Gamelan Learning System

By

Noor Hafizi Uzairi

Dissertation submitted in partial fulfilment of

the requirements for the

Bachelor Technology (Hons)

(Information Communication Technology)

JULY 2005

Universiti Teknologi PETRONAS
Bandar Seri Iskandar
31750 Tronoh
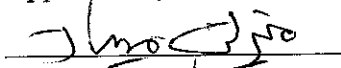Perak Darul Ridzuan

CERTIFICATION OF APPROVAL

Gamelan Learning System

By

Noor Hafizi Bin Uzairi

A project dissertation submitted to the
Information Technology Programme
Universiti Teknologi PETRONAS
in partial fulfilment of the requirement for the
BACHELOR OF TECHNOLOGY (Hons)
(INFORMATION TECHNOLOGY)

Approved by,

(Ms Mazlina Mehat)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
July 2005

i

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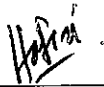
This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

NOOR HAFIZI UZAIRI

ABSTRACT

Technology keep changing make all thing easy to be settled. In music industry, technology is important to make a song. Music and technology are developing in parallel sequences. Combination of technology and music, the inventor had developed music software. Gamelan music is not only be played locally in formal ceremony. But, it is acceptable in many countries and going world wide. By developing music software like Gamelan Learning System, the development can be more organize and arrange to meet the need. Writing for notation music should be improved to protect the song. By using this system, the song can be listened for many times. The time for composing also can be reduced and mainly focus more on selecting the accurate notation. Reduction of unwanted element can be use to make a good composing. The target audience is mostly the novice Gamelan learner like UTP students. The system is not only for composing but also learning about gamelan as well. By using Waterfall methodology, the process flow is organized from the first process until the end product. Every process should be finish before starting the next process. Visual Basic 6 and HTML are being use as the development tools. The Gamelan Learning System can be widely use in the future. The system can be store in databases and include videos about how to play the instrument.

ACKNOWLEDGEMENT

In the name of Allah SWT, I had completed this Final Year Project successfully. Every phase in doing this project brought valuable experience and exploration to the real technology world and how to handle it. A lot of opportunity had been given to me to enhance all skills in many kind of knowledge in solving problems. Alhamdulillah, I had applied the knowledge that I had to make this project workable.

In this opportunity, I would like to thank to every person who had helped me to finish this project. Mostly to my gratitude supervisor, Ms. Mazlina Mehat for her guidance and helping me by supply some information to complete this project. This gratitude also goes to Mr. Nordin Zakaria, FYP Coordinator for approving this project and gives some opinion in developing the system. Other than that, I also like to thank my friend Muhd Hafiz Zaidi for helping me to solve some problem during the development. Without their cooperation the project could not complete within the time given. All of these people had given their best in supporting in developing the system. The valuable experience working with them is a precious time in sharing knowledge and skills that they have.

I also like to thanks to my beloved family and friends for support and encourage me to finish the project and come out with effective system. Last but not least, to those who has helped me through thick and thin either directly or indirectly. Thank you very much.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 BACKGOUND OF STUDY

Technology can be defined as the application of knowledge and skills for the achievement of practical purposes. People and machinery can produce a good or service, along with the set of rules and procedures governing their deployment. Life can be easier when having new things and new technology that help a person to perform better. Everything can be done easily and efficiently. Technology keeps changing from time to time. By changing current approach to a new approach will reduce time for producing a product and increasing the performance.

There are various areas that invention can be making in technology. In music also many inventor make new product and make enhancement for existing product. Nowadays, music is a way for many people to express their emotion and their feeling. Sometime the music can reflected their though and cool down their emotion. Music also can connect every person in the world to be together by ignoring the language barriers, song barriers and differences in melody.

By developing a new composing product in music, it also called as a new invention. There are various musical software had been developed and distributed around the world market. This can improve the quality of the song. New system or new software is the branch of technology. By using the system or the software, the process will be easier than before.

Nowadays, many composers use notation software or notation system such as guitar notation, piano notation and orchestra notation are being use to create new song. The new system provides flexibility for each person to create new song. In other words, the **Gamelan Learning System** is relevance to this matter. With multiple technologies, the learning system can generate as the notation. It may produce real and adorable song. The system must be well-organized, well-structured and accessible to anyone. The system is simple and understandable either for novice user or expert user. This developing system support Gamelan learning process through online.

Gamelan is one of the subjects available for Curriculum Courses in UTP. This Gamelan Class is included in CGPA and it takes one (1) credit hour. The student should pass this subject to maintain their CGPA. This system mostly will be used by novice learner like them. Some of the students are actively involve in Gamelan performance. They may use this system to start on composing their own song instead of just playing songs composed by others. It is crucial to understand their level of knowledge about Gamelan and their opinion about this system.

1.1.1   The Future of Gamelan Learning System

Gamelan Notation System is a system that can be used by UTP student who are taking Gamelan for their curriculum subject. This system is web-based system. This system is valuable to the student to learn about gamelan in this era. By using web, the students are able to access the website from their computer through the network. It is efficient and effective approached to make them feel comfortable and easy to handle.

There is no administrator to control accessibility from outside. Anybody does not need to sign up to be a member. Students are free to access the system without having limitation. They are able to practice Gamelan online anytime. By learning the notation and composing the Gamelan song, they can learn more about Gamelan. They can learn

about the history of Gamelan, the instruments and listen to their composed song. Besides, they are able to differentiate the sound of each notation.

The system is using the same sound as the real instrument. Each note of the instrument is totally different. The students can feel and hear the differences between the highest note and lowest notes. The ability to compose a Gamelan song for the student is a good approach for them to catch up with the class lesson. Familiarity with each note is a basic thing in Gamelan class and the instructor can proceed to new lecture for the next class.

1.2 PROBLEM STATEMENT

1.2.1 Problem Identification

The project can be started after the problems statement are been identified. Problem statement is most important steps that narrow down the expected output from students view. Then the analysis will be done to solve the problem arise. These are a few problems arising during composing a Gamelan's song by using traditional approach.

- *Learn Gamelan Notation*

The students learn Gamelan during the Gamelan class. They learn everything about Gamelan including the Gamelan Notation. The notation is different than common music notation using seven (7) notes (D, E, F, G, A, B, and C). But the Gamelan use five (5) notes (1, 2, 3, 5, and 6). This is the difficult part to be learned by the student. They need to spend more time to understand the notation. By learning in class, students had difficulty to differentiate each notes. In class the sound for each notation is not loud and it will be interfere with the students' voice. The note is hard to be identified by the student. This shows that the notation is the most important part before they can proceed to next lesson.

- *Time for composing*

The user or the student needs a few days and most likely a month to compose a song. There is more than one instrument being to produce a gamelan's song. Student's need to understand on notation for each instrument before they can compose a song. The student takes at least a month to learn about each notation. They had to understand about the rules on composing Gamelan song. They had to learn the notation and the same time try to compose a song.

- *Mix and match notation*

One of the issues is difficulties in mix and matches the notation. All of the instruments had to be play one by one before the song can be combine. Then, we ca decide for the notes and the match instrument that are appropriate for colotomic structure or each single bar. The tempo for each instrument is different depending on each function. For example like Saron, it will be play the melody and Bonang will be the bass in the Gamelan song. The song had to be modified a few times before it can be finalized as a song.

- *Losing the notation script*

Most of the composer creates the song manually. The student is having same problem in having plain paper or music manuscript to write each notation. The manual notation will be easily lost or misplaced and they had to start doing their masterpiece all over again. The masterpiece is like a precious thing for them. The paper based approach is not really efficient because it might mix with other music manuscript. Besides, this approach is not efficient enough to be learned by the student. Because notes on paper are not interesting at all.

4

1.2.2 Significant of the Project

Based on arising problem mentioned, it is important to build a Gamelan Learning System. The system will provide efficiency and effectiveness for the students to learn and get better understanding about Gamelan notation. The student can learn each notation every day and every where. This web-based system will give the full accessibility to all students to enroll in this subject without having to get any authorization. All of the information and data are relevant to Gamelan Courses and the entire notations mimic its original sound in a real environment.

The system provides something special that existing web-based Gamelan Learning System does not have. The student is allowed to compose their Gamelan song. The composing part may involve the student to be in the real life situation in handling Gamelan notation. In traditional approach, student had to compose each instruments one by one. He or she cans only hear one instrument for one time and cannot feel the real Gamelan environment. By using modern approach, they can compose the entire instruments at same time. Then all the sounds can be combined to create the new Gamelan song. Now they can fell like in a real environment. The real thing can improve their perception and expectation from taking this Gamelan Course. This uniqueness make this notation system is different.

Currently UTP provides internet and intranet connection in the campus, which includes in the residential village where the students' apartment is located. This system can run on the facilities and will surely provide an effective and efficient network for Gamelan subject to be learn by the student. Most of the students are familiar with technology approach like this web-based system. It is easier for them to use this system rather than using paper based approach to learn Gamelan notation. They just need to type the URL and it will be linked to the server of Gamelan Learning System.

5

1.3 OBJECTIVES

The main objective is to develop a Gamelan Learning System that will give an opportunity for user to learn about Gamelan. They can explore and experience more about Gamelan by using the system.. These are the objectives for this **Gamelan Learning System**:

- **To be able to compose and arrange note**

Anybody using this system will be able to learn about compose, arrange notation and teach music on a personal computer. The system is easy to use and easy to be handling to news student. The student had to understand about the Gamelan notation, and then they know how to deal with each Gamelan notation. Now they are able to compose and in the same time they learn about the notation arrangement. This approach is to expose them to Gamelan world.

- **To commercialize the Gamelan music**

Gamelan music is one of Malaysian's traditional music. The Gamelan music arrangement and notation is unique different than western musical arrangement Many people do not know about gamelan music. This is one opportunity to commercialize the gamelan to attract more people to learn about gamelan. Then the gamelan music will be known all over the world.

- **To enhance the student creativity**

In music, creativity in composing a good song is an advantage to the composer or the student. The student can compose simple Gamelan song and enhance the song to be more creative by adding additional elements. The student can integrate their creative and

6

capabilities in music learning. They can explore more within this system and they will come up with great melody in the new song.

1.4 SCOPE OF STUDY

The scope of this study involve UTP's student as the target user. This project mainly focuses on developing the system and it will be the prentice for commercializable Gamelan software in future. The selected authoring tools help to develop the best product that finished within 14 weeks. The system only covers four (4) instruments, *bonang, saron, kenong* and *gong.* These four instruments is the main instrument in Gamelan and need to focus more on the notation before creating Gamelan song. The system's functions are allowing user to learn all about gamelan and in the same time they can compose a Gamelan song. Besides, the system also has function to play the instrument notation and song. User will understand about the notation for each instrument and can differentiate the sound better after using this system.

