Pitch the Tune Mobile Application

By

Chin Shu Wei

Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
(Business Information System)

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CERTIFICATION OF APPROVAL

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Approved by,

_____

(Penny Goh Kim Nee)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
January 2012

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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CHIN SHU WEI

ABSTRACT

This paper explores a new and upcoming development of an Android application music game in the hope to contribute to the benefit of the music society. This application aims to cater to young people in the urban or suburban places where technology is part of their life. This project embarks on a platform where it centers on learning and advancing in music skills through the playing of games. Android users would know how to play it as long as they have the slightest knowledge in music that can help them identify and pitch the tunes of the music. The game would firstly play a phrase of notes, beginning from its simplest forms, and the user is required to listen attentively to the notes being played and try to play out exactly what has just been played by the game. If the user can pitch the tune accurately with the right notes and tempo, he can clear the first quest and proceed to the next level. If he fails to produce 100% accuracy, he would need to make more attempts until he finally gets it right. This application tests the accuracy of the user's skills in listening and playing by ear. Through music games like this, it can benefit the user in terms of creativity and productivity increase in life as music is known to be able to stimulate growth in brain cells.

ACKNOWLEDGEMENT

This project would not have been made possible without the guidance and help of several individuals who in one way or another contributed and extended their valuable assistance in the preparation and completion of this study.

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Last but not the least, to everyone else who have contributed in any way, thank you, and not forgetting the one above us all, the omnipresent God, for answering my prayers and for giving me the strength to plod on despite my constitution wanting to give up and throw in the towel during critical moments.

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CHAPTER 1
INTRODUCTION

1.1 Background of Study

The Apple and Android market is the current trend in technology that has affected our youngsters in this era in many ways. Hence, this project would be targeting the primary interests of the youths. Considering the amount of urban teenagers who own smart phones, this study focuses on the target group who owns smart phones particularly Android.

Mobile learning is currently one of the most effective and efficient way of learning via mobile technologies. The fact that mobile smart phones are meant to be carried with users almost 24 hours of the day, it goes to show that mobile learning can be done anywhere and anytime. Users with mobile smart phones can exercise mobile learning during breaks, during their travels in public transports, during times of waiting, or any other time when they were meant to do nothing. This can allow users to maximize their usage of time with mobile learning instead of letting their time go to waste. The benefits of mobile smart phones are not merely limited to the increase of accessibility towards educational means. Mobile learning can also facilitate changes in the character of learning modalities that would eventually impact educational outcomes. In that sense, mobile learning extends far beyond traditional forms of learning.

We're now living in an era where music plays a huge role in the lives of many youngsters and an interest that many have actually adopted. We can say that most youngsters would have at least the slightest association with music. Even though some may not be affiliated to the point they are able to play musical instruments, they would have at least know how to sing a song. Music is a universal language

whereby people, though from different countries, cultures and language are still able to connect to each other through music.

Games is one entertainment that many of the youngsters have regarded as their favorite past times. Through this interest of the youngsters, we would use this approach to reach out to their needs and provide them with a game that brings more benefit and value to their lives.

1.2 Problem Statement

1.2.1 Problem Identification

1. Taking music lessons are costly

   Music lessons particularly learning the piano is deemed rather costly for average income earners. Taking up music lessons could be a huge investment that not many are willing to take. A beginner's level would cost at least RM100 per month, having half an hour lessons per week. On top of music lessons, the student would need to invest in a piano or keyboard in order to practice after lessons, and these musical instruments are not cheap either. Besides, learning music requires buying resources such as books or CD's to assist in more effective learning. Also, if the student advances in their level of music, the fees for higher levels also increase accordingly.

2. Most games do not contain educational values

   The younger generation today advances along with the movement of technology. From playing outside in the field to playing indoor electronic games, we can see just how much our world has changed. Worst still, some of this games that are played by youngsters are addictive and do not provide educational benefit to them at all. Games such as Counter-Strike, Defense of the Ancient (DOTA) or Angry Birds are simply games that teach users how to fight against their enemies. After playing over 10 hours of a game of fighting or shooting, the most they will achieve is to gain points and

advancing to higher levels. They do not learn anything in terms of character building and behavioural values through playing these games. It is just a form of entertainment that does not bring out any educational value. This is also a waste of time which could have been served for more beneficial use.

1.2.2 Significance of Project

This project is significant in the sense that it addresses to the problems mentioned above. The fact that Pitch the Tune music game application is Android based, the cost of learning music through this game is free or at a minimal cost. The only cost that would incur in using this mobile app is the purchase of an Android smart phone, in which most youngsters would have already possess them. The low cost in learning music through games overcomes the problem where music lovers would no longer need to invest a huge amount of money in taking music lessons if all they wish to learn in music is about how to play songs.

Youngsters could better use their time to play more beneficial games that can help to stimulate their brain and achieve better productivity. This application will help users train their ability to listen to a song and try to play it accordingly. Once the user has achieved perfect score, he can then unlock the next level which leads the user to more challenging songs.

Since it is a game that users can play it on their smart phones, its attachment to the users can be 24 hours, and its portability and accessibility provides much to the convenience of the users. This game can be a reliever of stress to students who had a tiring day of classes, or working youths who wants a break after heavy workloads of the day.

