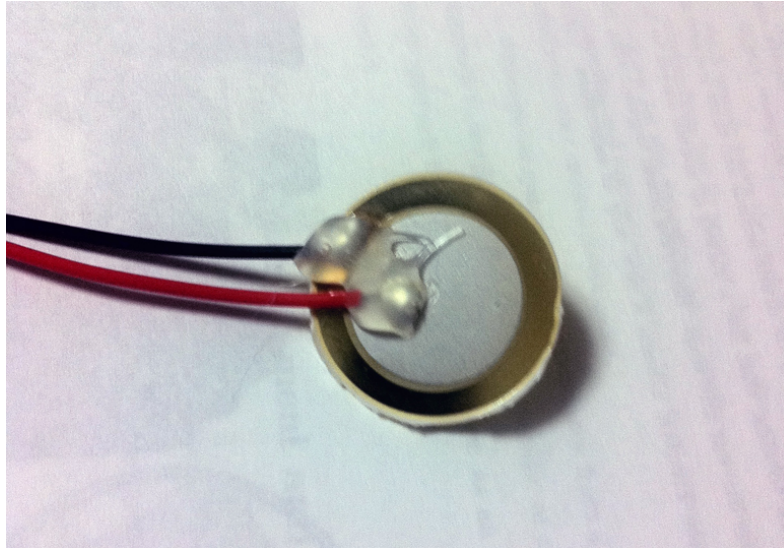Figure 4.6: Piezo sensors, 1M Resistors, Arduino UNO

Figure 4.7: Piezo sensor reforced with Hot Bond

Using the Media Sofa speakers as the main sound output generates an interesting outcome that is the vibration of the sofa according to the music, enhancing the experience and the feedback of the player. The media sofa uses a sound amplifier with it's own power supply to be able to generate sound to fulfill the whole environment. The sound coming from the sofa feels natural and since it makes the sofa vibrates, there is the sensation of the sound comingo from the instrument itself.

4.3   Pitch and Tempo

4.3.1   The Chords

In the beginning the concept was to make Music Life a support for people to sing along with it, to be an accompaniment. So instead of single notes, the system had to be programmed with chords. A chord is a group of (typically three or more) notes sounded together, as a basis of harmony. In the Gregorian scale there are 12 major tones, Do; Re flat; Re; Mi flat; Mi; Fa; Sol flat; Sol; La flat; La; Si flat; Si.

Those notes together create the type of chord you want to make. Since the variety of chords can make the system too complex in the beginning, we opted to add just the most common chords used in pop songs. Those are the major chords, the minor chords and the chords with the seven note.

The music sytem is mathematical and chords can be expressed by numbers. Those number are the reference they have inside the major scale. To exemplify, the major scale in Do (C) is the one that follows all the white keys of the piano. Major chords have the first note, the fifth and the eighth in the cromatic scale[2]. So to create a Do chord we use the Do (1), the Mi (5) and the Sol (8). Minor Chords use the first, minor fourth, and the eighth. For Do minor we need Do (1), Mi flat (3) and the Sol (8). And so goes on and on.

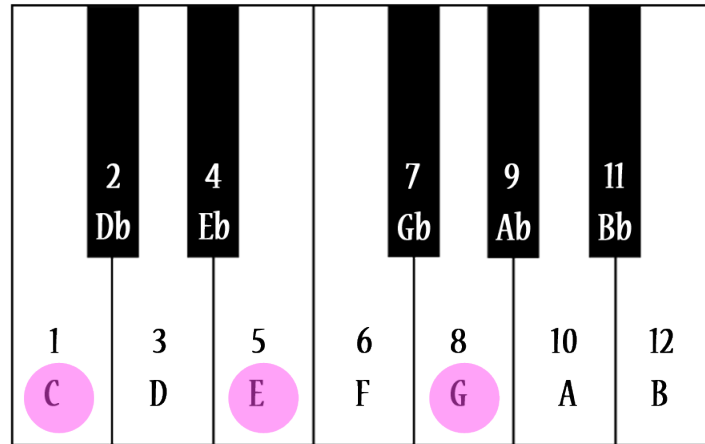[2]The Chromatic scales is the direct sequence of all the 12 notes in the Gregorian scale.

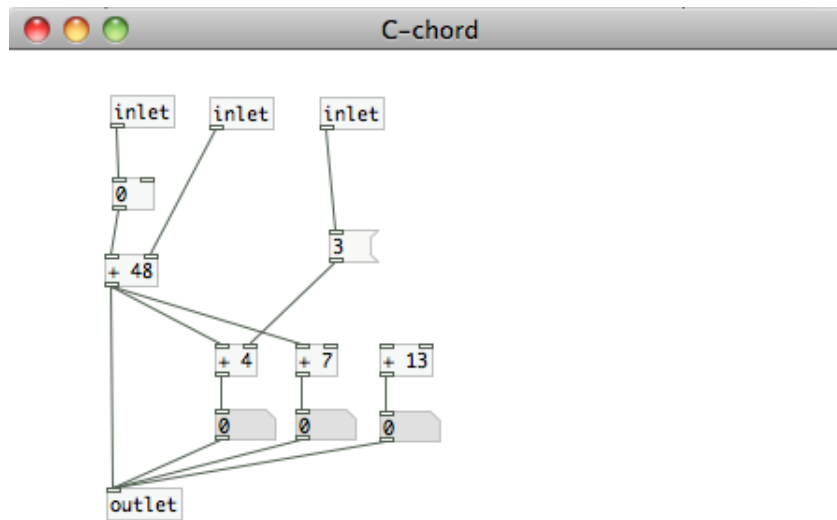Figure 4.8: Do Major chord in a Piano

Figure 4.9: Mapping the C-Chord (Do)

After creating those main chords we just need to sequence them in order to create songs. So there are some chord progressions that are famous by it's harmonic aesthetic pleasure. One of the most common is the Re, La minor, Si, Sol. Used for more than 60 top hit pop songs around the world, those chords were used from "With or Without you" from the U2 to Lady Gaga's "Bad Romance".

So if people want to create their own versions of the pop songs they can just add the chord progression of the song in the system, save it and play. Eventually the system will be creating a big repertoire that might be a good music started for parties and events.

In the same way, people can create their own music by creating their own progressions and saving it.

