March 2018

Videogame_&_Music_Design

Chandler Reynolds
Worcester Polytechnic Institute

Edward Lee Shaddock
Worcester Polytechnic Institute

Guillermo Rene Rivera
Worcester Polytechnic Institute

Thananart Piyajarawong
Worcester Polytechnic Institute

Follow this and additional works at: https://digitalcommons.wpi.edu/iqp-all

MUSIC AND VIDEO GAME DESIGN

Interactive Qualifying Project Report completed in partial fulfillment of the Bachelor of Science degree at Worcester Polytechnic Institute, Worcester, MA

Submitted to: Dr. Vincent J. Manzo, Advisor

Submitted by:
Guillermo Rivera
Edward Shaddock
Thananart Piyajarawong
Chandler Reynolds

March 14, 2018

Abstract

This project paper explores the concept of technology and gamification used for learning purposes. The project takes in aspects of music and video games to enhance and engage a student's learning experience of musicianship with a musical instrument. Specifically, we focused on ways that one might learn to love learning how to play an instrument by interacting with a digital piano in a puzzle video game. We explored by taking the most commonly used teaching methods in piano instruction as well as gamification strategies, computer programming, and game art design. We then interviewed professional music educators and, using their feedback and the results of our background research, implemented these ideas into a music game prototype. We then surveyed students likely to play the game and obtained their feedback regarding the concept, our design, and its potential to be an engaging educational tool. Learning and implementing these methods, computer programming, and game art design, the students will show if games are beneficial to musical learning.

Table of Contents

Introduction

Music is part of every known culture it has been with us since the prehistoric times. Music is a ubiquitous part of what defines us as humans and is a significant area of study in our society, molding the great composers of tomorrow.

To have experience in the music field one must start with the basics: chords, scales, vocabulary, and music theory. The way music is traditionally taught, students must learn and master the fundamentals before using more advanced techniques. In the formal classroom it is safe to say that learning music is short of an easy task.

Since many students want to directly focus in a specific area of music instead of everything covered by a formal classroom education, some opt for more informal learning. A group of researchers from the Westminster Choir College of Rider University took this to heart. In their "Going Green" research, they assigned a Christmas carol to teams of students from grades K through 12. Their task was to learn how to perform or remix the assigned carol without teacher intervention for 12 weeks.

Incentive-based systems reward players for accomplishing a task, which in turn motivates the player to act. This is one of the reasons why people play video games. Whether it is advancing to a new level, unlocking achievements, or having character enhancements, these incentives entice players into the game realm. With educational video games, it is possible to promote student engagement and enhance the learning process. A study done by The University of Michigan (DIGITAL GAME USE) states "We found support for claims that well-designed games can motivate students to learn less

popular subjects, such as math, and that game-based learning can get students interested in the subject matter."

Determination and persistence are vital qualities when playing video games as well as when you're learning a new subject. Constant practice when playing video games enhances reaction skills by introducing the element of surprise. As stated by Shawn Green and Daphne Bavelier in "The Cognitive Neuroscience of Video Games": "Using a rotary pursuit unit, subjects were required to track a light stimulus that moved at various rates and in different patterns. Video game users far outperformed their non-user counterparts on this task, particularly at high speeds, clearly demonstrating that video-game users have superior eye-hand coordination than non-users". With the player's skills improving, it teaches them a systematic way of thinking and a deeper understanding of causation.

This prototype is a puzzle game where a player will achieve the end of the puzzle when various piano compositions are learned. Our team first accomplished background research on different teaching methods and musical instruments. Following that, the team had to learn C++ and the Unreal Engine 4 developers environment since these would be the tools used for the prototype creation. After being comfortable with using the IDE (Integrated Developer Environment), we set out to contact music professionals in our area to discuss their music teaching methods. We were able to take things from curriculum-based learning into the incentive-based environment that we designed.

The goal of this IQP was to analyze the strengths of using video games as a method of teaching music and to use a developed and tested prototype that incorporated similar game traits.