1.3 Objectives and Scope of study

1.3.1 Objectives of Study

This project has the following objectives:

- To develop a mobile application that assists users to learn to play music by ear.
- To study similar products in the market and provide a different approach to users in learning music.

1.3.2 Scope of Study

The target groups for this application are the youngsters and teenagers who live in the urban and suburban areas. Music is a form of art and some see it as an entertainment during free time to relax their mind and soul of the busyness of their lives. Listening and playing the instrument by ear is one alternative form of learning to play a song instead of learning to read music notations. This study assists the learning of music through playing by ear. Users would be given a set of notes that would be played once, and the user is expected to play exactly according to what was just heard. In order to advance to the next level, users are required to achieve 100% accuracy for the current level.

1.4 Relevancy of the Project

Android games are currently very high in demand. Pitch the music application is likely to have a bright future considering the number of youngsters who are into music. Besides, games are also one of the favorite past times of the young people today.

1.5 Feasibility of the Project within the Scope and Time Frame

This project is feasible within the scope and time frame. Since the student has gained some experience of programming languages such as Java and the object-oriented programming, and also according to people with similar standards who have achieved doing a similar product in less than four months, we can say that this project is feasible.

CHAPTER 2
LITERATURE REVIEW

2.1 The learning of music through playing by ear

In music education, students who learn instruments are taught in a way that assumes reading of notation as a sine qua non of playing. Often, it is made a condition before the student learns the basics of a particular instrument (Cleave & Dust, 1989). Classical music in particular, emphasizes heavily on sight-reading which is the ability to read and play an instrument at the same time. This skill is deemed crucial especially in instrumental activities such as orchestras, bands and choirs that many have regarded as crowning achievements of the Western music education (Heuser, 2009).

Though this learning method remained the official and widely held in any forms of formal music education, many have tried experimenting another approach towards music education, which some deemed as easier compared to the traditional, formal method. This approach, which Suzuki quoted as being a process similar to learning one's own native language, mainly immerses the idea of having to listen to pieces repeatedly, and unfolding this learning method in the most natural way (Comeau, n.d.). The idea of learning to play by ear instead of relying on note reading was in sharp contrasts to many common practices at that time (Landers, 1984). However, this has changed many perspectives after Suzuki's young Japanese students were heard, first in a film in the United States in 1958, and then during a tour later on in 1964. The quality of their performance has been a testimony of the success to this new learning method (Herman, 1981). This has also influence many musicians and music teachers to be advocates of this approach (Bigler & Llyod-Watts, 1979; Hargrave, 2010; Herman, 1981; Kendall, 1978; Koppelman, 1978). The Suzuki method has grown to a world-wide movement ever since and became one of the leading music methods around the world. In regards to the popularity and considering tens of thousands are actually learning music through the Suzuki method (Suzuki Association of the Americas, 2010), we are fully justified in

undertaking an analysis of one of the basic principles to this method, the playing of music by ear.

The method of playing by ear is also defined to include playing from memory and all forms of improvisation that some teachers view it as being valuable although only a small number would include this in their music teaching (Priest, 1988). People who can play by ear tend to also understand the music deeper and the meaning behind it. They are able to express and interpret the music in a much more artistic way. Besides, research studies have shown that ear-playing methods used with players who are musically literate can actually improve sight-playing (Luce, 1958). Furthermore, to those who are musically illiterate, the ear-playing ability seems to come more naturally than those who went through formal music education. (Robert & Andreas, 2010) confirms that in a test done on players to track the number of times through the listen-then-perform cycle to achieve accurate performance, vernacular musicians required fewer trials compared to formal musicians.

2.2 Game Based Learning

Game based Learning is a branch of serious games that deals with applications that have defined learning outcomes. They are generally designed to balance the subject matter with the game play and the ability of the players to retain and apply the said subject matter to the real life world. [wiki]

Play is an important element in a healthy growth of a child, which also contributes to its learning development (Ginsburg, 2007). As games are able to provide an opportunity for play through simulated environments, these games would not necessarily be a distraction from learning, but rather an integral part in learning and intellectual development (Ke, 2009).

Researchers have explored the fact that there are indeed clear positive outcomes of using games as part of learning, part of it which includes engagement and motivation (Joyce, Gerhard & Debry, 2009). The very nature of games in this aspect that can motivate a child includes three main factors, which are fantasy, challenge and curiosity (Malone, 1981). Fantasy is often related to the use of imagination and the child's inherent inclination towards play (Opie & Opie, 1969). Children are free to experiment the approaches towards the game playing and it is often through these that they can better understand their strength and shortcomings. Challenge is created by the task or puzzle in the game and when appropriately aligned with the child's ability level (Groff, Howells & Cranmer, 2010). The game must be difficult enough for their level to bring enough challenge and encourage the child's growth through scaffolding, at the same time without being too difficult to cause the child to give up on playing. In most gaming circumstances, the child would put in extra effort to challenge his ability towards defeating the game, thus training his mind to think that achievements can only be obtained when one puts in effort. Curiosity on the other hand is meant in the sense of testing the game, enabling the child to explore the possibilities of what will happen if this or that were to be done. This again aligns with the nature of play and how children use safe spaces to explore and experience their world.