4.3.2   The Tempo

Music Life is much more than a playback device and this can be demonstrated in the way we treat tempo. The control of the music tempo is done by the player like in a normal music instrument. This design decision was made in order to allow more space for improvisation and to let the instrument adapt to people and not the opposite.

In order to adapt the instrument to the players feelings and emotions a system was created that understand the beats per minute in which the user is playing. Beats per minute is the measure used in music to refer to time. 60 beats per minute is the same as 1 beat per second. There is a tool called metronome (analog using a pendulum or digital software) that does that measure with the sound of a click. Musicians usually use the metronome to keep the tempo right and its usage becomes really important when more than one person is playing together so everyone can play synchronized. In Music Life, you can set up the metronome or let it setup by itself being guided by the melody to help the whole group.

4.4   Mapping

Mapping is one the most important parts of Music Life because it is the core of the music play. In a DMI there is a whole map structure that divides the six inputs of the

system into three parts: two inputs for the right side of the sofa, two inputs for the left side and, and two inputs for the cushions. With the goal of having people interacting into the same song, like in a band, the right sofa input works with drums and percussions; the left side works with the melody and rhythms; the cushions are designed to be extra sounds that adds but not break the harmony structure, so they will be assigned with light percussions sounds or a melody in the same tone, like a music solo play.

In the system there are three kinds of mapping, one that is related to the famous songs and it maps the sensors automatically to enable you to play those songs; enable the users to map during the create mode, where the player choose the sequence of chords that will go to its sensors; or the sound effect that randomly assigns sounds with comic appeal to the whole system.

In the creators mode, the user have to choose first the number of chords that he will use. This will make the chords get into a loop. So far the system can loop up to 64 chords but this number is arbitrary, in a way to give the user simple directions. The interface offers 4, 8, 16, 32 chords, because multiples of 4 combines easily with Pop songs because of the 4/4 beat. So after choosing the number of chords he is looping, he will choose the chord sequence by clicking at the chords name in the interface of the program.
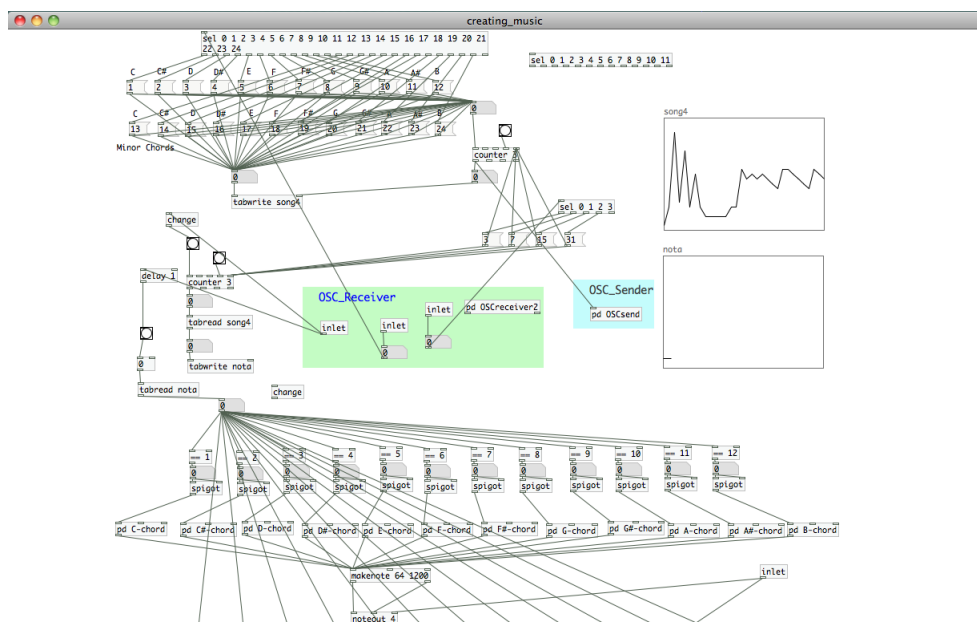

Figure 4.10: Creating the Chord Sequences

4.5   The Cifra

This chord structure comes from the amateur musician community sharing that is really strong in Brazil. Cifra club is the website with most expression in America Latina and the basic idea is to offer an easy way for people to play pop songs of the artists they like. In a normal music sheet, the chords are written into a classical music notation form, using the pentagram music sheet, while in a "Cifra", the chords are defined just by a letter over the lyrics were it will be played. With a music sheet the musician can reproduce the song with precision once he has data about rhythm and tempo besides the notes itself. But in a "Cifra" format the musician can play the song, but he will not get it right unless he knows the song from listening before. The "Cifra is very useful for amateur musicians that wants to reproduce themselves the musics they love without getting into much trouble of doing it perfectly. "Cifras" are the ideal match for people who care more about singing along than perfection of reproduction, being a nice way to enjoy a night with friends playing maybe dozens of song and enjoying music together.

Because "Cifras" have such a big impact in the Brazilian music environment a similar system was adopted into the Music Life composition. That way, if you want to play a Beatles song by yourself in the system you just need to search online for the cifra version of it and insert the chord sequence in the interface. You might even save to play again later on creating your own repertoire.
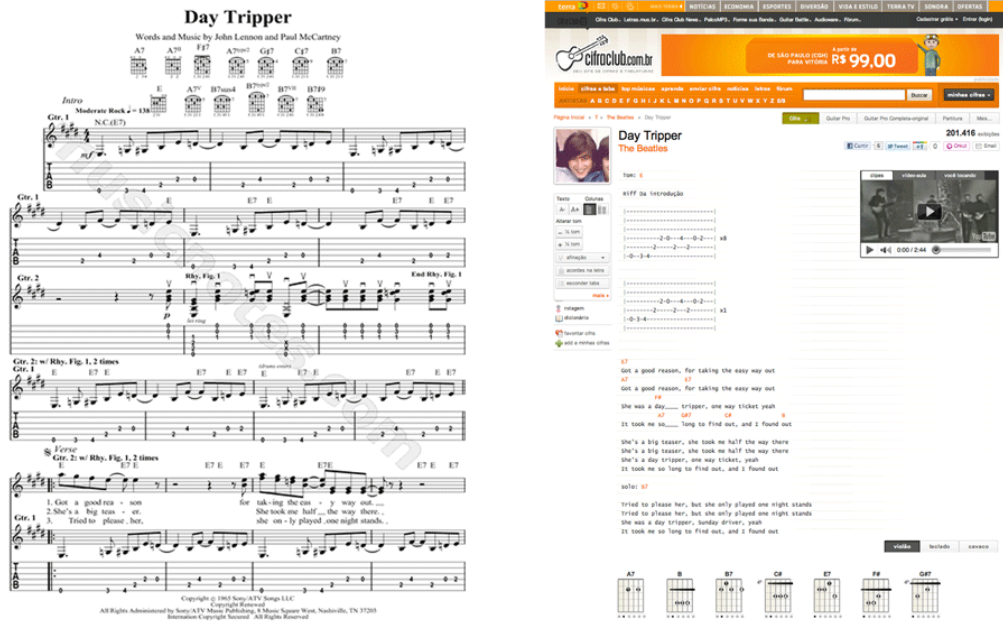
Figure 4.11: Comparing Music Scores (left) and Cifras (right)