Background

      Since the inception of the piano in the early 1700's as a status symbol for the wealthy, music has played a vital role in everyone's lives. Today music mostly serves the purpose of being a way to relax. We can listen to music in different contexts, but being able to play the music you love listening to can produce feelings of happiness and creativity. The only difficulty is being able to use an efficient and fun method of teaching that employs into the curriculum all the aspects of music playing, reading, and listening techniques while keeping students engaged. There are many approaches to achieving the goal of educating a student to become a professional musician, and all methods are categorized as being formal or informal. There are varying outcomes to having a formal versus an informal music education and students react better to some methods compared to others. However, for this project, the method being used is known as the Suzuki method, a formal teaching process, which will be applied to the informal way of playing an educational video game.

      "More than fifty years ago, Japanese violinist Shinichi Suzuki realized the implications of the fact that children the world over learn to speak their native language with ease. He began to apply the basic principles of language acquisition to the learning of music and called his method the mother-tongue approach. The ideas of parent responsibility, loving encouragement, constant repetition, etc., are some of the unique features of the Suzuki approach. Suzuki bases its teachings on the same theories regarding language." This principle is based on the philosophy that people learn from

their surrounding environments this is known as "Enculturation." "The immersion of music or musical practices in one's environment is a fundamental factor that is common to all aspects of music learning whether formal or informal ("Music, Informal Learning, and the School," p. 5)." "A student to begin should first learn "Tonalization," as to be able to recognize pleasing notes from their instruments and be able to reproduce them. Sound recordings are also used, to add to the student's environment. The pre-recorded music will help students learn the musical notes, rhythm, dynamic, and tone quality. Other Suzuki method elements include repetition, encouragement, playing with other children, and graded repertoire ("About the Suzuki Method")."

Informal learning is any training that is self-directed or knowledge gained from experience. This form of education takes place outside of formal educational facilities, like schools. Regarding informal learning and music, "Young, famous musicians mainly teach themselves to play music, through processes of skill and knowledge acquisition that are both conscious and unconscious. One early central learning practice is solitary and involves purposive and attentive listening linked to the close copying of recordings, as well as more distracted listening leading to close imitation and improvisatory adaptation. The written is always secondary to the aural. Another central practice involves learning from each other in pairs and groups, through casual encounters and organized sessions, both aside from and during music making. Through such interaction, they copy and exchange ideas, knowledge, and techniques, learn to play together, including making covers, improvisations and compositions, of original music (Green, 2002 p. 97)." Meaning most musicians improve their skills by self-learning

through the emulation of professionals by listening to recordings or improvising their compositions. The desire to become a professional musician demonstrates the drive for most students to acquire knowledge through informal practices to improve themselves, especially for musicians and the most informal teaching method available are video games.

Games can be used as an alternative method to learning in classrooms. With educational video games, it is possible to promote student engagement and enhance the learning process. Games work through incentives by utilizing reward systems; this is how students get enticed into playing them. These systems also improve reaction skills by introducing the element of surprise, which makes the player react naturally. Meaning education and video games go hand in hand like jelly with peanut butter, they mix perfectly to make a delicious meal, or in this case a valuable education. This method of informal learning through educational games is an excellent way to keep those who wish to learn something interested. Using the formal didactic teaching of the Suzuki method applied to the informal education of video games can lead to a growing population of students who love music but are new to the advanced techniques of playing instruments. "As far as music is concerned, sound interaction is usually absent from commercial video games or lacks educational purpose otherwise. Nonetheless, rhythm video games such as Samba de Amigo are quite successful in Japan; their gameplay is based on reproducing a given sequence in sync with a soundtrack using buttons or specially-designed input interfaces such as plugged Maracas. Rhythm Breaker, also part of the Jam-o-drum4 project, offers what amounts to a competitive

multiplayer, Tetris-like time-matching game in which players have to follow imposed

temporal patterns. The main educational by-product of such systems is dexterity and

memory, but players are mere reproducers and have no musical control. Some genuine

audio games with no video support, such as the audio Mastermind presented by Targett

et al., in which token colors are replaced by melodies and auditory icons, have been

originally designed for visually-impaired persons but may be used by any hearing one.

Players find the game challenging since they need to develop aural dexterity" (pitch

perception, sound concentration, and memory). (Building the Case for Games in Music

Education.).

Platform

       In the age of technology, the vast majority of instructive materials are in the form of multimedia which provide knowledge representation of various musical concepts: tempo, tones, sight-reading, etc. integrated with video game conventions such as sound, score and image. Most learners (millennials) have access to personal computer which enhanced the viability of an offline PC-based platform.