The benefits of game-based learning go far beyond motivational factors. Game-based learning can be of help in preparing kids for the real world via simulations. Gee (2005) argues that the brain resembles a simulator by acting and reacting to inputs and is designed for achieving goals. The use of simulations can engulf kids into a learning environment and replicate real-world scenarios. According to Lee and Hoadley (2007), it is discovered that kids enjoy the interactive, immersive experience of technology and prefer experiencing objectives first hand instead of learning through traditional instructions (Raven, n.d.).

One other most promising goals for game-based learning is the ability to foster problem-solving skills related to science content. In contrast of textbook teachings of problem

solving as isolated investigations, games can engage students in dimensional problem solving related to scientific inquiry. It is proven when Chris Dede, a profession of Learning Technologies at Harvard's Graduate School of Education conducted an experiment using multiuser virtual environments (MUVEs) as a pedagogical apparatus to teach science concepts to middle grade students. He argues that instead of learning by listening to lectures or reading textbooks, students can better learn science by exploring and solving problems in realistic environments. One of the MUVE used called River City, is set in a historical town in the late 1800's, where local residents are contracting a certain disease. The students were asked to take on the role of 21st century scientists who travel back in time in order to help the mayor identify the cause of this disease. Kettlehut (2007) discovered that embedding science inquiry curricula in River City could act as a catalyst for change in middle grade students' self-efficacy and learning processes.

As the engagement between gaming and education becomes more comprehended, we are likely to see a significant investment in educational games. As research and experiments have proven, games can clearly be applied very effectively in many learning contexts. Games can engage learners in ways other tools and approaches cannot, and their value for learning has been very well established. However, the gaming research needs to continue to focus on what works with whom and in which context. When the research community adequately addresses this concern, games will become more compatible with school learning contexts and potentially have a greater impact on developing students' skills of the 21st century.

2.3 Similar Systems in the market

2.2.1 Piano Melody Free

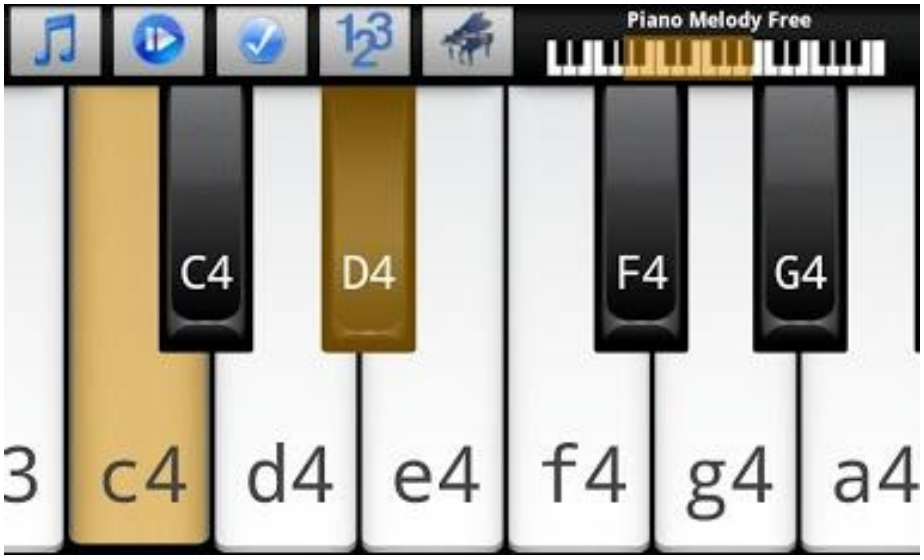

Figure 2.2.1 Piano Melody Free mobile application

This application is a play the tune game whereby the user will play accordingly after given a melody. However, this application already provides a list of songs to choose from even before starting to play, which means that users do not need to pass any of the songs correctly in order to proceed to more difficult levels, it is simply a learning platform to play songs. Besides, the songs which are provided for the users to listen and play are rather long, which make it rather difficult for beginners to catch the tune and remember them exactly.

2.2.3 Perfect Ear

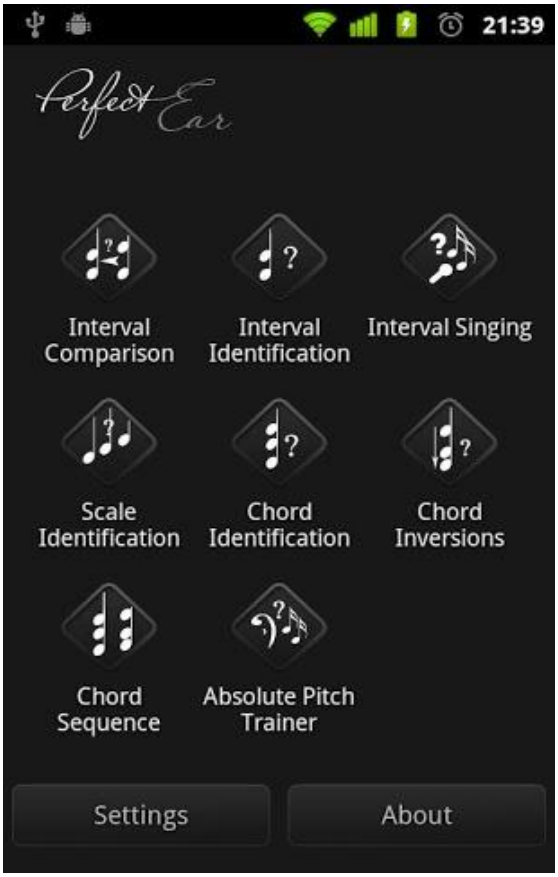

Figure 2.2.3 Perfect Ear mobile app

The Absolute Pitch Trainer in Perfect Ear trains the music ear to identify which pitch is which key. This application caters mostly to people who already have basics in music education considering the terms can only be understood by people who actually learnt them in music classes.