4.6 The novelty of the system related to tempo

Inside the Music Life there is a special tempo control software. It still needs fine tuning but it works by understanding the user's music tempo automatically while he plays and offering drums accompaniment at the same bpm, enriching the experience. The point here is that so far the musician had to match the metronome but with Music Life the metronome can follow a leading musician and offer a background support that doesn't conflict with the music tempo being played.

To create this "follower" we analyze the frequencies and the time difference in what they show up, after getting an average of the first 10~12 seconds of music the system calculates the number to offer the bpm.

This new system will enable people to play alone without having to worry too much about tempo or having to start the drums before them playing. We can also explore its possibilities as background support for analog instruments like guitars and pianos.

Chapter 5

Evaluation

Music Life was initially designed for home parties and moments out of the ordinary life. So an environment similar to a party was designed into one room inside the Keio Media Design Graduate school building and 30 people experienced the system. The environment had a different set of lights, juice, soda, snacks and ice-cream to make the users feel at a celebration. Everyone who entered the room would be welcome with drinks and food and asked to seat in the sofa as guests. By drinking and eating the participants relaxed and most of them even forgot they were being recorded, which helped by making them talk more open about the system. Most of the time they would come in groups, of 3 or 4, which seemed to make the play much more fun for the participants. Before leaving they would answer questions about the usability of the system related to the interface, the sensors and the music references.

There was a routine of tasks for the tests: They would sit in one of the two spots of the sofa, and try to discover by themselves how things work and what to do. If they start to have any frustration or misunderstanding the moderator would interfere by guiding them through the interface. If there was someone in the melody seat, the moderator would ask them to try to create themselves a song. After awhile the participants would be asked to change places and let them play for a short time then ask the person now in the melody seat to create a song as well. During this time the moderator would give the cushion to the next participants that were around or take it himself to play together. Sometimes some of the participants sitting in the sofa would try to mix the cushion into their playing as

another option of interaction. By the end, the moderator would take the guitar and ask the participants to follow at play. Before finish the test, the moderator would make sure that everyone tried a little bit of everything possible in the system. Sometimes the testers would be left alone with the Music Life just to see how they would play without a person monitoring and giving directions.

The high quality of the synthetizer software being used, Reason version 5.0, made the contact with the digital instrument smoother. The feedback of the players was that the sounds felt really pleasant, mainly the Drums and the Piano.

Figure 5.1: Preparing the Environment

5.1 Overall Playing

The prototype had the aim to make people enjoy music at a party situation and not only play famous songs but also let them create their own song to express their feeling in the moment. The participants feedback was really positive and although they seemed to have some trouble with the music notation used in the system, even novices in the music field were able to appreciate music and have fun with it. Musicians seemed to be the ones who most cared about the system, giving a lot of feedback related to how make it more

close to real instrument.

Most of the times the tests were conducted in groups of 2 or 3 people, but it would get to 9 people in a busy hour. It seemed that when you had more people in the room the players would get more excited to play. Sometimes, the participants would just get distracted with so many people and while talking to others they would keep playing and the sound would work well as a background music or noise for the whole group.

The whole system was divided into Melody, Rhythms and Extra Sounds. The Melody (left side of the sofa) had control over the interface and could choose with song to play or create their own sequence of chords; The Rhythm (right part of the sofa) was responsible for the drums and there was a default drum sequence set up but they could change it; The Extra (the cushions) had simple percussion sounds to serve as accompaniment for the other players.

Although the system was designed to be played by hand tapping in the sofa and cushions, during the tests some participants tried to experiement by using their feets, jumping on the sofa or even hitting each others with the cushions.

Another kind of creative play that emerged was when two players tried to do the melody (or the drums) together, playing one instrument with four hands, synchronising their actions to get the right timing to activate the sensor.

Figure 5.2: Party Scenario

5.2 Playing the Melody (Left side of the Sofa)

Participants who sat on the left part of the sofa were able to play the melody part of the songs. The person who controls the melody part would normally lead the rest of the group and when a musician was in that role they seemed to be have total control over the situation of the song being played. By sitting between the 2 sensors they would reach out each of the sensors with one of their hands. They could choose between playing famous melodies and sequence of chords related to different genres or choose to create their own song. They also could choose between using of the four instruments, piano, bass, acoustic guitar and electric guitar.

5.2.1 Instruments

The default melody instrument was Piano, but the players could also choose between other three: Bass, Acoustic Guitar, Overdrive Guitar. Since the sound is controlled by

MIDI [1] which means that sound is processed as numbers to the computer, it is easy to assign new intruments in the synthetizer that will just receive the number that correspond to the tone and generate the sound in any instrument. What diferentiates an instrument from the other are not the notes, since most of them are created in the same scale, but the timbre.

Even though a lot of the participants considered themselves bad with music, they all would try to fit the best instrument (timbre) to the melody they were playing. Changing the instruments with the same music had also a funny aspect to it since some timbres in a different context can generate some comedy expression.

5.2.2 Songs and Riffs presets

In the prototype there was eleven presets for melody, five for songs and six for riffs used in different genres. The songs were Praise You (Fatboy Slim), Anna Julia (Los Hermanos), Pretty Woman (Roy Orbison), Smoke on the Water (Deep Purple) and Day Tripper (Beatles). The riffs were related to genres: Pop, a different Pop (Pop2), Super Pop (balad Pop), Rock, Rock and Roll, Reggae.