CHAPTER 2

LITERATURE REVIEW AND THEORY

2.1 INTRODUCTION

This Gamelan Learning System is a web-based system that supports the learning process in understanding the notation. The system can be used to compose own Gamelan song and in the same time differentiate the sound for each notation. The research is conducted to find the best solution of delivering information to student more effective and efficient. The research will focus on music notation software is dealing with the music manuscript and relevancy of developing this system.

2.1.1 Music Notation Software

Ang and Gan (2000) had analyzed that higher level of music writing skills may be attained with the aid of music notation software and computer based training. A side effect of increasing computer literacy and improving attitudes and perceptions towards computers results from such use.

Writing skills for notation music should be improved to protect the song from lost. The protection can increase the notation writing skills. Prior experience with computers and good attitudes and perceptions towards computer basis has give ability and readability for student to learn music notation. The music notation software or the system improves the capability to create new song. The music notation software can store the notation for

along time without having problem of loosing compare to paper-based notation. The notation can be used for many times and be changing from time to time.

Besides, this music notation software also can be use for learning purpose. Many people use technology in educational effectiveness. Most people get better understanding on subject when using interesting features like web-based notation system. Interesting system attract user to explore something new. Liu Huifen, Hu Xin and Hang Xinyu (2002) have made an investigation about learning using web-based. They make an assumption that the effectiveness of educational increase when the communication and interactivity increase (p2). The Gamelan Learning System will apply this theory to make the learning process more interesting.

Smithers (2001) had said that there were several of electronic notations can be created on the Internet. For example, Club Coda had developed their composing software call Finale. This Finale can create a modern music song such as guitar notation, piano notation and orchestra notation. Other than that, the system also gives opportunity to the user to view, print and transpose a song. From the example, any kind of music notation including Gamelan is not impossible to be developed. The Gamelan Learning System should include the notation part that user can use for composing a song.

.

2.1.2 Relevancy on Developing the System

According from **www.musicmanifesto.co.uk/news,** the news mention by using the expertise of the internationally acclaimed Music Faculty of Wells Cathedral School , a highly innovative piece of music education software has been created using recordings of live performance and samples from the school's own gamelan named Sumber Laras.

There is software about gamelan music called **Virtual Javanese Gamelan.** This software is basically focused on teaching gamelan music interactively. The environment for playing the gamelan music is virtually means no tutors or any guidance. The software also offers an immersive, self directed learning, ensemble performance

and step by step evaluations, as well as listening activities and research covering the cultural background of the music as well as the instruments of the gamelan.

From **www.imusic.org.uk,** "Since 1580, Gamelans have inspired a number of musicians from the West, including Debussy, Benjamin Britten and Steve Reich. Many colleges and music centres have purchased Gamelans, and there is now a thriving interest around the world in this music that lends itself so well to performance by people of all levels of musical ability and experience."

Gamelan is going global. It shows that gamelan music is acceptable in many countries. Many universities and collages had their own Gamelan group to perform in any functions. The learning and teaching process may be limited because the instruments are limited for a number of Gamelan's performer. The group member might be increase years by years. They need to use a system that can teach new Gamelan group member to learn the notation for each instrument. This project is relevant to be developing for market demand.

2.2 THEORY AND ASSUMPTION

Based on research that had been done, there are various musical notation software can be purchased in the market and Internet. But notation system for Gamelan music does not exist. The developing project, Gamelan Learning System is a new musical system that will be produce in market. The system is a web-based system that can be share by using network and multiple user access the system to learn about Gamelan.

This learning system is different than others, this system teach from the beginning about the notation that totally different than western music notation. The development of the system is also difficult. From website source, Solis (2002) said hat gamelan produces and endlessly challenging, wonderful sound. All the instrument behave in their own

way, but all the layers relate to a central theme or melody. The Gamelan song can be made by combining two or more instrument that can create a good Gamelan melody.

The system will be fully accessed by the student. There will be no authorization in accessing the system because the notation is there and will not change. The ability to compose a song is a part of learning the notation method. Students can differentiate between one sound and another; and understood how to make an arrangement in Gamelan music notation.

CHAPTER 3

METHODOLOGY

3.1 PROCEDURE IDENTIFICATION

For developing this project, the procedure had to be well managed. The Waterfall Model had been selected to be used for developing the system. This methodology is easy to plan and handle because the project had sequence of process as **Figure 3.1 (See Appendix 1.0).** It is linear model that every single step should be finish before started next steps. The process for each step will be continuous and finish as the planning time.

There are seven (7) steps to developing this project. It started with preliminary investigation; follow with planning and analysis, designing, developing, testing and implementation. It will be end with the presentation week. All of the steps are planning well. By using Gantt chart, the project is working on track.

3.1.1   Preliminary Investigation

In this phase, the author had studied the current situation about the system. Make an investigation to identify the problem statement and scope of study that want to be achieving while developing the Gamelan Notation System. By using PIECES Problem-Solving Framework, it provides an excellent outline for discovering problems,

opportunities and directives. PIECES framework is need to determine the performance, information, economics, control, efficiency and service of the planned system before developing the system.

The investigation phase must also establish the project charter that establish scope, preliminary requirements and constrains, budget and schedule. The target user for this system is the Universiti Teknologi Petronas (UTP). Students' enroll Gamelan Courses. The purpose of developing this system is to provide an effective and efficient system that helps the student to learn about Gamelan Notation.

3.1.2   Planning and Analysis

In this phase, there are a few steps to be taken such as develop the project plan, analyze the requirement and create the data flow for the project. Then defined the detail and serve as a system specification. Project plan should be plan well before starting the project. The Gantt chart is charts that provide guideline of sequences of project's steps with the timeline. The Gantt chart is referring to know the project status. **Figure 3.1.1 (See Appendix 1.1)** is the project Gantt chart.

All of the related information is gather through research on the internet and books. To make the system more accurate, the author had interview session with 20 students who enrolled the subject. The questions were basic question about Gamelan notation. The interview is one on one interview that asking about the expectation in this Gamelan class. Then, make an analysis that meet the requirement and reliable to develop the system. Furthermore, the best methodology and tools were being used in order to develop and complete the project. **Figure 3.1.2 (See Appendix 1.2)** shows the task involved in analysis stage.

13

3.1.3 Designing

The systems design process partitions the requirement to either hardware or software systems. It establishes overall system architecture. Software design involves identifying and describing the fundamental software system abstractions and their relationships. The design phase is concerned with technology-based views of the system's data, process and interface. It is also called physical design.

The Gamelan Learning System is a web-based system. In this designing phase, the author had designed the network architecture. The architecture had one server that serves the system web page. The server is set in one computer and use IIS as the working server. The students can use their personal computer to view the web-based. **Figure 3.1.3 (See Appendix 2.1)** shows the system architecture.

In this phase, the author had design the data workflow and designs the user interface. HTML and Visual Basic are the suitable programming language for development. Both programming languages are important tools for the web-based application and it can integrate each other easily. The design of data workflow is to be use for developing the system. **Figure 3.1.4 (See Appendix 2.2)** shows the Gamelan Learning System's data flow. The design for system interface is accurate to the web-based application and reliable to the student.

3.1.4 Development

Development stage is the stage where the file in folder will be link to the interface. The file folder consists of four Gamelan instrument with the respective notation. The sound can be retrieve from the file and able to play the sound with the system interface. But the composing song cannot be store into the file.

14

After the design for the user interface had been done, the development for the system interface started. Most of the user interfaces are using HTML as the tool to develop the system except composing page. For composing page, the author used Visual Basic to develop the page wisely. Visual Basic can easily be integrated with the wave or sound files. It can reduce concurrency in retrieving the audio and in the same time play the notes for each instrument.

The sounds are being record by using Pocket Voice Recorder 3.4. Pocket Voice recorder is freeware sound recorder that records equally well from microphone and any other input line available with the sound card. Recordings are organized as messages and may be easily exported to standard WAV sound file format. The author had to record each notation from *bonang, saron, kenong* and *gong*. Then the entire notation is stored in the file folders.

3.1.5 Testing

During this stage, the software design is realized as a set of programs or program units. Unit testing involves verifying that each unit meets its specification. The reason of having the testing phase are to review, validate, and test the modules created in the system regularly in order to check whether the system will run and perform the tasks as expected.

The alpha testing had been done to get feedback from student and in the same time to detect any errors. The test was post test which it is the first time the system exposed to the student. There were a control group consist of 20 students. They had to answer the questionnaire for getting the feedback. Various feedbacks were given by the students. Then the questionnaires were review to overcome any weaknesses.

15

3.1.6 Implementation

In this phase, there are activities to changes in design of the system as well as the modification of code to regenerate. The modification can make the system to be more workable by refering to the feedback from the student. The change that had been taken is navigation button that must be consistent and easy to identify by student. So the colours for the navigation button had been changed in order to differentiate the link with the text.

The Gamelan had been changed to be clearer and student understands the different in each notation. This is the main objective of this system. In composing page, the sample sound for the notation had been include making the system more reliable to the main objective.

In determining the value and effectiveness of the project, the real system must meet the standards of performance for the system. The evaluation is done on the functionality of the system, the content, the accuracy of the result, the efficiency of retrieving and editing data, the interactivity, and the student friendliness of the system.

The individual program units or programs are integrated and tested as a complete system to ensure that the software requirements have been met. After testing, the software system can be used by the student as Beta testing. The system is installed and put into practical use. Maintenance involves correcting errors which, improving the implementation of the system units and enhancing the system's services as new requirements are discovered.

3.2 TOOLS REQUIRED

3.2.1 Software

- HyperText Markup Language (HTML)
- Visual Basic 6.0
- IIS Web Server
- Macromedia Dreamweaver MX
- Adobe Photoshop
- Pocket Voice Recorder 3.4 (freeware)

3.2.2 Hardware

- Operating System : Microsoft Windows XP Professional Edition Pack 2 Version 2003
- Processor : Intel Pentium 4, 2.40 GHz
- Memory : 512 MB of RAM
- Display : ATI Mobility Radeon M7
- Display Mode : 1024 x 768
- Network : Internet TCP/IP Connection
- Input : Mouse and Keyboard
- Hard Disk requirement :50 MB

3.2.3 Documents

- Gantt chart for timeliness
- Questionnaires for survey.
- The design of architecture and development plan.