2.2.4 Piano Ear Training

2.2.5

Figure 2.2.3 Piano Ear Training mobile app

Piano Ear Training mobile application is an ear training tool that helps users improve their musical ear. Only one note would be played at any one time, thus users would only know how to which tune is on which key. It doesn't teach users how to play a song or a phrase.

CHAPTER 3
METHODOLOGY

3.1 Research Methodology

Before the implementation and development of the project begins, much research and study has been conducted in order to test the feasibility of the project. Internet sources, books, journals, and research papers are among the main sources in conducting the theoretical findings. Surveys and interviews were conducted among android users to observe the response of users towards this new application. Data gathering and analysis were also performed intensively to support the study before the project was implemented. Lastly, after the implementation of the project, feedbacks and comments will be collected in order to ensure the usefulness of the application.

3.2 Development Methodology

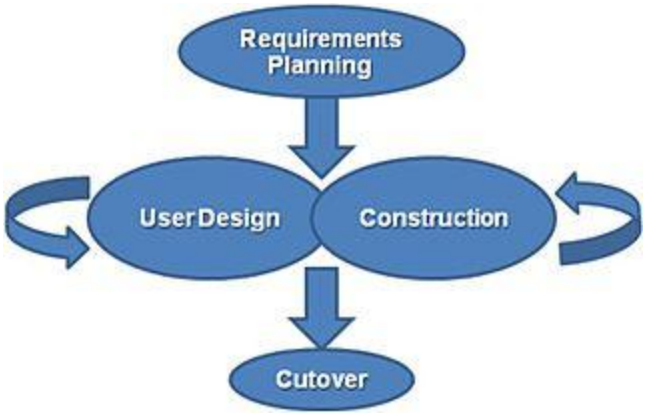

Figure 3.2 Rapid Application Development Model

The methodology used for this system is the Rapid Application Development (RAD) Model as shown in figure 3.1. This model is deemed as the best development

approach as it uses minimal planning in favor of rapid prototyping. As this project requires quick delivery especially when given just a short period of time, the RAD approach is to avoid extensive pre-planning, generally allowing softwares to be written much faster and making it easier to adapt to changing requirements.

3.3 Project Activities

Phase	Task	Status
Planning	Identify topic area and define title	Completed
	Research and study feasibility of project	Completed
	Discussion and advice from supervisor	Completed
	Submission of Title proposal	Completed
Research	Background studies for the project	Completed
	Theoretical findings and literature review	Completed
	Identify tools required for project	Completed
	Interview and surveys from users	Completed
Development	Gather data and information required for analysis	Completed
	Develop design strategy	Completed
	System Development	Completed
	Testing	Completed
Implementation	System Implementation	Completed
	Documentation	Completed