During the tests the moderator prepared the system so the participants start with the playback mode, playing preset sequences. It seemed that the playback mode was easier for the beginners but a little bit boring for the musicians. From the preset list offered, the riff with more acceptance was the Rock and Roll, which follows the same riff as the song Johnny B. Good from Chuck Berry [2], a classical example of a riff used in Rock music. The participants would enjoy more the songs they know and experience a sense of control over the system when playing it on the right time.

For the prototype, Music Life just had some short riffs and small chord sequences but it is understood that having the whole song might be more pleasurable for the user. Even tough, with this simple system some testers got involved with it and tried to master the songs. In the video shootage is possible to see that some of them looks close to a desired a

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[1]Musical Instrument Digital Interface: http://en.wikipedia.org/wiki/Musical_Instrument_Digital_Interface

[2]Chuck Berry Johnny B. Good Live video: http://www.youtube.com/watch?v=AEq62iQo0eU

state of flow, focusing hard on the music and their own movements, instead of the people around them.

5.2.3   Creating your own song

This mode is what made the Music Life so special. By letting the users create their own melodies they would express their creativity by playing songs according to the moment. Music Life also support complex creations and by saving your melody and chord sequence the users are able to play the same song again in the future.

To create a song the user had to go through two steps: First they had to choose the size of the chord sequence, 4, 8, 16 or 32 chords. Those number were offered because most of pop songs respect the tempo division of 4/4, which means that every 4 beats the tempo goes back to the beginning, so multiple of 4 are easy to match; Second the players had to choose the chords from a list of 24 chords, with all the 12 tones in Major chords and all the 12 tones in Minor chords.

The chords were showed using the ABC notation, that shows the scale from La to Sol flat (A = La, B = Si, C = Do, etc.). The usability studies showed that the most of the players were unfamiliar with the ABC notation and had difficulties understanding it. Because most the users beeing tested were not guitar or pop musicans they didn't understand right away how the chords would match, so most of the compositions created on the spot felt ramdom and not really enjoyable. For the musicians it seemed easy to create a new song and to explore the variety of combinations possible, but they were not fully satisfied with the feedback from the graphic interface telling which chord they were playing at the exactly moment.

To create a song normally took around one to three minutes, not interrupting the flow of the talk or the play.

5.3 Playing the Drums (Right side of the Sofa)

The Drums were the most exciting part for most the users. They would just sit and start to play in the default mode. The players could also choose between four presets: Pop Drums (default), Rock Drums, Twist Drums and Punk Drums. Most of the participants seemed to have more fun playing the drums than the other parts because of it's simplicity and the possibility to interact with other players or real intruments in a easy way.

One of the participants, a 29 year old Japanese salary man, commented: " I am not familiar with instruments, so it is difficult to play. But I liked playing drums, it is easy for me". What demonstrates that the drums had an appeal for the beginners once they did not had to worry about hamonics or scale, just about the time.

Although Music Life had four presets of drums, just a few of the testers actually bothered to change the default preset. It felt that once they could master the tempo, they were happy enough with it.

5.4 Playing the Extras (Cushions)

The cushions were given to the people around the participants with some percussions presets that would not interfere, but enrich the song. There were two cushions available for this prototype, one with cymbal sounds and another one with bongo sounds. In a part of the experiment both cushions sounds were changed to laser shot and explosion effects, what generated a enjoyable comic effect for Music Life.

5.4.1 Inviting people to participate

Once the cushion is portable, you can give it to anyone, sitted or not in the sofa. That was really important to bring people together in the music playing, even if they were physically away from the sofa. the cushion was also nice to make a round formation of the group, which is the optimal experience of Music Life, when players forget about the TV and look each others in the eye while playing.

Because the cushions added value to the music in a elegant way, without being the cen-

ter of the music playing, some participants of the test that were more shy would eventually look for the cushion to follow the ones playing the melody and the drums. Sometimes the cushions substitute the drums, offering a much softer alternative to keep the rhythm.

When mixing Music life with analog instruments, which was done with a acoustic guitar during the tests, the cushion showed up to be the most versatile and it was used with several diffent songs as an acompaniment. Really well suited for acoustic play.

Figure 5.3: People Participating

5.4.2 Playing as a starter for music.

During the first group that was testing the system, one of the participants got the cushion and started to hit her friend in order to get the cymbal sound together with the hit. Seeing what was happening the moderation activated sound effects that were not in the interface. One cushion got the sound of a lazer gun and the other one got a bomb explosion sound. The adults in the room started to behave like kids doing a pillow fight, interrupting some one speaking with the loud noise, or just bothering the ones that were trying to play seriously. Each of this pranks was followed with laughs and smiles within the group, which contributed for the party scenario that we were aiming for.

By using it with play, the cushions worked as the first step into the music play. The participants that used it as a toy, just after, were changing for the music playing by trying

to experiment new sounds with the devices. Melodical sounds seemed to be sustain the fun for more time than funny sound effects and the participants of the test naturally were going to the music.

Figure 5.4: Music Life Pillow Fight

5.5 Together with a real instrument

At the end of each session of tests the moderator would bring up a guitar, talk the participants into play together. In most of the cases it worked ok for all the participants, but at one time the synchro got so good that somebody started to sing. The addition of singing brought the experience to a new level, once people started singing with it there was a whole music aura that got attached to the Music Life.

To follow the real instrument, Music Life as a percussion instrument has proven to be good enough to follow Singers, Pianos and Guitars, playing different genres, from Bossa Nova to Rock and Roll. The percussion was, according to the usability test feedback, the easiest to play, well as on the sofa or on the cushions. The players easily would get control of the situation and find the right tempo.

As a main harmonical instrument Music Life also performed really well being accom-

panied by real life bongos and tamborine. Limitations of music speed were noticed during the tests, but for songs played in less than 180 bpm, it matched with no problem.

Figure 5.5: Music Life together with an Acoustic Guitar

5.6   Usability Tests Analysis

Usability is defined as the characteristic of being easy to use [3]. Usability tests verify that something is easy to use to the extent that it effectively performs the task for which it is being used. In the Music Life usability test we measured how easy the users could understand the system, execute the tasks, play with it and how satisfied they were with the sensors postition and the feedback system.