Methodology

Interview

  We interviewed two music teachers, as well as obtained information from surveys taken by current students enrolled in college level music courses. The teachers are both experienced in teaching vocal music, music theory/history, music technology, acoustic instruments and digital music production. Both teachers have experience teaching these subjects at the elementary school to university level. The unanimous objective is to help students progress toward established goals with as much individual support as needed. Time is less spent in class on direct instruction and more on individual work/practice, individual coaching, and peer coaching. One teacher quotes from their own past music instructor "keep them creative and happy". This philosophy potentially leads students to love learning about music while having fun. If students are having fun while learning they are more than likely to compose, and present their musical ideas on their own.

  The teachers of this interview are members of TI-ME.org, music professors highly regarded in their area of study. We took the information of 8 willing participants to help our creation of the game. The participants were willing to take part in a questionnaire. Doing so helped to shed light on the core curriculum music educators use to teach. It was better to speak to a music teacher directly so that questions presented by team could be answered by a real person in the industry rather than doing multiple searches online for a research paper on the topic. The focus of the questions were on their music teaching experiences and methods. The focus was the use of

technology with music; is it beneficial or detrimental, how so? Do you potentially see yourself using technology in the classroom? Why/ Why not? After the information of the interviews is transcribed, the team moved forward and created the musical game using the information from the interviews.

In this project, the objective is to identify the issues with music education and determine solutions to those issues through integration of music and video games. These hands-on issues were proven viable through interviews with three expert music educators. In order to develop a prototype, a set of established frameworks which includes platform, form of musical instruments, fundamental aspects of music and target audience was pointed out. This particular prototype is then directed towards the features found in the scholarly articles analyzed in the background research.

The central idea of musical fundamentals for a novice learner is that instead of starting with musical improvisation or musical techniques, he or she should follow a set of instructions to improve musical skills such as chords, tempo or sight-reading.

Design

      While the intention of this game is to enhance a player's learning experience this does not mean that the goal of the game is to learn about music. The goal of a game is something that players should have fun working towards. A possible flaw with games whose goal is teaching something, is that it is often not interesting or fun. An example of this is programs used to teach keyboard skills. The goal of these programs is for the student to learn typing skills without looking at the keyboard, in some case there may be a plastic mat to place on the keyboard so you cannot see the characters. While these programs may be necessary, even when themed to try and be interesting to young students, they are not necessarily effective. However, take for instance the idea of a zombie survival game[see final reference]. You are exploring a building and as you explore you encounter zombies. In order to 'defeat' these zombies you must correctly type sentences within a limited time. If you are successful you continue to explore the house searching for supplies to survive, if unsuccessful you must reload from your save point. In this example the purpose of the game is to learn or improve your keyboard skills. As the game goes on you may have to deal with longer and more complicated sentences or have less time to type them. The goal of this game is to explore and survive against the zombie hordes of the apocalypse, not to learn to type. While the theme of the game may not fit everyone's tastes it is still more interesting than the previous example of a typing program.

      With this in mind the design of this game was approached so that understanding the fundamentals of music would be important to completing the game, but successfully

understanding those fundamentals would not be the goal itself. However, music is a much more complicated system then your keyboard. As such a slower approach would be more effective at teaching our players then the survival game described above, players need time to think through and properly understand the information they are given. This factor is why the team decided on an exploration based puzzle game. Within a designed world (not randomly generated) players will need to solve puzzles in order to enter new areas and explore the world.

The puzzles for our game are located on what will be called podiums[image 1]. It was originally planned that the keyboard would in some way be located on the character allowing them to access the piano keyboard whenever they wished to. However, from the perspective of the game they would only use it for puzzles when at a podium. This meant the only other time they would use the keyboard is if they wanted to play music. but if that is the case it would then be better for them to use a real program for music composition. As such the keyboard will be located on the podium itself along with the puzzle, or in this case the music they need to play. When the player interacts with the podium they will be presented with both the keyboard and an equivalent to sheet music, they would also have an option for playback of the music so that they can listen to what it will sound like when played correctly. At first what they have to play may only be a single quarter note, but as they continue through the world these podiums will become more complicated, they may even have to complete multiple podiums or fill in the blanks. Another option is to have them write out music after listening to audio rather than playing the music on the keyboard.