CHAPTER 4

RESULT AND DISCUSSION

4.1 RESULT

The finding focuses on the existing similar application. There is one application has been identified and analyze which is Virtual Javanese Gamelan, develop by Wells Cathedral School, United Kindom (UK).

4.1 .1 Virtual Javanese Gamelan

The Virtual Javanese Gamelan is a similar to the Gamelan Learning System. The software is standalone software that not link in network. The software is only be used for learning purpose. Wells was one of the first schools in the UK to invest in music technology and to teach it at 'A' level. In particular, it is well known, for its expertise in the successful delivery of on-line learning in a number of curriculum areas including Gamelan. The software can be download from the website and applicable to be used by any body.

The software offers a full 'hands on' practical exploration of an aspect of music from a computer workstation, integrating performance, composition and aural perception. The software contains most of information related to Gamelan and not focus on the Gamelan notation. This software also tries to encompass briefly the irrelevant information about the Gamelan music. Too many information in the software make the system in not in good quality and valueless.

This software is developing by using Macromedia Flash and the user need to install Flash player to run the application. The composing part can only play the same music melody and the user cannot explore more on composing well. Learning the notation also limited to customize rhythm. Most of the contents is similar to Gamelan web-based learning and does not different at all.
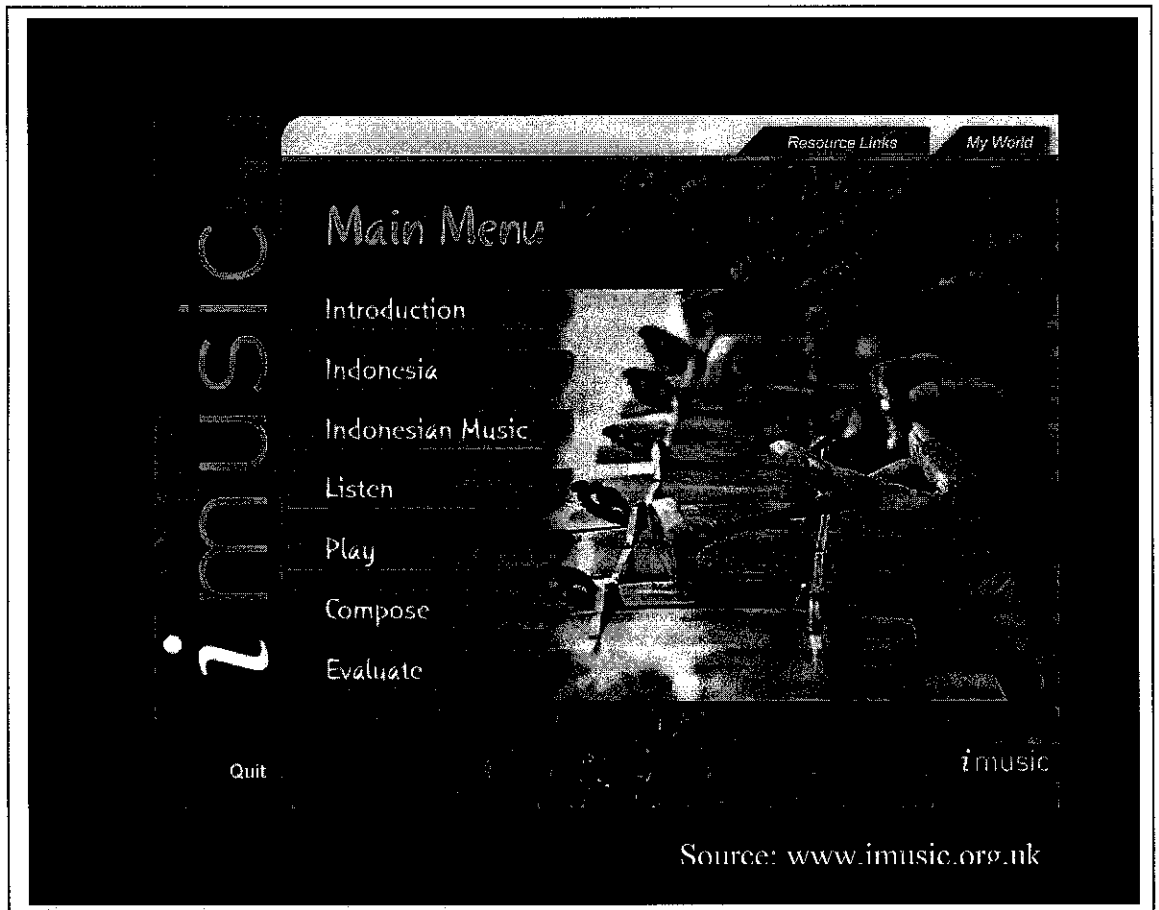

Figure 4.0: The Virtual Javanese Gamelan

The target audiences for this software are:

- **Public-** anyone can use the software
- **Lecturer/Teacher** – teach Gamelan
- **Students** – taken Gamelan Class

19

Mostly the target audience is teachers and learners in the South West of the UK, who are able to be registered on the South West Grid for Learning Portal, will be able to access an on-line community dedicated to The Virtual Javanese Gamelan. The Gamelan learning concept is similar to UK music class.

This software is useful to:

- Music academies
- Universities
- Schools (offer Gamelan)
- Tourist organization
- Musicians
- Libraries

By using this software, the user can:

- Perform a part in an ensemble performance of Lancaran Kebogiro
- Compose your own Lancaran through guided interactive tutorials
- Learn about Indonesia and Indonesian Music and see video footage of a Gamelan performance and demonstrations of each instrument.

The project is more focused on provide a content creation system that will provide efficiency and effectiveness that will help to learn Gamelan notation.

4.1 .2 Gamelan Learning System

Gamelan Learning System is the developing system that gives opportunity to student to learn about Gamelan. The system is unique because the learning system gives a full 'hands on' to student. They are able o discover everything inside the system. From the system, they can learn the basic knowledge about Gamelan, recognize the Gamelan instruments, understand the Gamelan notation and able to distinguish the difference between each notation.
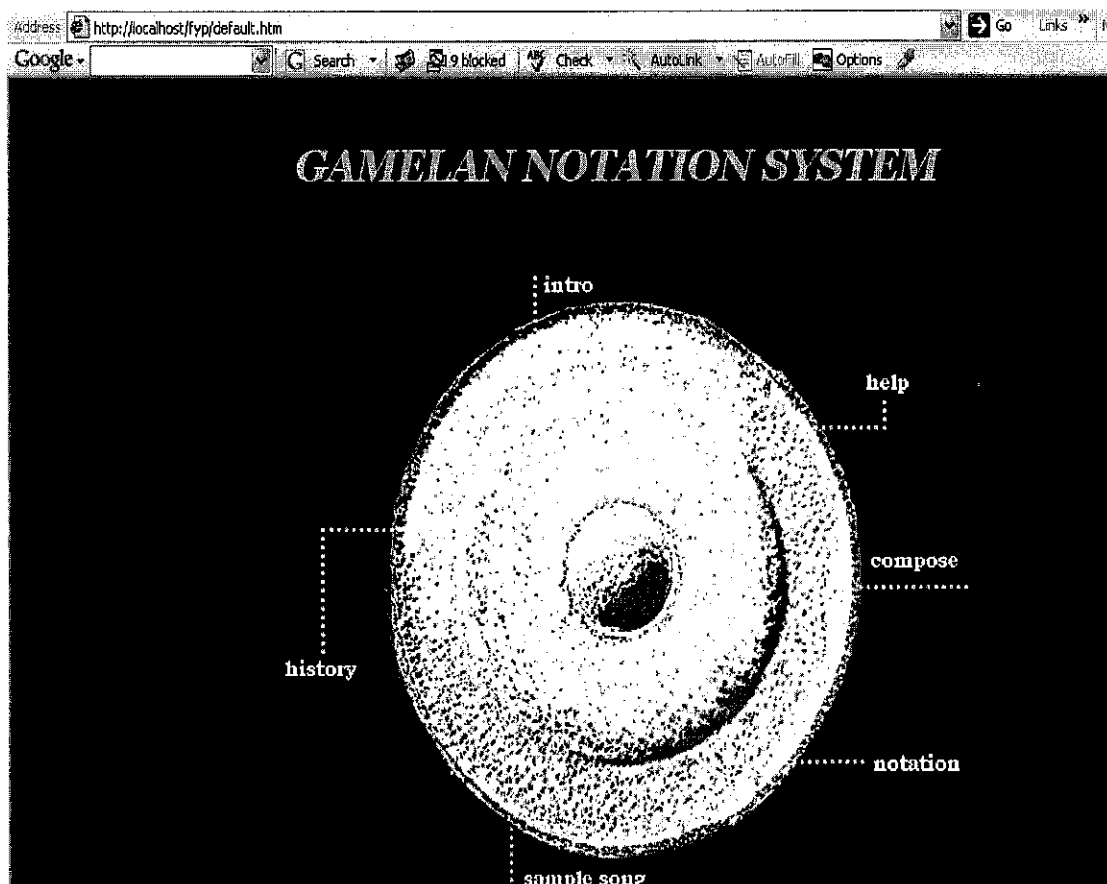
Figure 4.1: The Gamelan Learning System