The test steps were described during the whole chapter 5 and by the end of the playing each one of the 20 participants answered the test and had conversations with the moderator to openly give comments about the system and the experience.

5.6.1   Overall Analysis

The tests were answered by 20 participants with average age of 25.45 years old. The gender rate was 55% men (11) and 45% women (9). Japanese participants were 55%

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[3]Usability First: http://www.usabilityfirst.com/glossary/ - Accessed on June 5, 2011)

percent of the group (11), with the other 45% divided between Singaporean (3), American (2), Korean (2) , Australia (1), China (1). Among the participants 40% playing at least one instrument (Piano (5), Drums(2), Cymbals(1), Trombone(1), Bass(1) and Guitar(2)).

During the debrief of the users, the one's that could play an instrument were more excited to talk about how to improve the musicality and feedback response, while the one's that did not play an instrument (60%) would give comments related to the fun, to which part they most liked to play or the situations for it to be used.

The participants enjoyed Music Life and from their body behaviour and talk, they were having fun, but not the laughing type of fun, but rather the one achieved through solving puzzles and mastering a new skill.

More than half of the participants described that it was easy to understand what to do. The users had an easier time playing with drums and rhythms than with the melody and this was also clear in the comments that the they preffered the Drums or the Cushion with percussion because they felt more in control of the situation.

When three or more persons played together at a fast tempo there was some problems with feedback and the users were not sure of which part of the sound they were responsible for.

5.6.2 Music Terminology

The music notation used was the ABC notation, that relate music notes to letters (A=La, B=Si, C=Do, etc.). The users had to choose from the list of chords the sequence they were going to execute, therefore playing a song or creating their own.

It was clear that the musicians found easy to use, even the ones not familiar with the technology, while the begginers took some time to understand what each simbol represents. There was feedback of the sound of the chord when the users would put the mouse over a chord. Participants not familiar with playing music had a harder time, but seemed to enjoy the learning of a new language and would spend a good amount of time testing each sound, one by one.

5.6.3 Playing

Sixth five percent of the users described the system as easy or really easy to play in general. Separating by melody, drums and cushions, the three positions that the users tested, the melody was considered the most hard of them, with an average in the middle between hard and easy. Both the drums and cushions were described as easy or really easy by more than 70% of the participants of the test.

Because the melody had a leading part in the system, people sitted at the melody chair also had more peer-presure to do well and guide the drums. Being in that position may also added stress to the player, making it even harder to play the melody.

The cushions were the ones that received more comments because it's mobility would make it accessible for everyone around and it's simplicity of just one sound assigned to it made the learning curve a painless process.

5.6.4 Interface

The participants considered the interface easy to use, but there were a lot of comments on how it should offer even more visual appeal and feedback for the actions. Another problem described by the users is that the interface shows all the information at one time, being better to divide it into a few screens, like in a videogame. Some of the testers also asked for some visual feedback according to the actions they perform and rhythm of the song they are playing

5.6.5 Sensors and Sound Feedback

The users were asked to sit in the sofa and there was some collor instructions by tape that showed where the sensors were and they naturally would find the best place to sit between two sensors. The cushions had, each one of them, one sensor at one side of it.

The most part of the users, 65% gave a positive feedback related to the position of the sensors and 30% was neutral about it. In the comments the participants explained that for them there shoud be 2 positions of the sensors for each seat, one for when you are relaxed,

with their back supported at the back part of the sofa, and one for when they feel active and sit more to the edge of the sofa.

Figure 5.6: Sensor position on the Sofa

The feedback was decribed as good and very good by 70% of the participants. The musicians were the ones most worried with the feedback and when the whole system was being played at the same time they felt frustrated not to differentiate the sound and comment of a slow performance of the music response. The users also reported sound feedback problems when performing at a fast pace and they would feel that the music was not following their speed exactly. Even though, they reported good sound feedback performance in most of the situations, mainly when playing alone.

5.6.6   Song Creation

This was the hardest part for the users and 65% described it as hard or very hard to do. The users explained that they had trouble understanfing the music notation and even when they understood it they could not get the harmonics of the chords sequence right at first and they would get frustrated.

The learning curve for this part is longer and for the short experiment was hard to

measure how long it would take for people to master music creation inside the system. One of the testers, that has no music background, tried it for about an hour playing alone (he did the whole test and stayed playing while there was a break for dinner). Later on, observing the video shoot, it was interesting to see his concentration and positive reactions to the patterns he was discovering. To understand about the song creation system further specific tests are needed with longer hours and even days of practice, like in a analog instrument.

5.6.7 Conclusions of the Usability test

The prototype of Music Life stills need fine tunning, but the overall response was really positive. Group playing seemed to be more appreciated than playing alone and people felt more pressured in the position responsible for the melody than playing the drums or the extras with the cushions. The sensors were well positioned but even though there is good feedback most of time, it glich sometimes causing frustration to the users. In the creation mode the system felt like a real analog music instrument and it worth persuing this way in order to prolong the fun and enable people to express themselves.

Chapter 6

Conclusion and Future Works

6.1 Conclusion

Music Life is a new home entertaiment system that is made as a digital music instrument upon furniture, allowing people to express their creativity through music while enhancing face-to-face communication through an easy to access interaction with the sofa and cushions.

Music Life opens the field of applications for Media Furniture, being the first complete application for the system. It is also the first application that uses the sofa and the cushions as medias for digital entertainment, bringing novelty in the music playing system and in the usage of the soft surfaces of the sofa and cushion as interfaces for music interaction in the living room.

During the usability studies, it became clear that Music Life is a great media to entertain people in a smart way, challenging the user to master a new skill and offering the high quality music sound and the fun of everyone around the furniture as a reward. The kinesthetic appeal of the music being played and created live in a accessible media as furniture, made all the participants to try it out without any hesitation. Different from a videogame, the focus was not on the screen but in the action of the player itself, which made the players feel great about being the entertainers of the party. The usability studies also showed that Music Life has a big potential as a starter for converstations about music

styles and the development of new bonds between people through the music playing.

It was not possible to measure how much the users learned about music by playing the system in a short experiment, but it's potential to develop the musicallity was felt and commented by most of the users.

6.2 Future Works

Music Life is still at it's beta version and for further development, the implementation of new features and experiences becomes essential for the success of the design.