But what happens after the player correctly completes a podium. They will not be locked out of the podium if they wish to practice what was on the podium but the first time they complete it the podium would close, bringing the players attention off the podiums contents and onto something else. In the case of this worlds design it would be the flowers located throughout the world. There are two types of flowers important to the system. In this case it is the larger of the two flowers[image 2]. When a player correctly completes a podium the affiliated large flower will open (motion) and become a light source (lighting). This creates immediate feedback for correctly completing a podium[image 3]. Additionally these larger flowers will be located near the object that the podium effects, such as a door opening. The other flower which would be smaller but always give off light would be located on all podiums so that players never feel lost when searching for where to go next, preventing possible frustration on that account. In addition to these flowers you would also add roots. These roots would lead from the flowers at the podiums to the flower or flowers affected by said podium. This allows for the player to clearer understand what podiums they must complete to affect certain areas. It also clears up confusion in areas where there might be multiple podiums, provided of course you properly lay out these connections.

Which brings us to world design. In the case of this worlds artistic design the idea was to use mid tone colors in an evening style lighting setup. The goal of this design would be to make the lights from plants and the podiums to stand out more as points in the darkness. If need be you could add another flower type simply to act as a guide

leading them towards the next podium. However, this brings us to several things that were not covered in this short design.

The first of these is that within this game the player is exploring a world. But what kind of world? The artistic design given only covers a minute part of the work required to truly create a world that players would want to explore and spend their time in. But this raises the question of what kind of world this will be. Which brings us to the question of genre and target audience. As mentioned with the case of the zombie typing game where a game takes place will affect who is interested in playing it. Will this game be science fiction, fantasy, or post-apocalypse. While the design of the game above could be effective in introducing players to music, especially with testing, changes, and additions how many players would be interested in purchasing this game to play? They are not purchasing this game to learn music but for entertainment. As such, for the release of this game, or any game, having an understanding of the specific audience you are targeting and their size is very important. This must be kept in mind when creating any game.

In regards to the game, here we must set an array of practices that will be taken in order to complete the process of an educational game. We must clearly state the principles or rules which will help us reach the desired procedures in conducting the making of the prototype.

Student Surveys

The subjects of this interview are WPI students that have experience in music. We will take the information of 8 willing participants to see if the game concept meets the requirements in the music teaching process. The participants will be willing to take part in this questionnaire. The focus of the questions will be on the prototype of the game itself. Building from our previous interviews with music professors, we will determine if the concepts brought in by the professors are of use to the students who are willing to learn the piano via an interactive game.

Results

Interview Results

We interviewed two music teachers and both are experienced in teaching vocal music, music theory/history, music technology, acoustic instruments and digital music production. With the basic concept and design initialized the team was able to conduct interviews with established music instructors. The report includes the instructors' opinions on the effectiveness of a music education based game, the difficulty curve of the curriculum for most students, and the initial inquisitiveness of the students when they start learning.

Regarding maintaining a student's interest in being taught there is rarely a lack of attentiveness since the student chose to be taught. Enthusiasm is also an important factor on the teacher's part in order to create an engaging environment for the student. When the student is engaged in learning new techniques, or improving themselves they can establish individual goals and completing those goals becomes their own reward. Constant improvement is essential for a student's learning. Keeping the difficulty of the learning process ahead of where the student is is important, but not so far that it would be a struggle for them to get to that level. One teacher quotes that "when I see 80% mastery of a skill or topic, I add another layer of detail or challenge."

Students who are taking their first steps in learning about music usually have questions for instructors based on the curriculum and their ability to succeed. The team asked the teachers interviewed what the most common question they received from

their students was and what their response is. The most common questions asked are when can the student start playing songs and if the student has the ability to succeed or not. The responses to these questions are "Today, because that's the whole point of being here." and "I project absolute confidence, since I have taught hundreds of beginners over nearly 30 years."