The Gamelan Learning System is a web based system which can be retrieve the system from the server via the network. There is a server for storing the system with the link file folders that can be use by the student. There are six (6) significant links that contribute to the system. The links are Intro, History, Sample Song, Help, Compose and Notation.
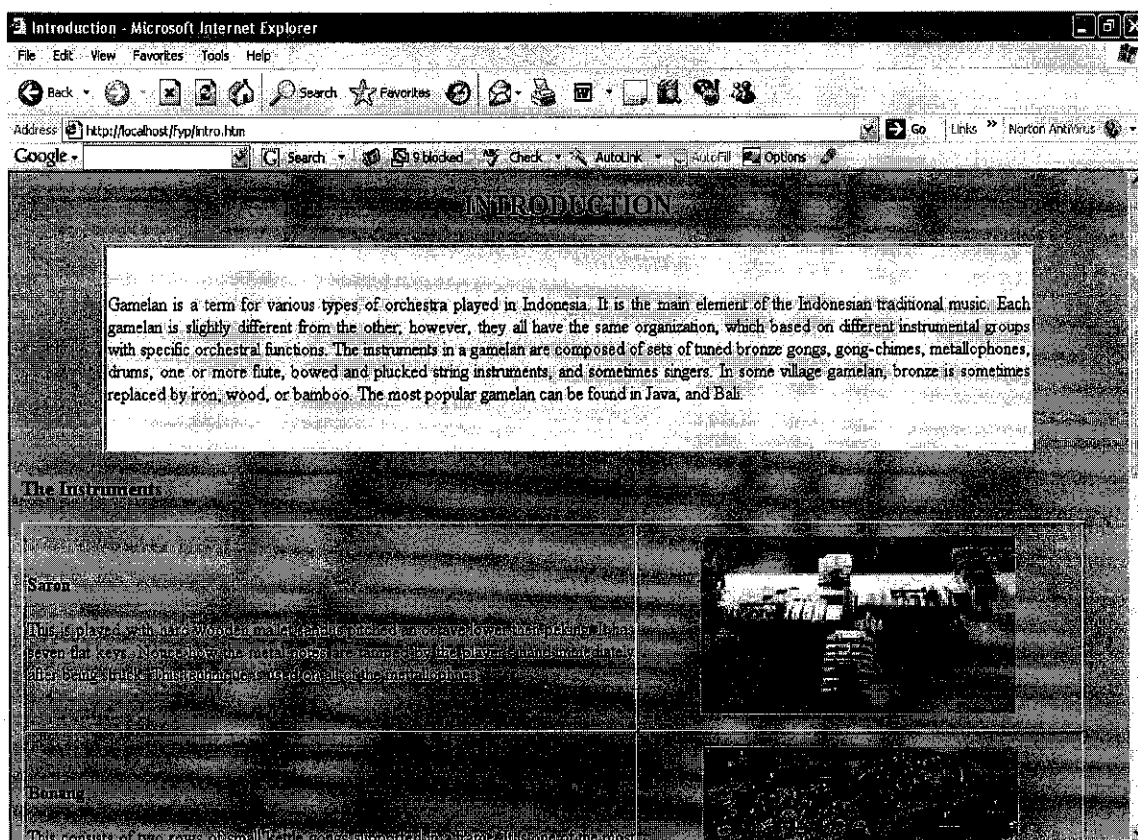
Figure 4.2: The Introduction page

The Intro is linking to Introduction page that focus on basic information about Gamelan and the instrument. The student can get better understanding about each instrument well. In the same time, they also can learn how to play the instrument. In the History page, it is all about the root of Gamelan. This can give an additional knowledge to them about the Gamelan generally.
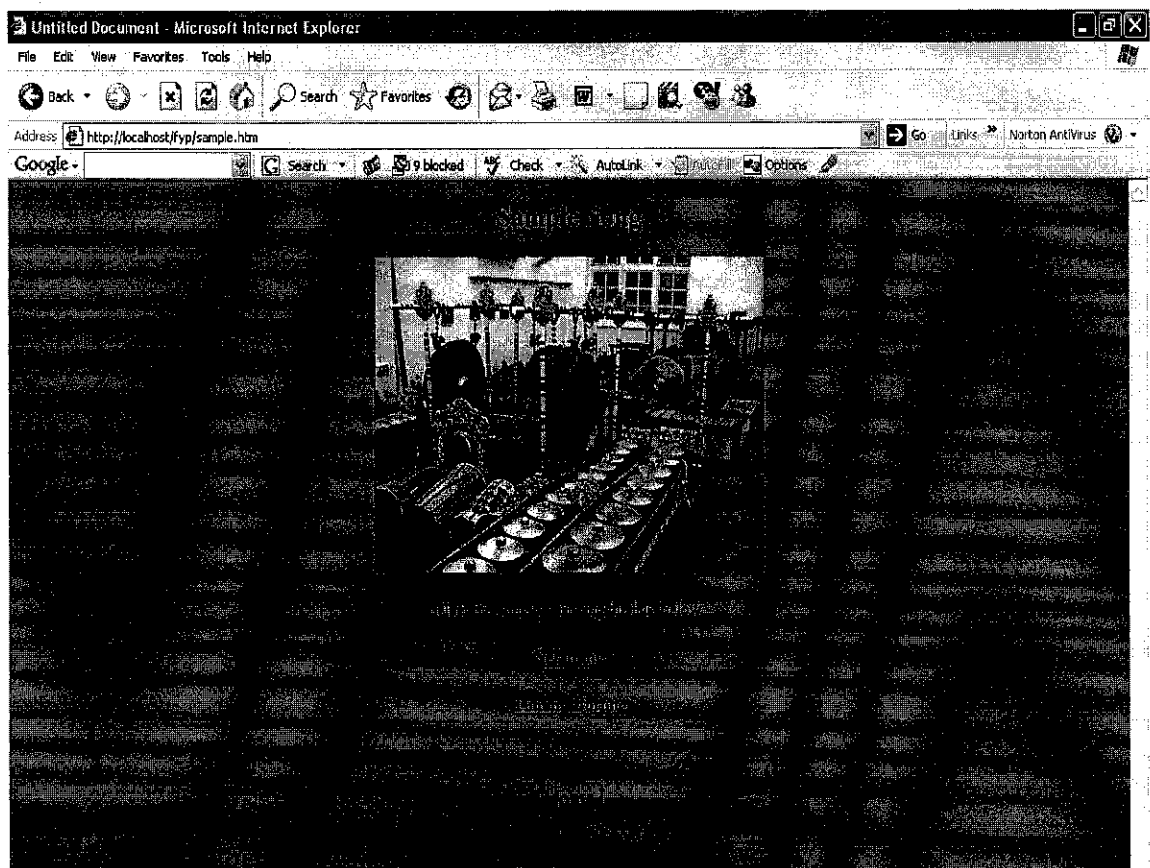
Figure 4.3: The Sample Song page

 The Sample Song page has a few link of Gamelan's song. By clicking the link, the song is able to run at the page by using Windows Media Player. The sound is allocated at the file folder and running through the selected song until the end of it. In Help page, it will guide the user how to use the system in the best performance. This can make the user understand about the system's flow.
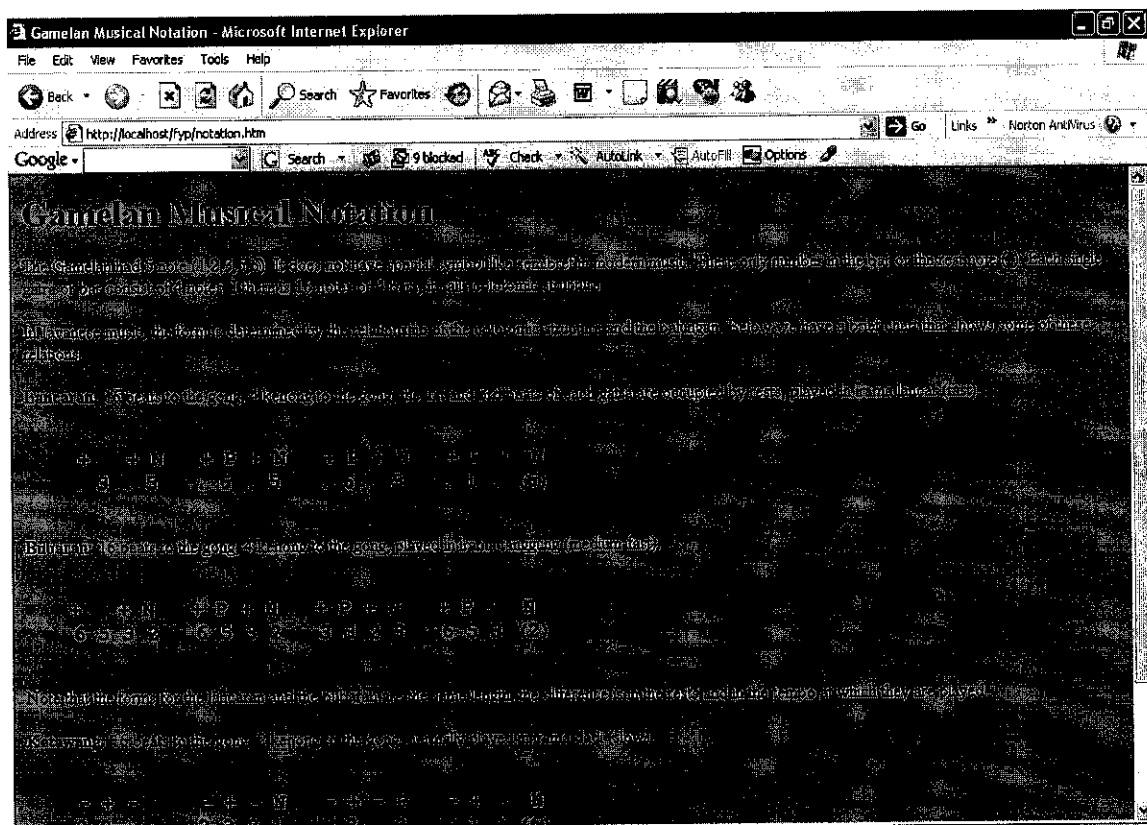
Figure 4.4: The Notation page

The Notation page is focus on Gamelan notation. It tells about the notes use in Gamelan and the form of Gamelan. Student can learn the Gamelan Notation by following the form of Gamelan. It is easier for them to understand the form of the notation and can keep track with note given.
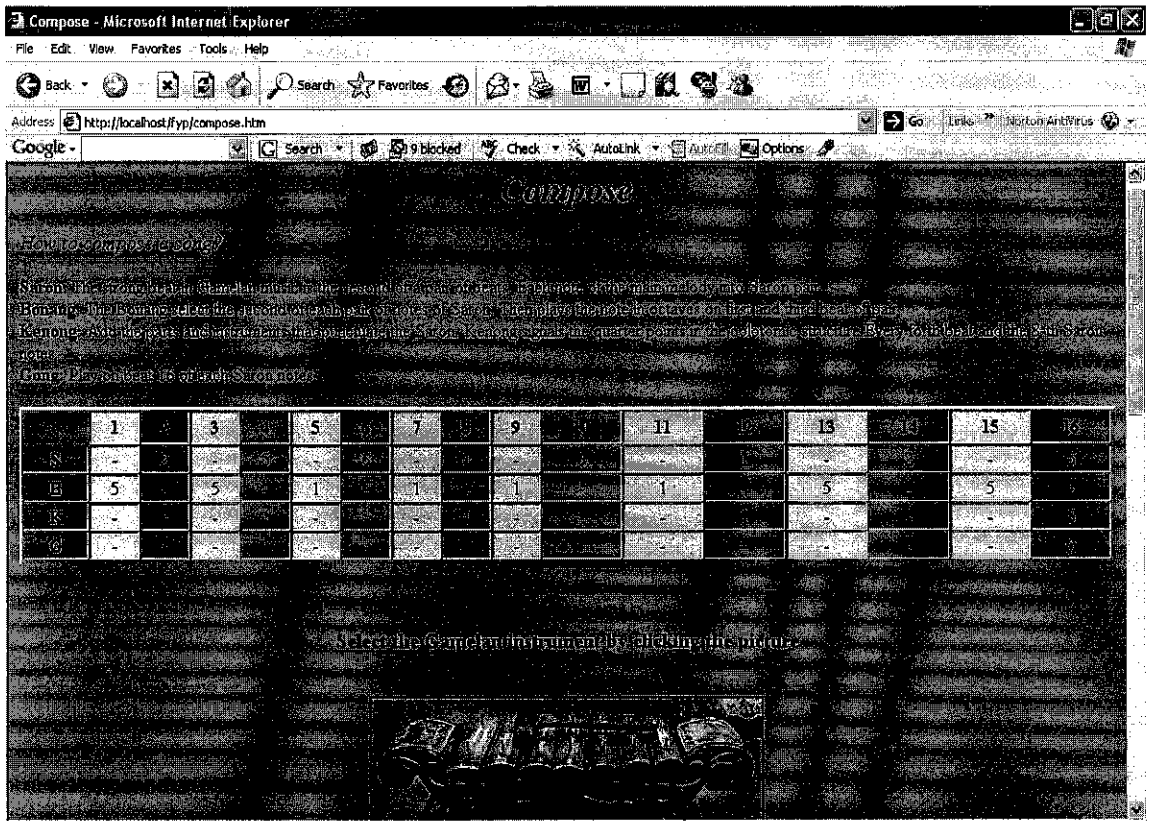
Figure 4.5: The Compose page of Gamelan Learning System