6.2.1 At the Formal level:

In the actual system, the players can't change fast to a different chord sequence, so a system that allows more than one chord sequence needs to be implemented to allow users to change between music parts and chorus, for example.

Although the mapping system already allows a huge variety of chord combinations, the interface number of chords is limited to 48. This was a design decision to simplify for the tests, so for future development the interface needs to be redesigned to acomodate a bigger variety of chords expanding the possibilities of the player.

For the interaction with the sofa, only piezo sensors were used, limiting the number of actions people can actually do with furniture and not taking advantage of the sofa and cushion total afordance. For a next version of the system, a variety of sensors may help the users to create sound by shaking the cushion or stomping at the carpet, opening new possbilities of body expession and making better usage of the furniture affordances.

6.2.2 At the Experience level:

Because of the focus on enhancing communication of Music Life project, the link with social network applications needs to be implemented. Beyonds a system to share songs, videos and photos of the users, there is also an intereting possibility of people playing

together at different places through the internet.

A recording system also needs to be implanted for a next prototype. Being able to record and play again their own songs might be a great motivator for heavy usage. Once people would be able to listen and share their own music, albums and a develop a whole repertoire, Music Life will get another dimension. People will be able to get online, play it, share it, enjoy it in group. Imagine how nice it would be when young people from different parts of the world could join 2 or more parties by playing together the same music in their living rooms, making new friends through the language of music.

6.2.3 At the Socio-cultural level:

The concept of Music Life can be expanded to almost any kind of furniture. By giving the house objects a new value through sound one can enhance their everyday life with small points of joy through complex harmonic sound effects coming from everyday behavior. A recreational room at a school or a creative space for an office also are places were Music Life might be welcome. Kids could be entertained during long trips inside a car with Music Life installed in the seats.

Another point that should be explored is the musicality development of users. It is know that people who plays instruments develops different parts of their brain and are open in sensibility for new padrons and creativity. To record analog instruments with high quality is a difficult task and to create and share music with eletronic and computer based instruments requires software skills and counter intuitive interfaces, once most of the times you have to work with a mouse and a QWERTY keyboard to create and play the songs. Music Life might help by enabling people to create with a live music performance directed interface (the way it is now) together with a recording and social network sharing applications to help the people to express and share their creativity through songs in a easy and fast way. Going further in this idea, a whole new social network might emerge from the need to share the songs with friends and family.

The new way of playing and the possibilities of sound effects, chords, rhythms and digital instrument sounds togehter with a variety of body interactions will generate new

genres, new aesthetics and new music movements based on the Music Life platform. As Onyx Ashanti tries to create a new movement with his beatjazz[1], the users of Music Life might create a revolution without leaving their living room, sitting on the sofa with their family and friends.

Figure 6.1: Furniture as a way of Music Expression

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[1] Beat Jazz live performance at TED conference: http://www.ted.com/talks/lang/eng/onyx_ashanti_this_is_beat-jazz.html Accessed on June 21, 2011.

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Appendix

Design Thinking Method:

Before getting into the Music Life concept, I will explain about the design process used in the research. Music Life was inside the Media Furniture project at Keio Media Design Graduate School and followed the same research methods to look for innovative ideas. So at the first group it was focused on building living room objects. This project offers an application to be used with the Sofa, Cushion and TV previous built, showing the possibility of Media Furniture as a platform and also offering a new way of thinking about applications for your furniture and the living room of the 21st century.

Ethnography Research and Analysis

The research started around november 2010 by the overall concept of adding a layer of entertainment design to Media Furniture, which has already a mix of Furniture Design and Electric Appliances design in its core.
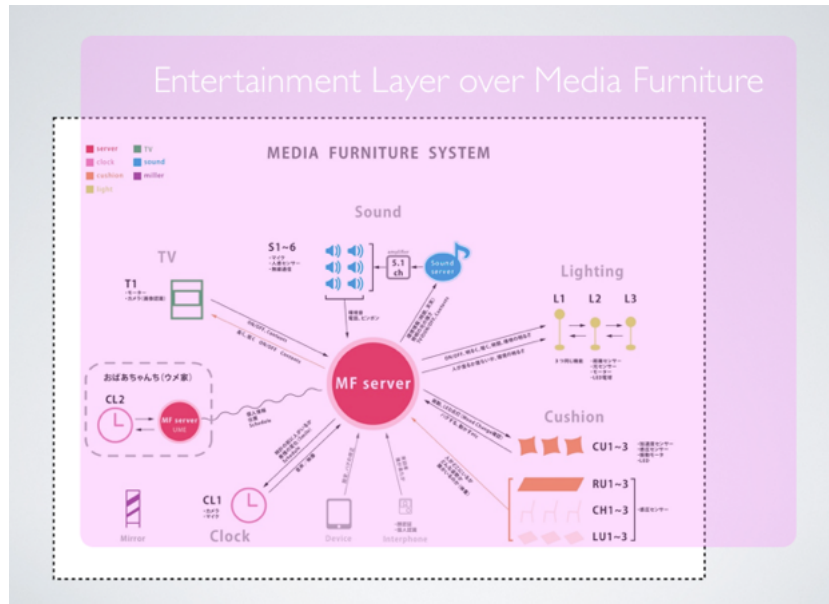
Figure 6.2: Media Furniture + Game Design

Looking through the trend of "Gamification", which is the idea of bringing Game Design to places that we usually don't imagine as a game, we decided to research a well know physical education teacher, that has to create many games to motivate his students to exercise.