Student Results

      With the design specifications of the game implemented in sketches, and the flow of the game finalized, the team conducted a study in which students would evaluate the game concepts. The first question consisted of showing the flow of the game in different scenarios; correct or incorrect key entries while playing the game, and how the environment would change. After the explanation the survey asked the students if the concept was easily understood by ranking the system from 1 to 10, 10 being easily comprehensible. From the survey results, 60% of the students questioned found the concept relatively comprehensible(Figure 01).
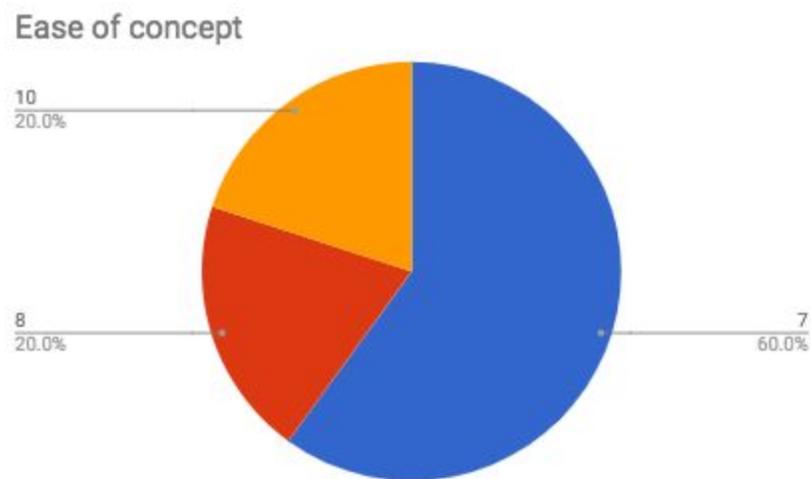

Figure 01

      The team then followed up the question by asking if the concept of the game intrigues the students to learn using the game. 80% of the students responded by saying that the proposed system does cause intrigue for future learning mechanisms(Figure 02).
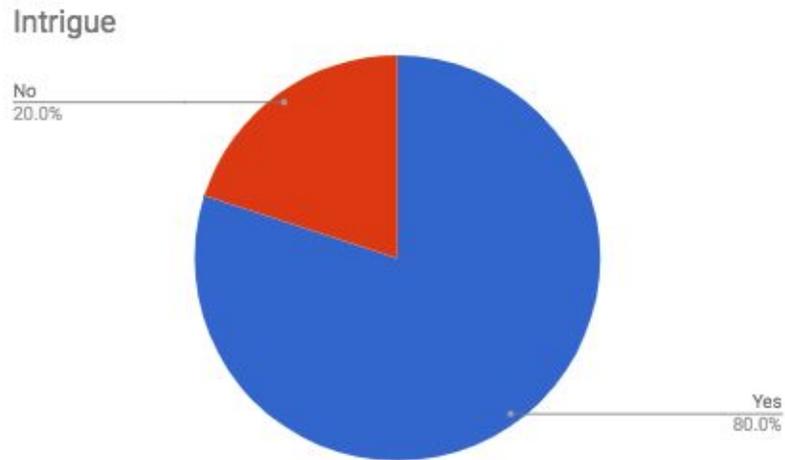
Figure 02

The research then asked if the concept will be useful and successful in teaching basic and repetitive musical concepts to students. All of the students responded saying that the system will most probably successfully teach the concepts to students(Figure 03).

Figure 03

Moving away from the game concept designs, the team wanted to then ask the students their perspectives on technology in the classroom. When asked what is the initial difficulty in learning music, the results were unanimous in suggesting that memorizing the basic notes is difficult. This could be due to the immersion of a new material for unknown students. As mentioned before, when learning music, it is compared to being as difficult as learning a new language, due to the tasks of not just learning notes, but also how to read and write them. The students must also be attentive to what they are being taught. If there is no attention in the student's part, there will be no benefit for them in learning to use an instrument with the system.

From the survey, the students also shared their ideas in how the game can be implemented in teaching besides the flow of the game. The students gave the idea of using a real instrument as the controller for the game. Since the game is based on teaching musical notes for pianos, an electric piano can easily implemented as a controller, giving the students a more "real life" experience as they mentioned. The real life experience of the game could be then complemented with an adventurous or puzzle like environment which is what is part of our design.

Conclusion

Video games can be viewed as a waste of time by some, but if used correctly games can be used as a valuable source to teach those who wish to learn in a different way. By using this method students can learn about music at their own pace while enjoying themselves. This enjoyment of learning can potentially lead a student to reach depths of musical proficiency they never thought they could reach on their own. Music learned through an informal medium like a videogame is a considerable option to use to sustain interest, relevant difficulty level, and fun for the student. Future studies should include research into the difficulty curve of learning advanced techniques like fingering speed, reading speed, and note accuracy and precision while playing piano. Obtaining data on whether these factors improve more while playing a music game vs. playing an analog piano with traditional teaching methods would be useful in helping students and teachers create more efficient curriculums based on their needs.