For the Compose page, there is a table shows how the Gamelan notation can be compose for each instrument. It helps user to compose their song for each instrument well and follow the rules of Gamelan Notation. In the page also include the picture of each instrument that link to the instrument notation page. For example, by clicking the *Saron* picture **(Figure 4.6)**, it link to *Saron* page as **Figure 4.7**.

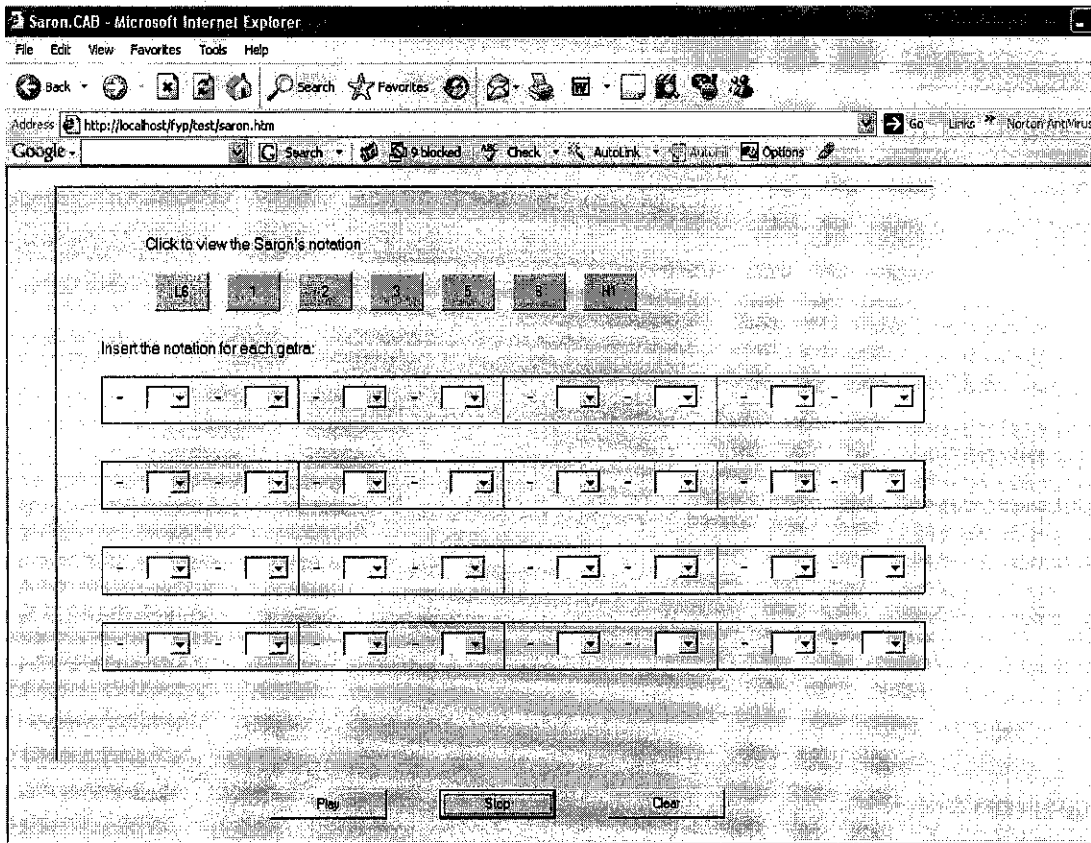**Figure 4.6: Selecting the instrument from The Compose page**

Figure 4.7: The *Saron* page

In *Saron* page, there are notation buttons on the top of the page that can be used to play or view the sound of single note. The comboboxes are use for inserting the notes for compose a song. Then, click the Play button to run the whole notation or click the Stop button to stop the song. If we want to create new song, click the Clear button and all the existing notes will be clear.

4.2   DISCUSSION

Based on the Virtual Javanese Gamelan description above, the main focus is to teach about Gamelan in general. By using the software, the beginner Gamelan player can understand the fundamental and the history of Gamelan. It is good syllabus for them to learn about Gamelan and the scope of user is high and from difference background. For

the Gamelan Learning System, the target user is only UTP's student and the syllabus is different then others. Some of the navigation in the software will be useful in Gamelan Learning System like *History* and *Tutorial* navigations. These navigations can interpret the main objective of the developing system. The project had ability to learn more about notation in this developing system compare to existing software. The existing software is a standalone project and not link to Internet. But the Gamelan Learning System is web-based system that can be link through network. Web-based system can reduce the space that used to install any standalone product.

4.3   QUESTIONNAIRES

The questionnaires were usability questionnaires conducted after the post test. There were 20 questionnaires distributed to 20 students called control group. The students are the student who enrolled in Gamelan subject. The questionnaires **(Appendix 3.1)** consist of 8 questions which need to be evaluated by them. The rating is in likert scale with the rate from 1 to 5. The measurement for each rate:

- 1 is "Strongly Agree"
- 2 is "Agree"
- 3 is "Neutral"
- 4 is "Disagree"
- 5 is "Strongly Disagree".

They used the Gamelan Learning System to and give their feedback about the system. The result of the questionnaires is as follow:

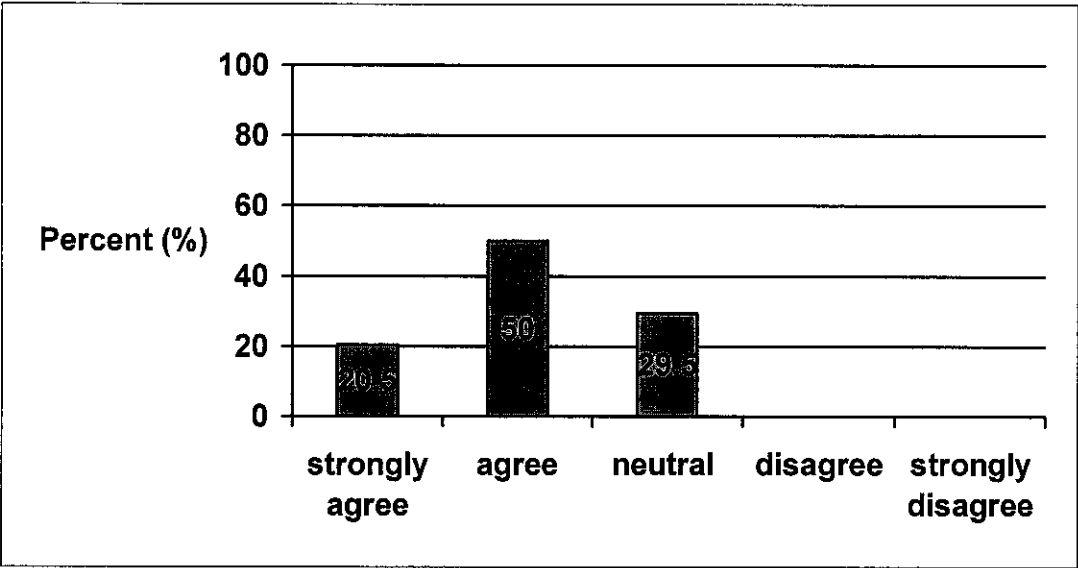Do you think that Gamelan Learning System able to teach student about Gamelan notation?

Figure 4.8: Percentage of the need of Gamelan Learning System

Discussion

From the observation, half of the students agree that Gamelan Learning System able to teach the Gamelan notation. About 5 students' rate as neutral. So it can be summarized that the system is beneficial for the students.

<u>Question 2</u>

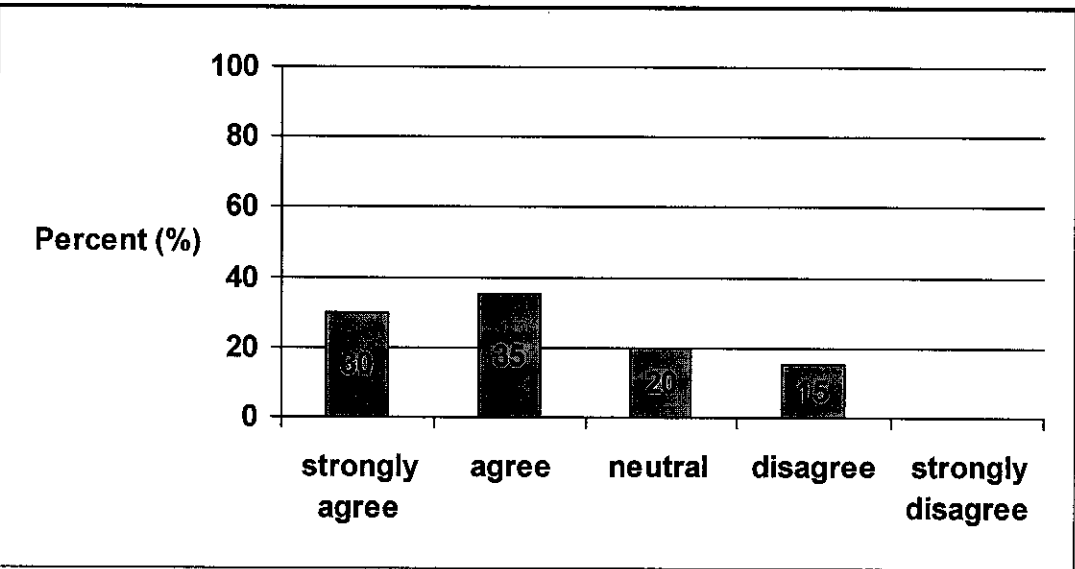Do you think that Gamelan Learning System content is useful to the student?