Figure 6.3: Master: Professor Ichinose

After doing the fieldwork, the 5 model analysis was used in order to understand the data that we get from it. We learned three interesting points in the fieldwork: to motivative people the teacher would show once how to do and tell a story that would give value to

that action. The second point is that body movements were really important for the fun, not only running, but by moving the body when lifting weight, the students seemed to forget about life and concentrate in the action. The third point is that group activities would get the students more excited than individual ones.
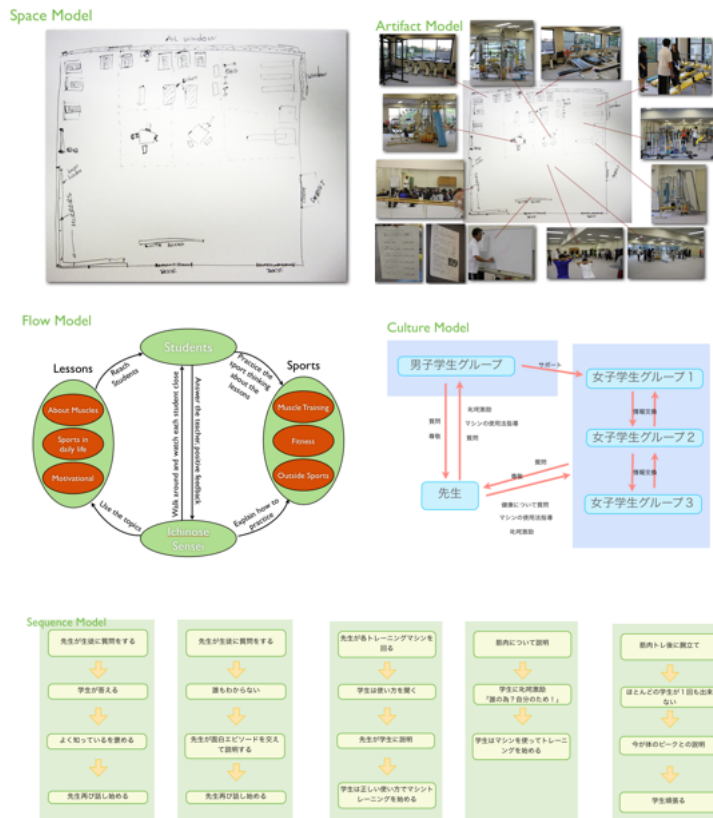

Figure 6.4: 5 Models Analysis with Professor Ichinose

The Brazilian Music Research

After the first fieldwork I went to Brazil to visit my family. So I took the opportunity to observe how brazilians entertain themselves and what kind of activities they do. After a couple of days I could understand that home parties and music was a big part of the entertainment in Brazil. Families would receive visitors with some background music, in a live concert DVD or just the radio and, after some drinks, people would be dancing to the music or playing guitar or just making rhythms by tapping around in the tables or anything that could make some sound. There was also this round formation of the groups

so everyone could see everyone else's face.

Back to Japan I went to a fieldwork with a Samba group that tries to recreate the brazilian atmosphere in a brazilian bar at Asakusa.

Figure 6.5: Brazilian Samba in Japan - At the "Que Bom", Brazialian restaurant in Asakusa

Once more, after the fieldwork, the 5 model analysis was part of the process. This time we could perceive that the experience of the listening to the samba got much deeper once people were invited to participate. Cláudio, one of the masters in this fieldwork would go to some tables and offer simple instruments like rattles or tambourins so the people around could follow adding a percussion. As he walked around he would teach the basics of the instruments and get people engaged creating the mood for the whole restaurant. By the end of the night 80% of the people in the restaurant were being part of the music play and enjoying the samba rhythm. The customers were also allowed to play songs they wanted and to try other instruments that were around in the main table. Because there was more people than instruments the restaurant staff improvised some soda cans with rice inside to use as a rattles.
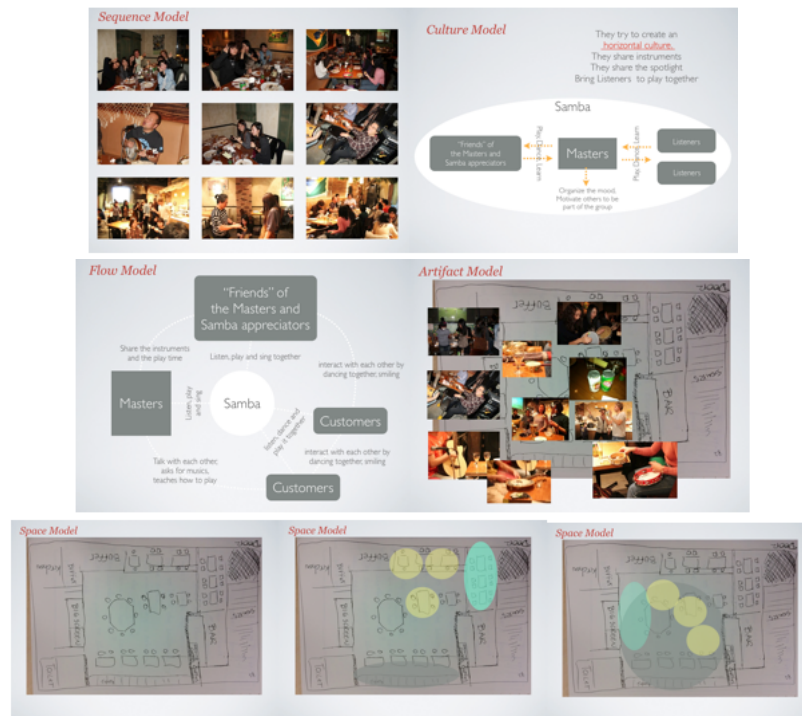
Figure 6.6: Brazilian Samba Fieldwork - 5 Model Analisys

Using Game Dynamics with Design Thinking.

Game Design and Design Thinking has a lot of aspects in common, being the most of them in the brainstorming and idea generation phase. Brainstorm for creative ideas are similar in both processes, as explained in the book The Art of Innovation[48], we are supposed to give ideas freely without holding back and from seeing those ideas in front of us we understand more about the project and the group working on it. It is really similar to Freud analytic process where the person in observation is the one that speaks and by the topics and words that show up on his speech, himself becomes to understand the situation. The Psychoanalyst has much more a guidance role compared with a Shrink that will tell you your problem. So for the creative development it seems that we need more people with Analytical thinking to bring up the best ideas of the group instead of telling them what to do.

As explained in the book Game Storming, every creative project has the opening phase, where a lot of ideas are generated, the Explorarition phase where we see the possibilities of most of the ideas and the closing phase where we narrow it down till the end

of the project. Both Design Thinking and Game Design follow this rule.

A idea that deserves discussion is the fuzzy goals approach that Game design adopts. Fuzzy Goals means that you don't know the exactly point were you are going to get by the end of the project. You might even have a direction of were they want to get more or less, but never 100% sure from the beginning. Because if you know exactly where do you want to get from the beginning there is no point in trying a creative approach, since you already know what to do. If you are building a bridge, you know you want to get from point A to B in a straight line, which is probably the fastest and cheapest way to do it.