References

Green, L. (2002). *How popular musicians learn: a way ahead for music education.* Aldershot: Ashgate.

"About the Suzuki Method." *Suzuki Association of the Americas*, The Suzuki Twinkler , 1998, suzukiassociation.org/about/suzuki-method/.

Green, Lucy. *Music, informal learning and the school: a new classroom pedagogy*. Ashgate, 2007.

Denis, Guillaume, and Pierre Jouvelot. "Building the Case for Video Games in Music Education." Ecole des mines de Paris.

"Introduction to Programming in UE4." *Introduction to C Programming in UE4*, docs.unrealengine.com/en-us/Programming/Introduction.

Rafaniello, Anthony, et al. "Going Green: The Application of Informal Music Learning Strategies in High School Choral and Instrumental Ensembles." Rider University.

Green, Shawn, and Daphne Bavelier. "The Cognitive Neuroscience of Video Games." 1 Dec. 2004.

"Changing the Game: What Happens When Video Games Enter the Classroom?" *Innovate: Journal of Online Education*, vol. 1, no. 6, ser. 5, 1 Sept. 2005. *5*, nsuworks.nova.edu/cgi/viewcontent.cgi?article=1168&context=innovate.

Novotney, Amy. "Gaming to learn." *American Psychological Association*, vol. 46, no. 4, ser. 46, Apr. 2015. *46*.

Mangalindan, JP. "Play to win: The game-Based economy." *Fortune*, 3 Sept. 2010, fortune.com/2010/09/03/play-to-win-the-game-based-economy/.

Dobrota, Snježana, and Ina Reić Ercegovac. "Music preferences with regard to music education, informal influences and familiarity of music amongst young people in Croatia." *Cambridge Core*, Cambridge University Press, 25 Oct. 2016, www.cambridge.org/core/journals/british-journal-of-music-education/article/music-preferences-with-rega rd-to-music-education-informal-influences-and-familiarity-of-music-amongst-young-people-in-croatia/6E 4273810E1BD049C6DFD0F94F64448F/core-reader.

Richardson, Patrick. "Evaluating the Impact of Music Video Games on Musical Skill Development:" *Music . Entertainment . Technology*, MET Lab, music.ece.drexel.edu/research/musicgames.