Figure 4.9: Percentage of usefulness

<u>Discussion</u>

Referring the **Figure 4.9** above, more than half respondents agree that this system is useful for them. This is because the system provides an easiest way to learn Gamelan. None of respondent rates at number 5 (strongly disagree) in this question.

<u>Question 3</u>

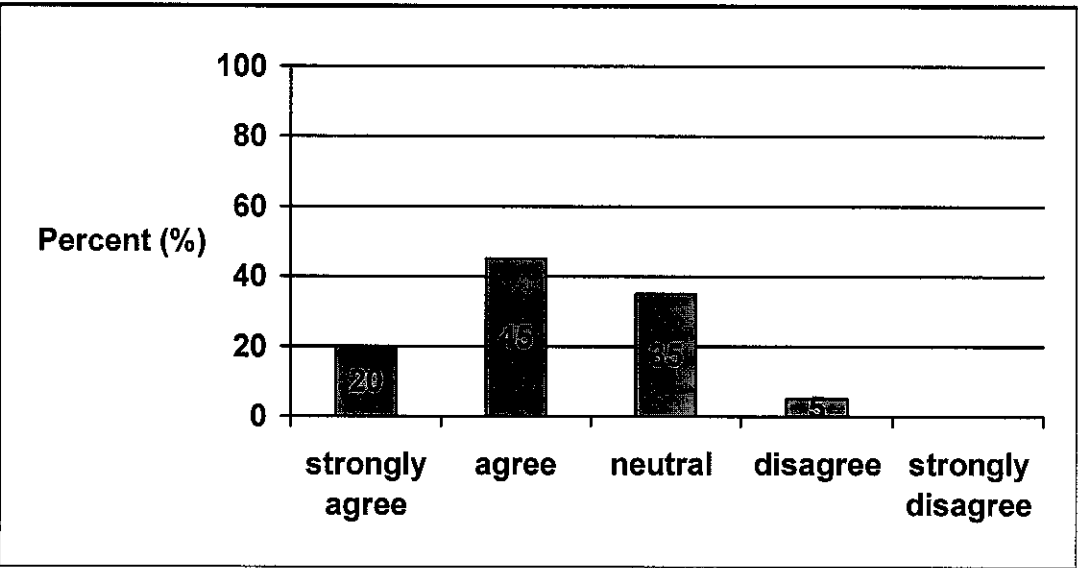Do you think the content is understandable?

Figure 4.10: Percentage of understanding

<u>Discussion</u>

Referring the **Figure 4.11** above, about half respondents strongly agree and agree that this system can be understood by them. This is because some of them had basic experience using web-based system. 35% of them respond neutral because this might be the first time for them to use web-based system

Question 4

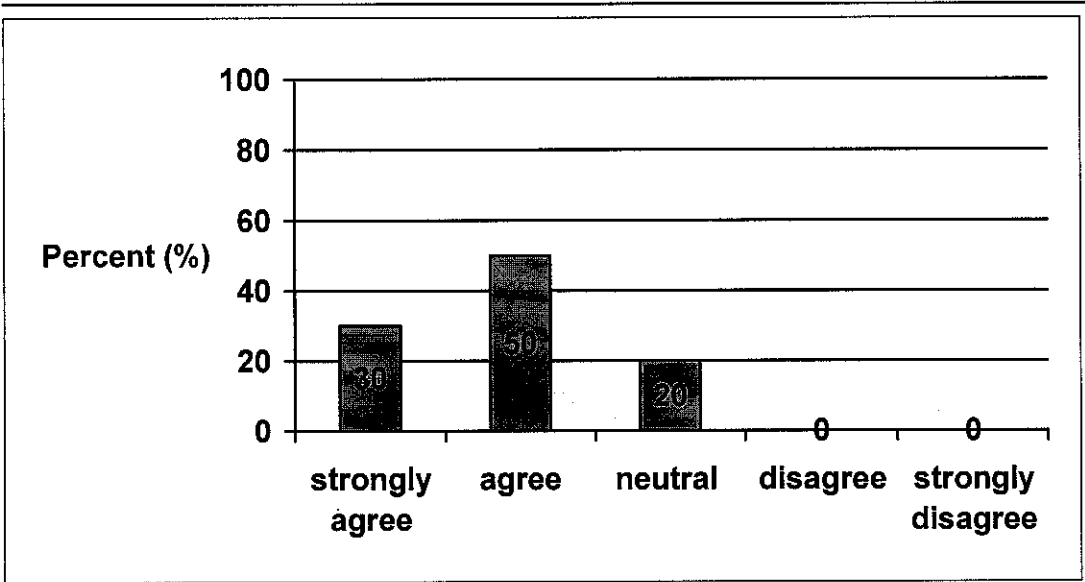Do you think the system is informative?

Figure 4.12: Percentage of informativeness

Discussion

The highest percentage of rating is agree about half of the students feel the system is informative for them. They can gain more knowledge about the Gamelan and the notation well compare to traditional approach.

Question 5

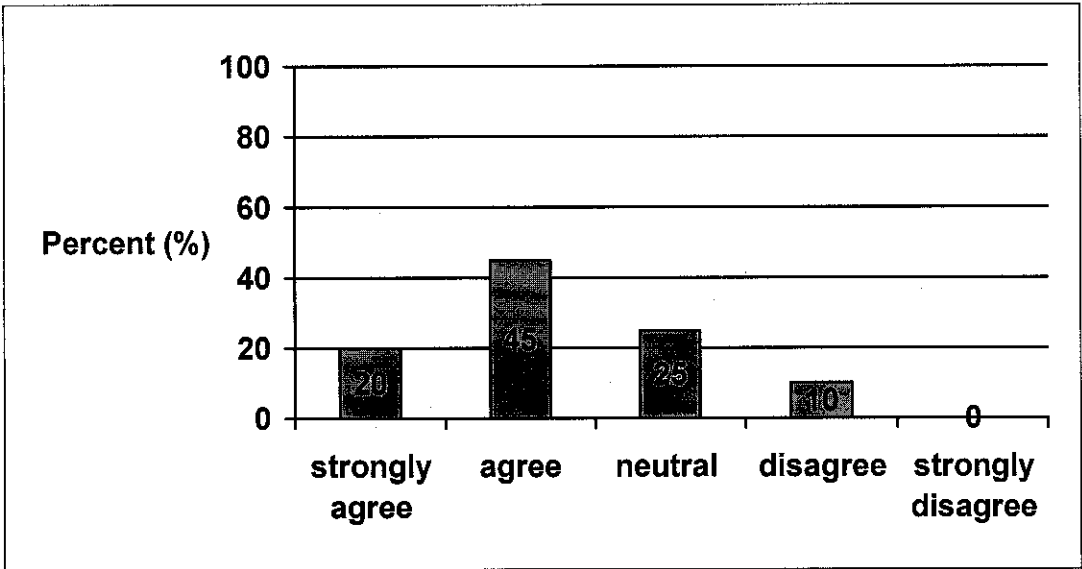Do you feel the composing page help you to understand the notation for each instrument?

Figure 4.13: Percentage of composing page

Discussion

From the observation, 45% of the students agree that the composing page increase their understanding about the notation. Other than that, they can distinguish the difference of each instrument.

Do you think by using this system, it can attract student to learn Gamelan?
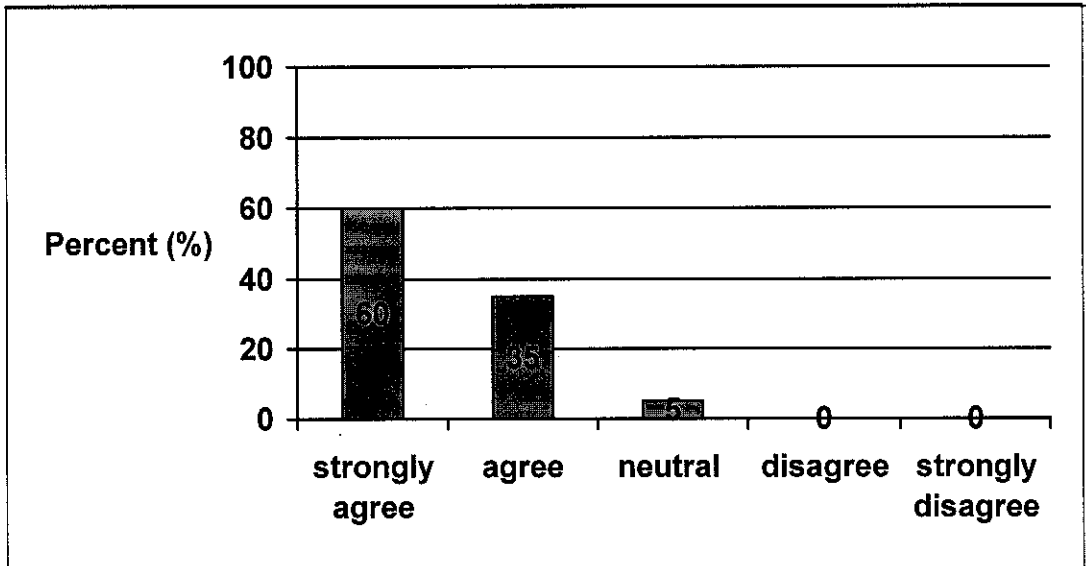

Figure 4.14: Percentage of attractiveness

Discussion

The highest percentage of rating are strongly agree and agree within the same area which is 19 students agreed about the attractiveness. The system provides simple and user-friendly interface. The students seen the system interesting to them and not feel bored in learning the Gamelan notation.