Table 3.3 Project activities

3.4 Key Milestones

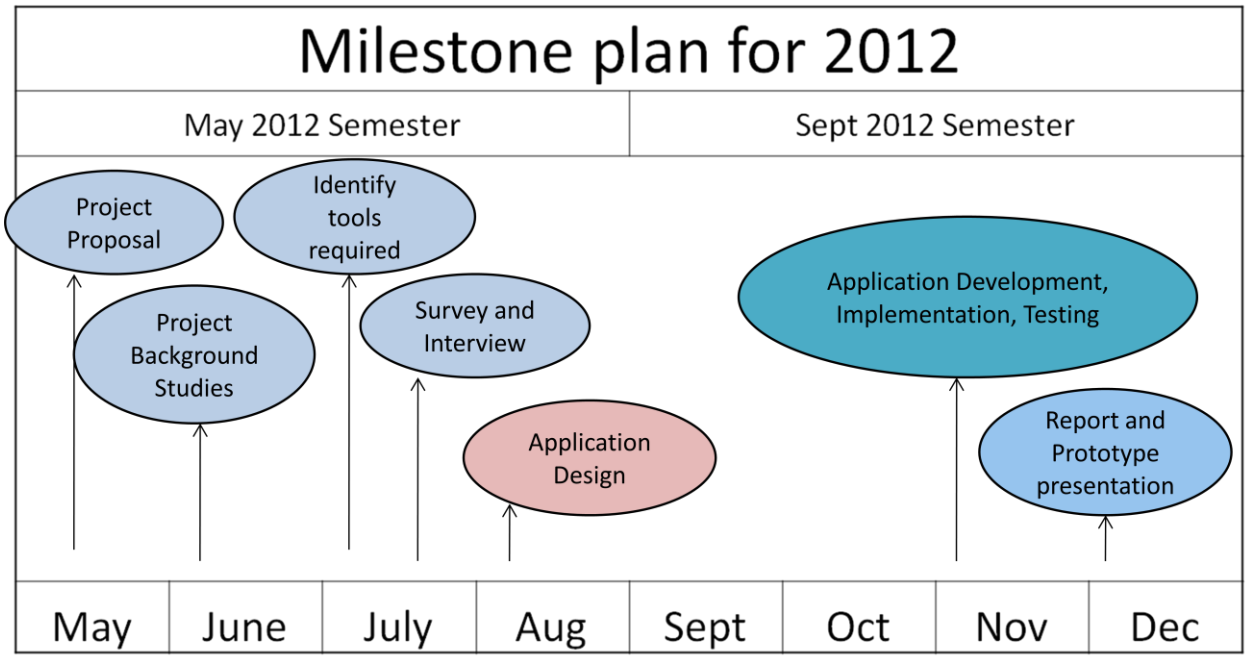

Figure 3.4 Key Milestones 2012

3.5 Gantt Chart

	Detail/Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	Selection of Project																												
2	Proposal Submission																												
3	Literature Review																												
4	Tools and Methods Research																												
5	Extended Proposal Submission																												
6	Proposal Defense																												
7	Interim Report Submission																												
8	Programming Research																												
9	Prototype Development																												
10	Progress Report Submission																												
11	Poster Presentation																												
12	Dissertation Submission																												
13	VIVA Presentation																												
14	Final Dissertation																												

Table 3.5 Gantt Chart

3.6 Tools Required

In order to ensure successful development of this mobile app, there are several tools necessary for the product to carry on. First of all, the project will be running on a platform known as the MIT app inventor. It uses a graphical interface that allows developers to drag-and-drop visual objects to create an application that can run on the Android system. Secondly, the Android Software Development Kit (SDK) is also needed in order to run the emulator for the project. Next, Microsoft Paint also comes in handy when the developer needs to design certain graphics to be used in the application. Besides the software tools as stated above, there are also hardware tools required in the development of the application. A laptop is inevitable in order to run the softwares to develop the system, and a tablet is also used to test the usability of the application from the user's point of view.

Figure 3.6 MIT App Inventor logo

Figure 3.6 Microsoft Paint logo

CHAPTER 4
RESULTS AND DISCUSSION

4.1 Data Gathering and Analysis

4.1.1 Questionnaire Results

A set of questionnaire was done in order to survey the current market and to analyze how the users react towards this new coming mobile application. This questionnaire was done using Google Spreadsheet and so far there were 64 who responded to it.

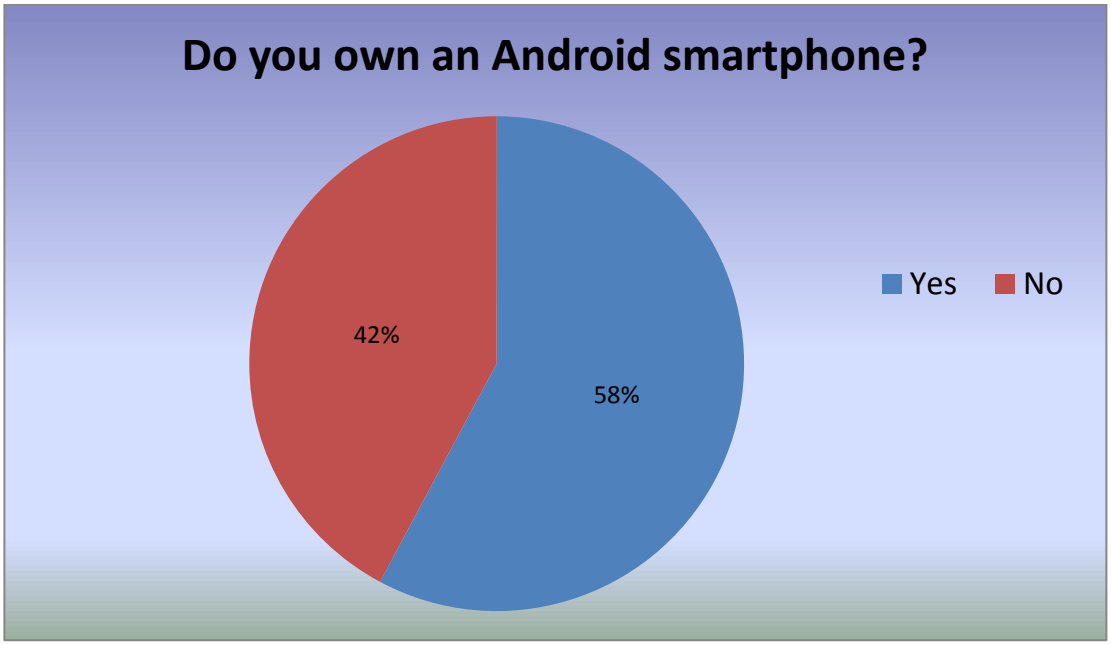

Figure 4.1 Questionnaire Result I

The result above shows that Android users make up more than half of the urban and suburban population in youngsters and teenagers, confirming that there will be a huge market for this coming Android mobile application.