But if you are developing entertainment, or trying to achieve something new you can not know where you are getting. Because then the new it is not coming, but something that you already knew.

Playing a game is hard work, as says Jane Macgonigal, because you force yourself to make a simple thing in a difficult way. A game is always adding obstacles (lucky of the dice being an obstacle as well) to tasks that could be much more simple. Imagine an Basketball game, where you have to put a ball inside an circle of arrow that is positioned 2,30 meters from the floor. Adding this obstacles to everyday life is the way humans find to create fun and entertainment, or by another point of view: Working hard.

So in this project creative process we added some extra rules to make it more fun to develop. The book Gamestorming was of a big help but eventually we would come up with our own games.

Another instance that the Game got an important part of the process is when the other team member graduated and eventually I had to work on my own for a long period. By adding time obstacles, rewards of ice cream or sunbath, calling random people to play with me and then challenging them in a certain way was important to keep the motivation high and ideas coming.

Game Design and Design Thinking have similar approach to creativity and idea generation. Another similar aspect between both processes is the Fuzzy Goals approach, which means that the designer don't know the exactly final product he is creating in the beginning of the project and there is not one only right answer, but the collective creativity of

the group generate ideas and solutions that never existed before [15]. This is the way both approaches foster innovation.

So in this project creative process we added some extra rules to make it more fun to develop. The book Gamestorming was of a big help but eventually we would come up with our own games. For example, instead of doing simple brainstorm for idea generation we would do an heuristic approach and choose the related topics and create an X Y table and force ourselves to mix the ideas. It was actually a lot of fun to add those arbitrary rules to the process, keeping the team motivated at the starting phase.
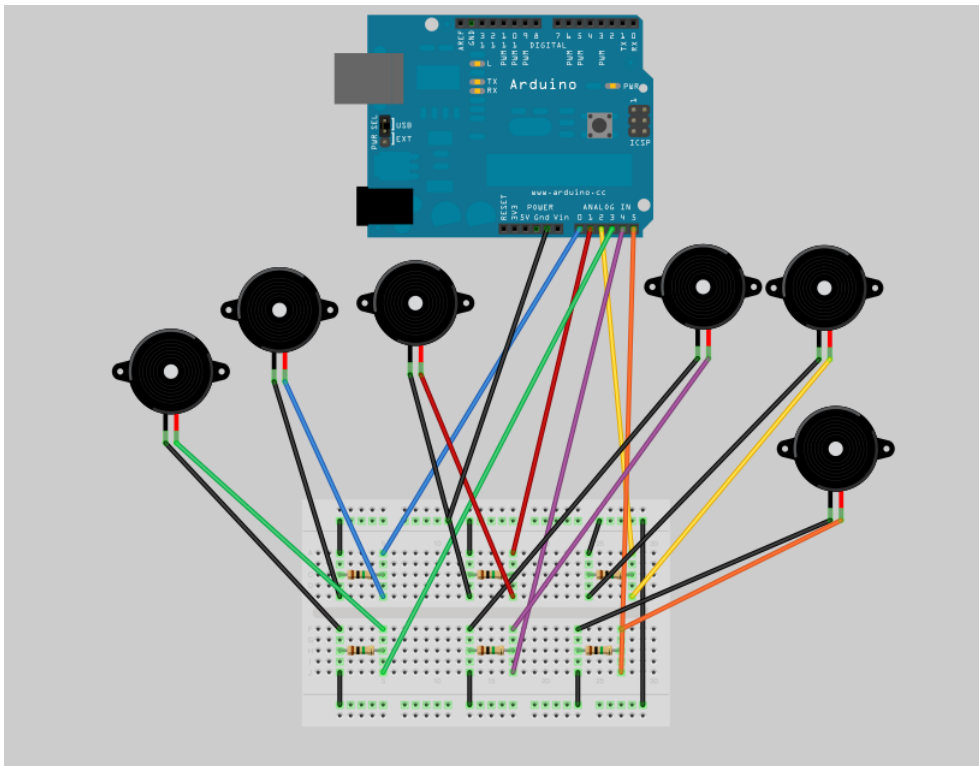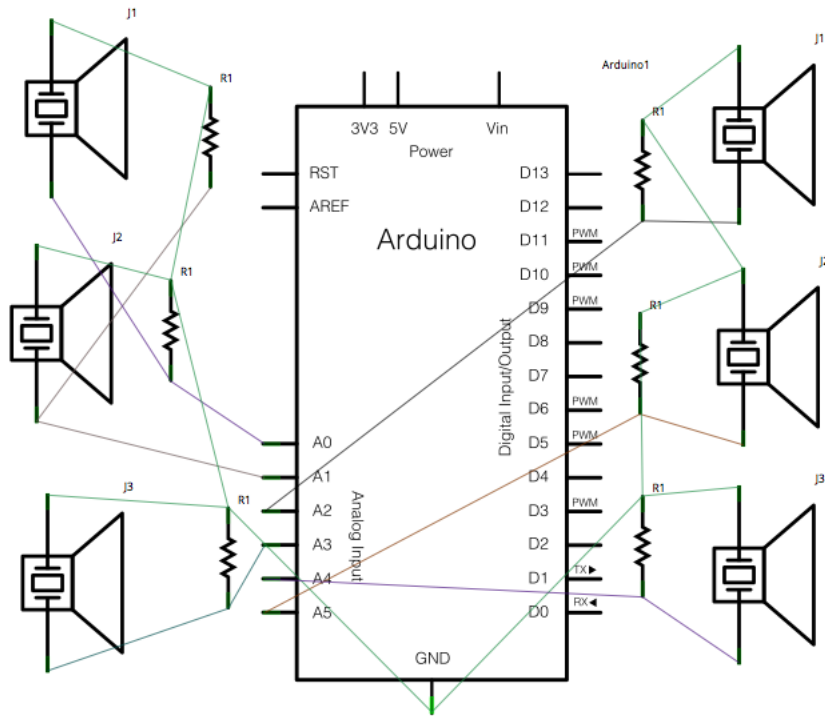
Music Life Schematics

Figure 6.7: Music Life Breadboard

Figure 6.8: Music Life Schematics