34

Do you feel web-based approach is easy to learn compare to paper-based approach?
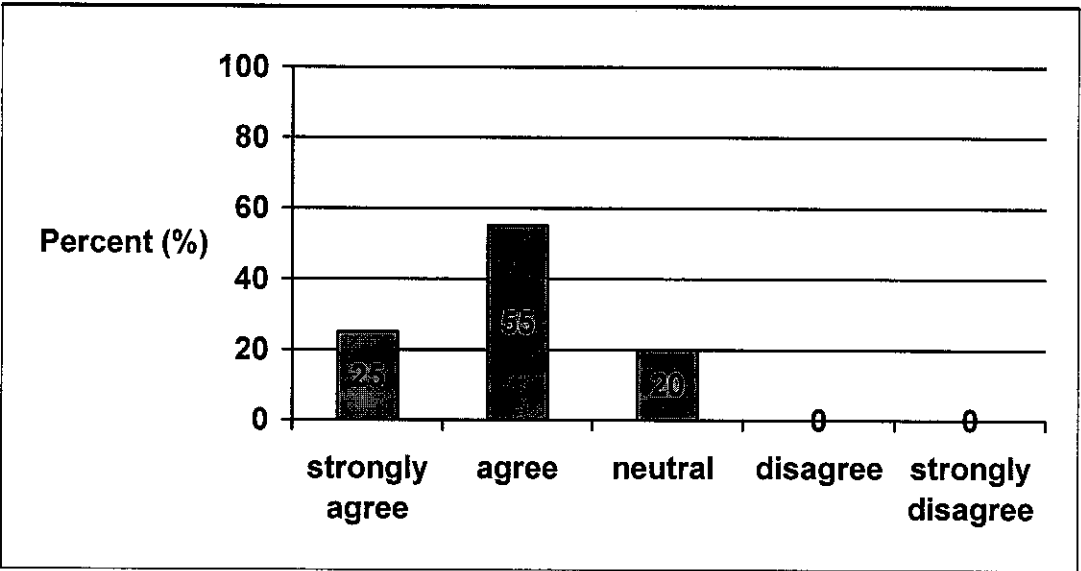

Figure 4.15: Percentage of using web-based system

Discussion

The figure shows the students agree and strongly agree that web-based approach is easy for user to understand the subject. Web-based provide Gamelan information that long lasting and will not lost. .

Question 8

Are you satisfied with the system's functionality?
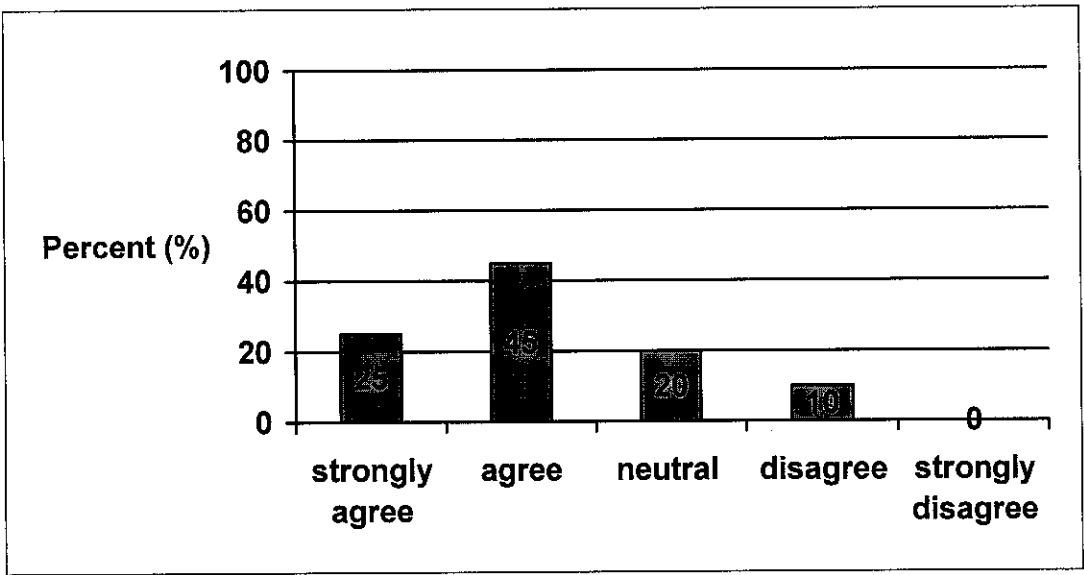

Figure 4.16: Percentage of system functionality

Discussion

The highest percentage of rating is agree, the students satisfy with the system's functionality. The system can be handle easily by the novice user like the students.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.0 CONCLUSION

Based on research that has been done in this project, the objectives and goals must be achieved. From the research, the musical learning software is useful for beginner user and composer. The software can be created as web-based system. The usage of Gamelan Learning System as a web based is smart ways to develop a content creation and knowledge sharing that certainly have the system to manage the content and information in the web. Applying the technology that useful for student is a big success to assist in learning the Gamelan notation.

This project can help the user to learn about Gamelan and the same time learning the notation easily with paperless and effective. The project engages the student with information features that related in learning the Gamelan notation. By composing a gamelan song, they are able to apply the knowledge that they had learned in differentiate the Gamelan notation for each instrument.

From the questionnaires that had been reviewed, the Gamelan Learning System is able to teach Gamelan notation to the students. They learn something about Gamelan and recognize each notation wisely. The content in the system is useful, understandable and informative for the students. The system is useful for them because they can access the system freely. All of the content is relevant and important to Gamelan Course for them

37

to understand the subject matter. By adding object and sound, the student can get better understanding about the course.

Composing page is beneficial for the students to compose a simple song and in same time learn to distinguish the difference sound for each instrument. The composing page allows them to listen to each notation one by one. Compare to class, they cannot listen the appropriate notation clearly. The system also can attract them to learn Gamelan by adding interactive and interesting figure. Most students like to explore more about Gamelan rather than look and play the instrument during the class.

Parallel to technology, web-based approach is significant to be used compare to traditional approach. The students preferred to use new technology and it is easy to be use. Web-based approach also can store all the information wisely rather than paper-based that may be lost. If the notation and other materials lost, the learning process is hard to be continued.

The students also satisfied with the system functionality. The system is functioning well similar to other system. Each navigation button and link can be navigated according to it function. The students feel comfortable to use the Gamelan Learning System because it easy to be handles and as a novice user, they are able to use the system wisely. They can apply all of the information into their Gamelan class and able to follow the Gamelan syllabus. This show the project is worth to be use by anybody and anywhere.

5.1 RECOMMENDATION

There is several recommendation and suggestions that can be done in the future for the system enhancement like change the current sound file allocation in folder into database system. The sound or the .WAV file can be secure from unauthorized person. Then, the composing song is also able to be store and retrieve from the database.

The make the system more interesting, there should include videos about how to play the instrument. The video can be one person play the instrument with simple song. This may make the user get a better view about the instrument.

Interactive tutorials should be included in making the learning process more interesting. There will be simple question to be answer by the user. This can give feedback to user about their knowledge for Gamelan Course.

The system should have "access level privileges". The administrator can access the whole system and restrict the user's access area.

REFERENCES

Ang, M. and Gan, D. (2000). "The Effectiveness of Using Computers in "The Teaching of Music Notation Writing Skills to Malaysian Trainee Music Teachers", *"UPM Music Department Home Page"*

Chapman, D (2000), *Developing Secure Application with Visual Basic,* First Edition, United State of America, Sams Publishing

Kenneth E. Kendall (2002), *System Analysis and Design*, Fifth Edition, New Jersey, Pearson Education Inc.

Ian Sommerville, (2001), *Software Engineering,* Sixth Edition, United State of America, Addison Wesley.

Liu Huifen, Hu Xin and Zhang Xinyu, (2002), *Human Communication and Interaction in Web-Based Learning,* Tsinghua University, p1-5.

Smithers, B (2001), *Notation and the Internet,* Electronic Musician, Jul 2001, Vol. 17, Issue 7

News, Reviewed on 15 August 2005 from http//music.asu.edu/e-Notes/spring03/gamelan.html

Introducing the Virtual Javanese Gamelan, Reviewed on 13 September 2005 from http://www.musicmanifesto.co.uk/news/detail.cfm?&id=45