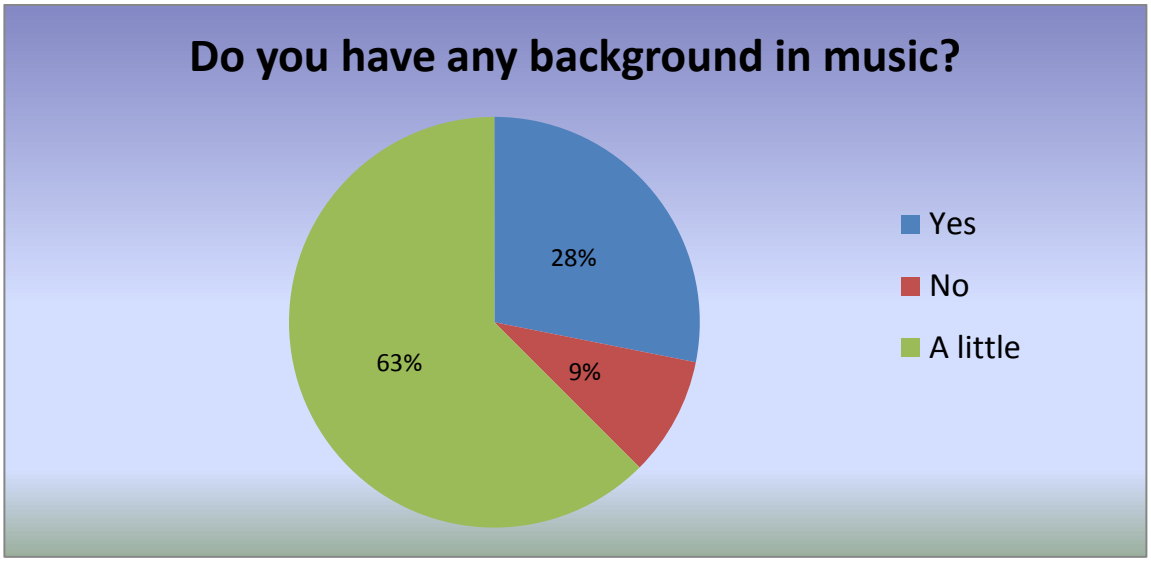

Figure 4.1 Questionnaire Result II

According to the results, 91% of the people who answered the questionnaire have at least a little knowledge in music. The 63% of the people here are assumed to be music lovers but were not able to take up serious music classes, hence they learned it on own because of interest. Thus, we can conclude that the music market is huge.

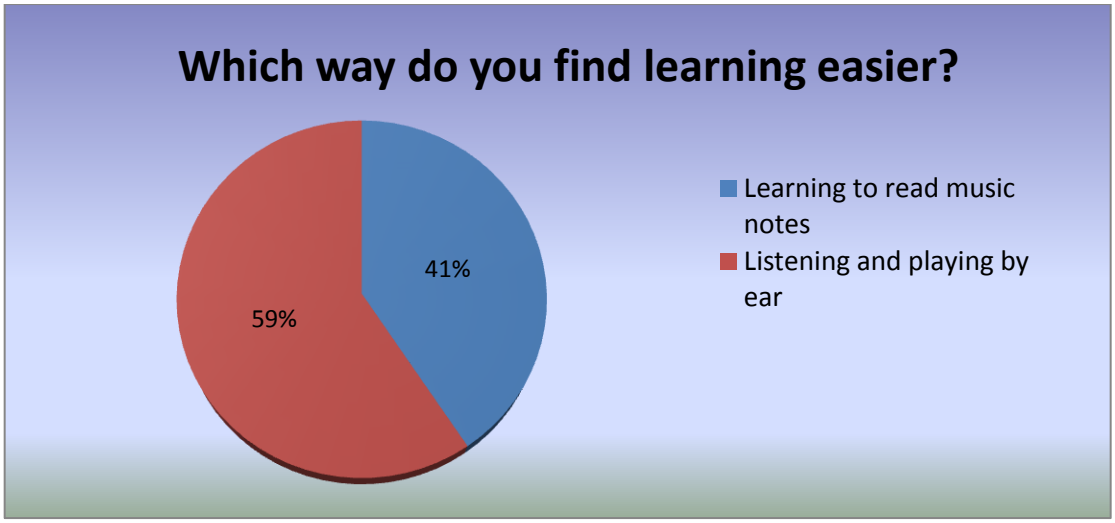

Figure 4.1 Questionnaire Result III

As stated in the figure above, 59% actually think that learning music through listening and playing by ear is easier compared to learning to read the notes. Thus, Pitch the Tune music game application would appeal to a fairly great number of people who would be interested in a game that trains the skill of listening and playing by ear.