Appendices

Musical Instruments

Pertaining to the interviews, two out of three instructors claimed to have used both the guitar and the piano while the outlier used only guitar. Through their insights, two experts agreed that the piano was the most accessible instrument in terms of novice learning experience. This statement is particularly genuine according to the development of educational video games such that players are able to see the relationship between pitch and keys. On the other hand, the guitar (string) requires techniques in order to generate certain sounds in addition to the coordination of both hands: one hand on the soundbox and another on the fretted strings. Hence, for the purpose of this prototype, the piano keyboard is chosen due to ease of use by novices.
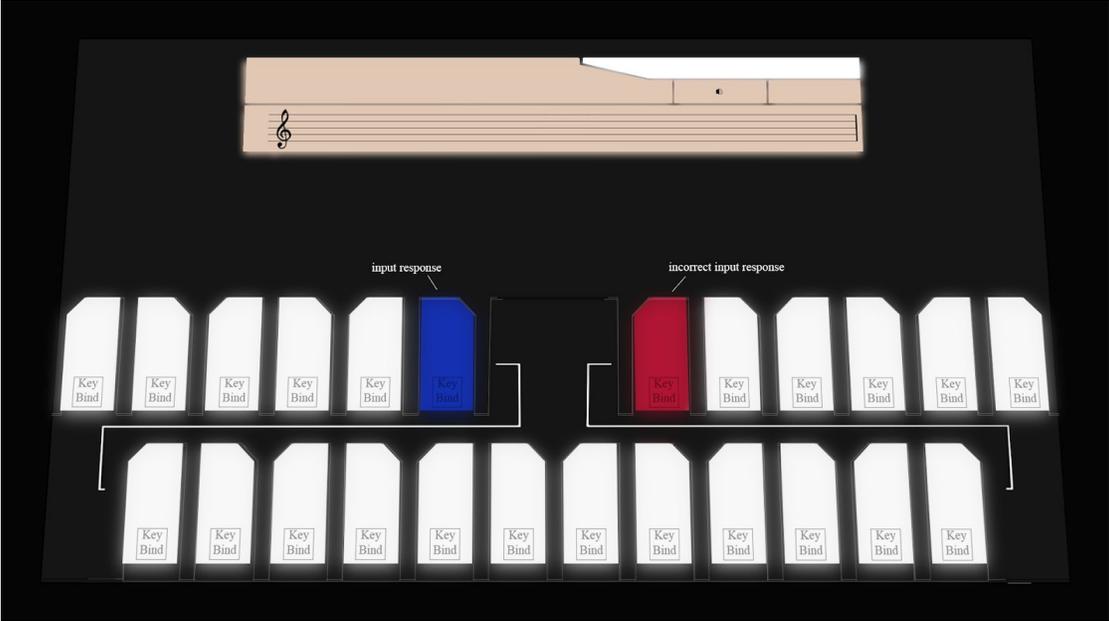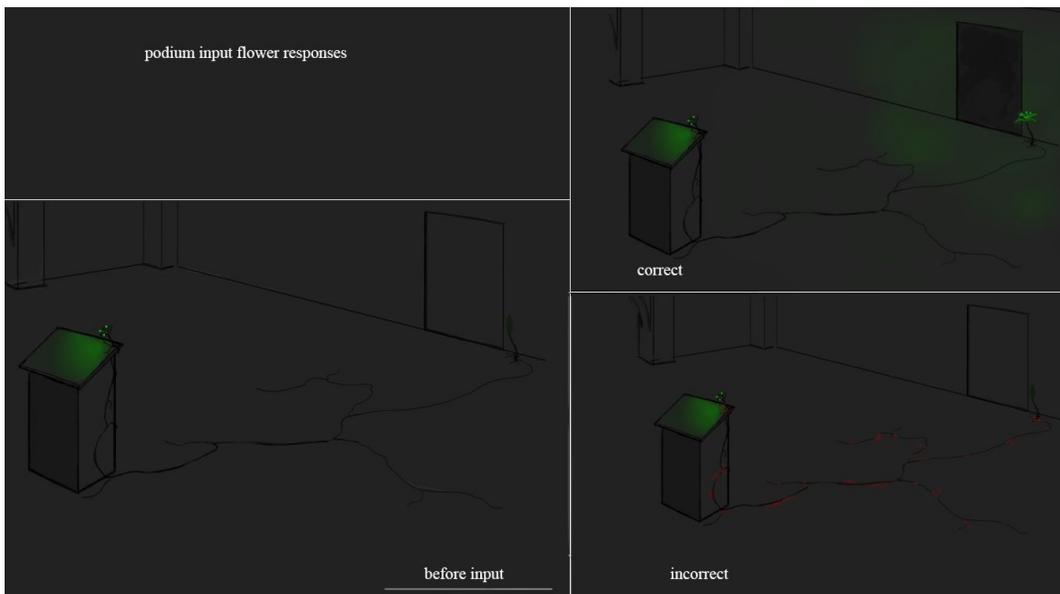
Images

Image 1: Podium face

Image 2: large flower

Image 3: basic podium system

Consent Forms

Professor Interview

Informed Consent Agreement for Participation in a Research Study

Investigator:
> Guillermo Rivera (grrivera@wpi.edu)
> Edward Shaddock (elshaddock@wpi.edu)
> Chandler Reynolds (coreynolds@wpi.edu)
> Thananart Piyajarawong (ttpiyajarawong@wpi.edu)

Title of Research Study:
> E Term IQP 2017 Music and Video Game design

Introduction: You are being asked to participate in a research study. Before you agree, however, you must be fully informed about the purpose of the study, the procedures to be followed, and any benefits, risks or discomfort that you may experience as a result of your participation. This form presents information about the study so that you may make a fully informed decision regarding your participation.

Purpose of the study: You are asked to participate in Musical survey for the advancement of technology use in the classroom. These questions are designed to increase our knowledge of classical teaching methods for music learning.

Procedures to be followed: After consenting to the interview process, we will reach out to you directly to schedule a time for a one on one video call. During this call, you will be asked a series of questions regarding your teaching experience in the classroom involving music and technology. This will last approximately 30 minutes.