APPENDICES
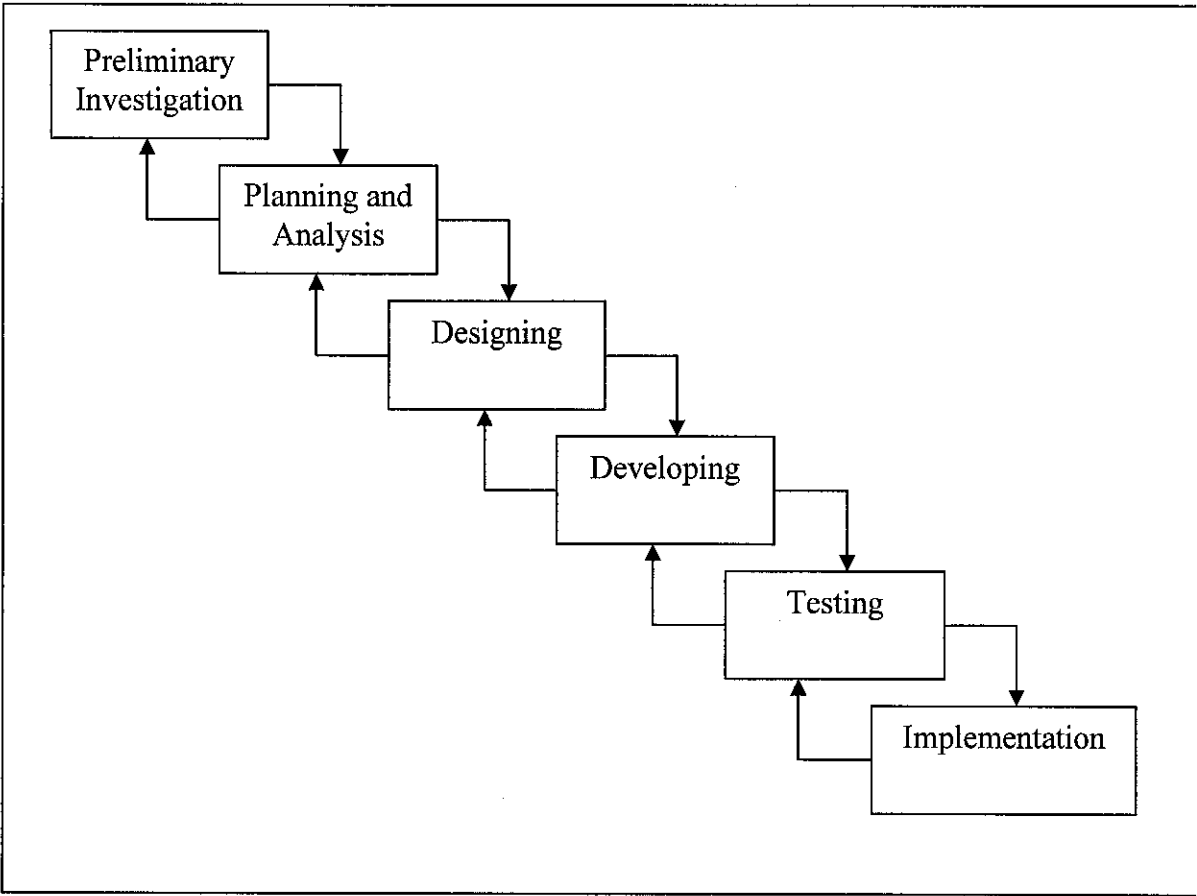
Appendix 1.0

Figure 3.1 Waterfall Methodology

ID	●	Task Name	July	August	September	October	November
1		**1. Preliminary Investigation**					
2		1.1 Study current situation					
3		1.2 State objective and the problem					
4		1.3 Find the requirement					
5		**2. Planning and Analysis**					
6		2.1 Develop project plan					
7		2.2 Analyze the requirement					
8		2.3 Create the data flow					
9		**3. Designing**					
10		3.1 Design the system interface					
11		3.2 Design the database					
12		**4. Development**					
13		4.1 Develop the system interface					
14		4.2 Integrate the database					
15		**5. Testing**					
16		5.1 Analyze error checking					
17		5.2 Establish test to user					
18		5.3 Get and review user feedback					
19		**6. Implementation**					
20		6.1 Modification for programming					
21		6.2 Improve the interface					
22		6.3 Final test					
23		6.4 Final modification					
24		**7. Presentation**					
25		7.1 Run the workable product					

Project: Project1
Date: Tue 12/13/05

Task		Milestone		External Tasks
Split		Summary		External Milestone
Progress		Project Summary		Deadline

Page 1

Appendix 1.2

Figure 3.1.2: Tasks Involved in Analysis Stage
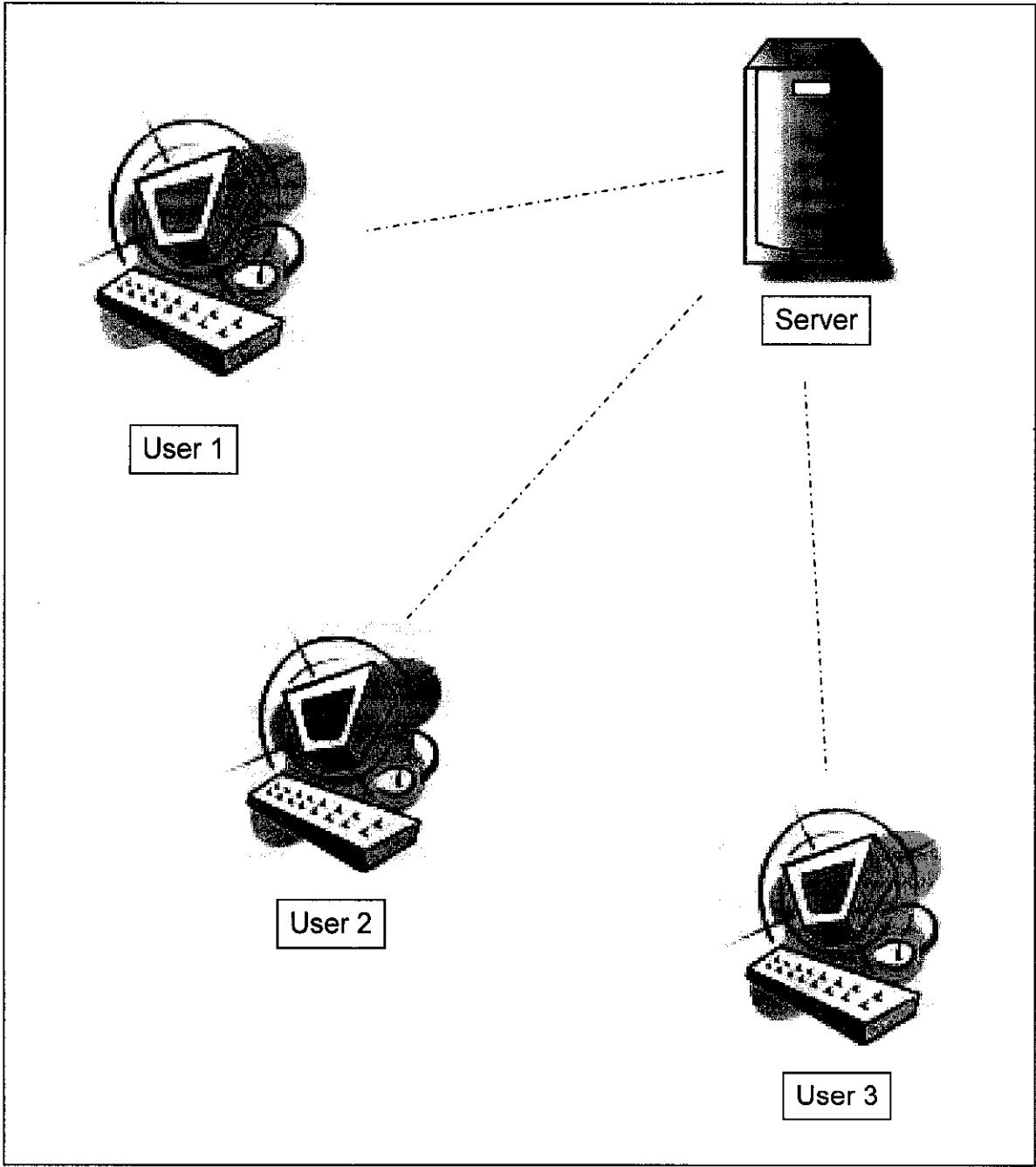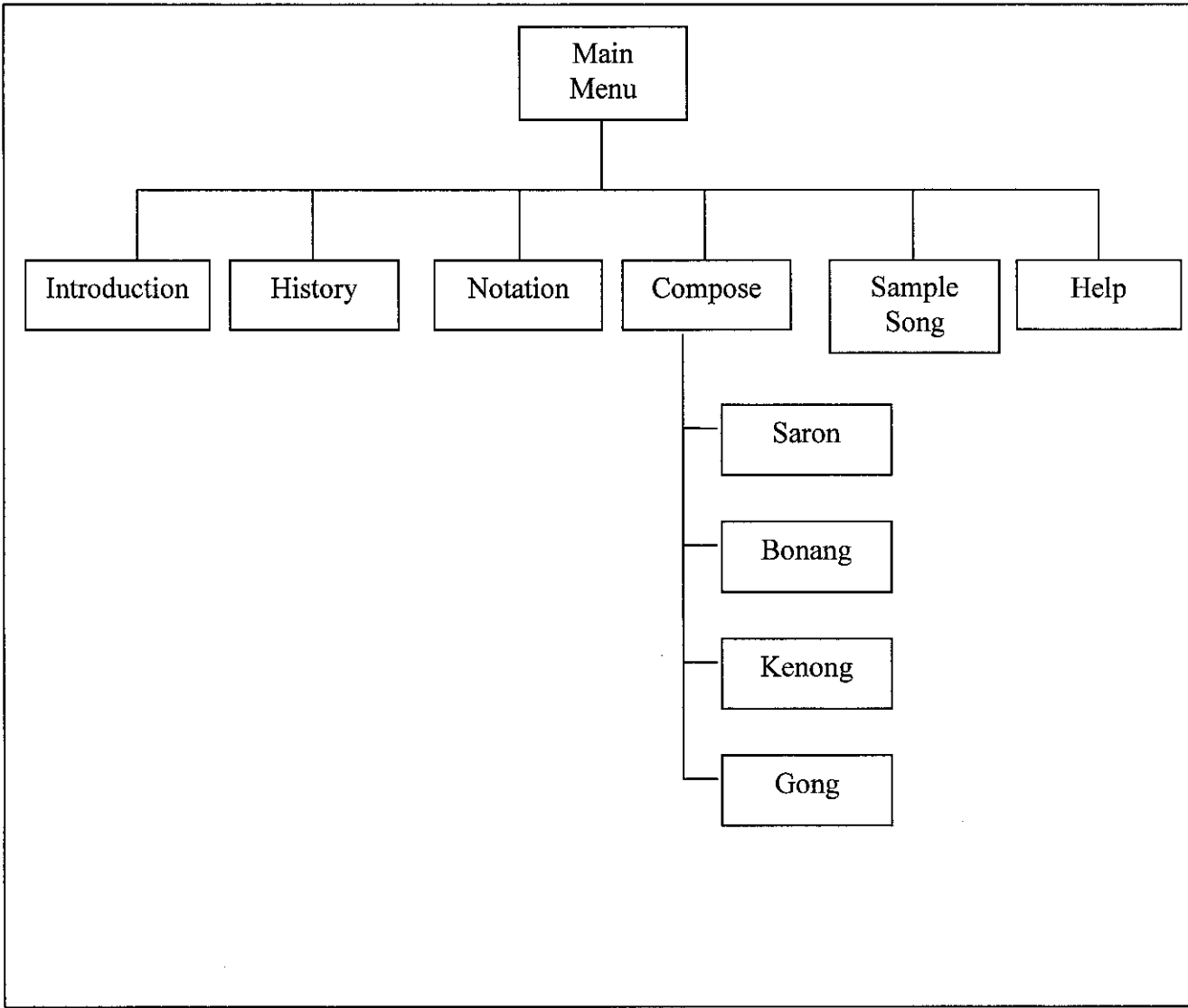
Appendix 2.1

Figure 3.1.3: System Architecture

Appendix 2.2

Gamelan Learning System Workflow

Figure 3.1.4

Appendix 3.1

The questions bellow asks about the effectiveness of using Gamelan Learning System. The question is base on your opinion about the system after the experience and evaluation on the system. Tick the most appropriate response number into the boxes below by using the scale from 1 to 5.

Year/Semester   :
Program   :

Please rate your answer between the given ranges:

1	2	3	4	5
Strongly	Agree	Neutral	Disagree	Strongly
Agree				Disagree

1. Do you think that Gamelan Learning System able to teach student about Gamelan notation?

    1 2 3 4 5

2. Do you think that Gamelan Learning System content is useful to the student?

3. Do you think the content is understandable?

4. Do you think the system is informative?

5. Do you feel the composing page help you to understand the notation for each instrument?

6. Do you think by using this system, it can attract student to learn Gamelan?

7. Do you feel web-based approach is easy to learn compare to paper-based approach?

8. Are you satisfied with the system's functionality?