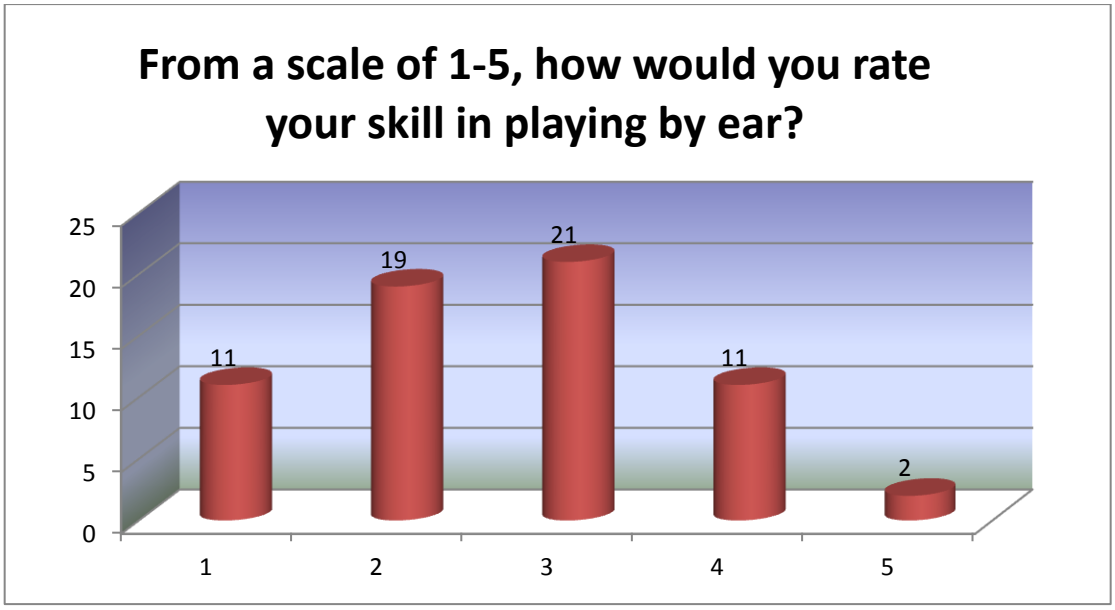

Figure 4.1 Questionnaire Result IV

From the result, most people regard their own skill in playing by ear as being average or below, which means that there are a lot of room for improvement for a lot more people. In any case, people who wish to improve their music skills in playing by ear would opt to play games such as this.

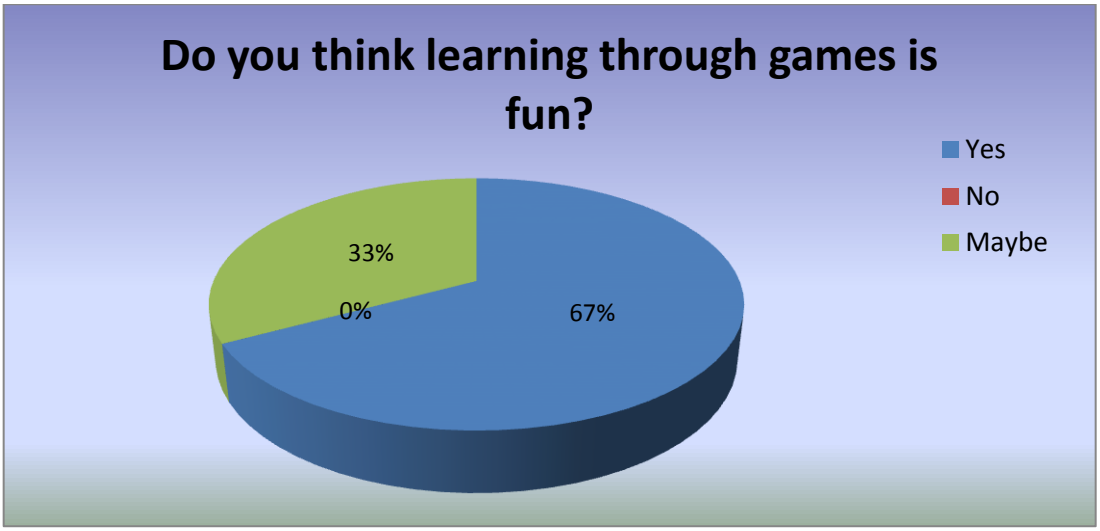

Figure 4.1 Questionnaire Result V

Based on the result, it is pretty much a well known opinion that learning through games is fun, considering that 67% actually responded to a firm yes, and another 33% who thinks that maybe it could be fun, depending on the type of games. So far no one gave a no for an answer that learning through games is not fun. This shows that people generally agree to some point that effective learning can be done through games and this music game app would probably hit a great market.