Risks to study participants: N/A

Benefits to research participants and others: N/A

Record keeping and confidentiality: You will have a one on one interview with the primary investigator whom will ask you a series of questions. That information will then be transcribed for the benefit of the study. We will record what is answered through a video call. The recordings will be kept away safely with the consent forms. The information discussed in the video call will be transcribed onto a document in the format of Q and A. The data files will be kept together with the consent form data files. After the interviews have been transcribed, these recording will not be necessary anymore and will be safely deleted. However, the study investigators, the sponsor or it's designee and, under certain circumstances, the Worcester Polytechnic Institute Institutional Review Board (WPI IRB) will be able to inspect and have access to confidential data that identify you by name. Any publication or presentation of the data will not identify you.

Compensation or treatment in the event of injury: You do not give up any of your legal rights by signing this statement.

For more information about this research or about the rights of research participants, or in case of research-related injury, contact: Feel free to email the Student Investigators shown on top. IRB Chair (Professor Kent Rissmiller, Tel. 508-831-5019, Email: kjr@wpi.edu) and the University Compliance Officer (Jon Bartelson, Tel. 508-831-5725, Email: jonb@wpi.edu).

Your participation in this research is voluntary. Your refusal to participate will not result in any penalty to you or any loss of benefits to which you may otherwise be entitled. You may decide to stop participating in the research at any time without penalty or loss of other benefits. The project investigators retain the right to cancel or postpone the experimental procedures at any time they see fit.

By signing below, you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure that your questions are answered to your satisfaction before signing. You are entitled to retain a copy of this consent agreement.

_____   Date: _____
Study Participant Signature

_____
Study Participant Name (Please print)

_____   Date: _____
Signature of Person who explained this study

Special Exceptions: Under certain circumstances, an IRB may approve a consent procedure which differs from some of the elements of informed consent set forth above. Before doing so, however, the IRB must make findings regarding the research justification for different procedures (i.e. a waiver of some of the informed consent requirements must be necessary for the research is to be "practicably carried out.") The IRB must also find that the research involves "no more than minimal risk to the subjects." Other requirements are found at 45 C.F.R. §46.116.

Student Survey

Informed Consent Agreement for Participation in a Research Study

Investigator:
    Guillermo Rivera (grrivera@wpi.edu)
    Edward Shaddock (elshaddock@wpi.edu)
    Chandler Reynolds (coreynolds@wpi.edu)
    Thananart Piyajarawong (ttpiyajarawong@wpi.edu)

Title of Research Study:
    E Term IQP 2017 Music and Video Game design

Introduction: You are being asked to participate in a research study. Before you agree, however, you must be fully informed about the purpose of the study, the procedures to be followed, and any benefits, risks or discomfort that you may experience as a result of your participation. This form presents information about the study so that you may make a fully informed decision regarding your participation.

Purpose of the study: You are asked to participate in Musical survey for the advancement of technology use in the classroom. These questions are designed to increase our knowledge of classical teaching methods for music learning.

Procedures to be followed: After consenting to the questionnaire, we will send out a link to you regarding the study. The link will contain a set of questions with various scenarios of the environment that will be presented in the game. After you have accomplished filling out the questions you will submit the questionnaire and conclude the study.

Risks to study participants: N/A

Benefits to research participants and others: N/A

Record keeping and confidentiality: All submissions in the study will be kept anonymous. There will be ne record keeping of participants name in questionnaire.

Compensation or treatment in the event of injury: You do not give up any of your legal rights by signing this statement.

For more information about this research or about the rights of research participants, or in case of research-related injury, contact: Feel free to email the Student Investigators shown on top. IRB Chair (Professor Kent Rissmiller, Tel. 508-831-5019, Email: kjr@wpi.edu) and the University Compliance Officer (Jon Bartelson, Tel. 508-831-5725, Email: jonb@wpi.edu).

Your participation in this research is voluntary. Your refusal to participate will not result in any penalty to you or any loss of benefits to which you may otherwise be entitled. You may decide to stop participating in the research at any time without penalty or loss of other benefits. The project investigators retain the right to cancel or postpone the experimental procedures at any time they see fit.

By signing below, you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure that your questions are answered to your satisfaction before signing. You are entitled to retain a copy of this consent agreement.

_____   Date: _____
Study Participant Signature

_____
Study Participant Name (Please print)

_____   Date: _____
Signature of Person who explained this study