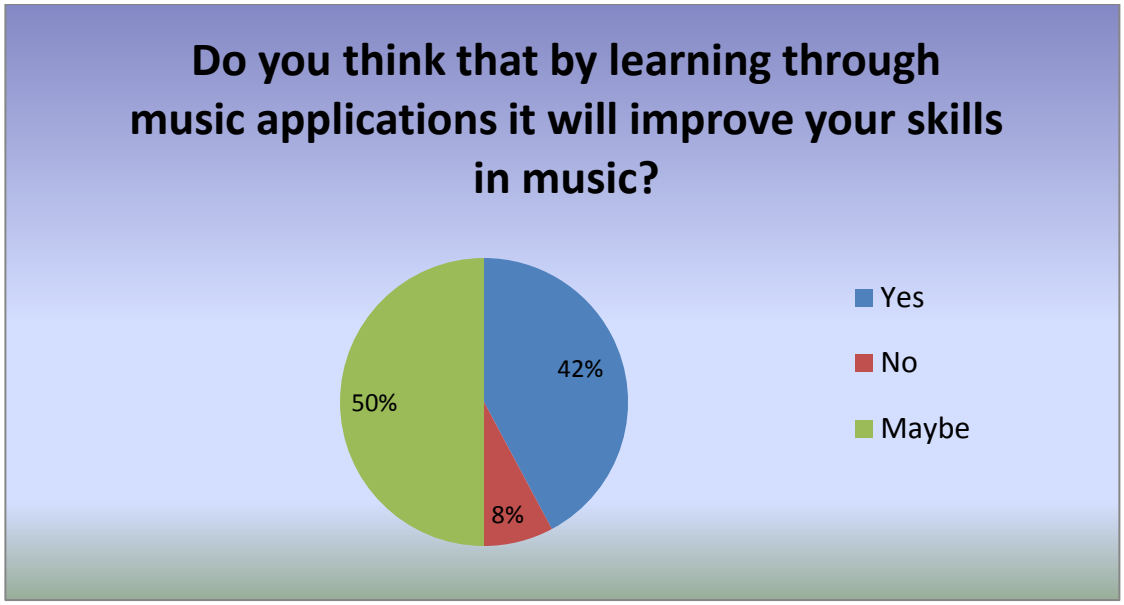

Figure 4.1 Questionnaire Result VI

The above result shows that only 8% of the respondents think that playing music games will not improve one's skill in music. It goes to show that 92% of them think that it will or at least may improve one's music skill through the playing of music games. Thus we can conclude that it is a majority opinion that playing music games is one of the ways to improve one's skill in music.

4.1.2 Piano Lesson Rates

One of the problem statement notes that taking music lessons are costly. According to a survey done in KL music centers, the rates for each grade per month are stated below.

Piano Lesson Rates/Music Centre	YAMAHA	CREMONA TALENT MUSIC	JOYCEMINT MUSIC & ARTS

Grade 1	100	100	120
Grade 2	120	110	140
Grade 3	140	140	150
Grade 4	170	160	180
Grade 5	200	210	230
Grade 6	260	260	280
Grade 7	330	300	340
Grade 8	400	360	380

Table 4.1.2 Piano Lesson Rates by month

4.2 Deliverables Interface

4.2.1 Main Menu

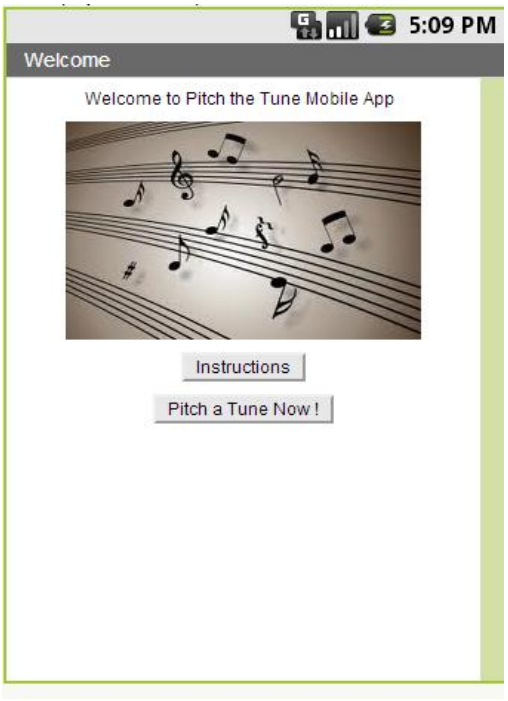

Figure 4.2.1 Pitch The Tune Main Menu

The Home screen of Pitch the Tune Mobile Application contains two buttons. The “Instructions” button will lead to a page showing first time users how the game is played. Once the user understands the game instructions, he or she can hit the “Pitch a Tune Now!” button to start the game.

4.2.2 Start Game

Figure 4.2.2 Pitch The Tune Begin

Upon hitting the “Pitch a Tune Now!” button, the user will enter the game and will be prompted with a notifier confirming that the user is ready to start. Once the user hits “YES!”, a phrase of music notes will be heard. Once the music stops, the user needs to repeat the tune that was just heard on the virtual piano.

4.2.3 Correct Answer

Figure 4.2.3 Correct Answer Screen

When the user has pressed the keys correctly according to the tune, a notifier will show that the user has passed that level and can continue to the next level. If the user chooses to continue, he can click “Yes!”, if not click “No thank you”.

4.2.4 Wrong Answer

Figure 4.2.3 Wrong Answer Screen

When the user presses the wrong key, a notifier will show that it is wrong, and the user needs to keep trying until he gets it right.

CHAPTER 5
CONCLUSION & RECOMMENDATION

In conclusion, Pitch the Tune music game application is an Android based app which is foreseen to contribute to the benefit of the people and the society. This game which is purposed to improve the skill of music playing by ear is expected to help many youngsters in their advance learning in music. However, it should be noted that this application is not a direct alternative of learning music through a real life teacher. It is simply a form of entertainment to help users better learn in music and advancing their skills in playing by ear on their own. For future recommendation on this application, there will be a need to constantly lookout for similar systems in the market in order to improve the existing features of this product and adapt to changes when necessary. There may also be a need to modify the scope of study to adapt to the current needs of the users. All in all, due to the limited time allocated and the limited experience of the developer, the outcome of this project will merely be the level of a student instead of a professional Android developer.

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APPENDICES

Pitch the tune mobile application

* Required

Do you own an Android smartphone? *

- Yes
- No

Do you have any background in music? *

- Yes. I take serious music classes
- No, I don't know music at all
- I do have a little knowledge in music, not much.

Which way do you find learning easier? *

- Learning to read notes from scores
- Listening to a song and playing by ear

From a scale of 1-5, how would you rate your music skills in playing by ear? *

1 2 3 4 5

Do you think learning through games is fun? *

- Yes
- No
- Maybe

Do you think that by playing music games it will improve your skills in music? *

- Yes it definitely will
- No it won't
- Maybe