# GAMELAN MELAYU: NEW INSTRUMENTATION SETUP IN THE ENSEMBLE

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### ABSTRACT

This thesis presents an academic study of the development and the instrumentation setup of gamelan Melayu in Malaysia. It draws to attention the current instrumentation set-up in the ensemble, and how restructuring it could enhance and improve the quality of sound projection in the performance of the gamelan Melayu ensemble.

The purpose of this research is to produce alternative solutions to improve the sound projection in gamelan Melayu. This is achieved through orchestrating new gamelan setups, based on the musicology study through the analysis of amplitude data obtained through music technology, and subsequently strengthening it with western orchestration theory.

This research finds out the amplitude of each gamelan instrument by detecting the sound using an instrument microphone (Shure SM57), and then recording the results of the audio level (amplitude) displayed in the digital mixer (Behringer X32). Then, a few samples of instrumentation setup are proposed based on the analysis of the results. This is further supported by the theory of western orchestration, which can determine the priority ranking of the gamelan instruments. In addition, gamelan repertoires in traditional *balok* (cipher) notation are transcribed into western notation system, as the western notation is more comprehendible by most musicians.

This research provide guidelines for future gamelan enthusiasts who would like to understand more about the gamelan Melayu before purchasing a new set of gamelan in the near future, as well as a reference for gamelan enthusiasts, and promote awareness among readers to explore more in-depth into gamelan instruments. It is hope that through this research, the beautiful sound of gamelan can be mold into a better shape. This research is divided into five chapters. Chapter 1 contains an introduction to the research, where the research objective and research question is determined. Chapter 2 presents the history and literature review of this research, which covers the literatures of the development of the instrumentation setup in gamelan Melayu, as well as various western orchestration theories that could be applied into the aforementioned. The research methodologies are explained thoroughly in chapter 3. Chapter 4 displays the results and analysis of the amplitude, as well as the discussion about a few different samples of instrumentation setup. A summary of conclusions and findings are highlighted in chapter 5, as well as suggestions for future researches.

#### ABSTRAK

Tesis ini mempersembahkan suatu kajian akademik tentang perkembangan dan penyusunan instrumentasi dalam gamelan Melayu di Malaysia. Kajian ini memberi fokus kepada penyusunan instrumen masa kini di dalam ensembel tersebut, dan bagaimana penstrukturan semula mampu mempertingkatkan kualiti projeksi bunyi dalam persembahan ensembel gamelan Melayu.

Kajian ini bertujuan untuk menghasilkan penyelesaian alternatif bagi mempertingkatkan projeksi bunyi dalam gamelan Melayu. Ini boleh dicapai melalui pengarangan susunan gamelan yang baru, berdasarkan kajian musikologi melalui analisis data amplitud yang diperoleh melalui teknologi muzik dan seterusnya diperkukuhkan dengan teori susunan muzik barat.

Kajian ini mengukur amplitud bagi setiap instrumen gamelan melalui kaedah pengesanan bunyi menggunakan mikrofon instrumen (Shure SM57), dan seterusnya merekodkan keputusan tahap audio (amplitud) yang terpapar di mixer digital (Behringer X32). Seterusnya, beberapa sampel penyusunan instrumen telah diusulkan berpandukan analisis keputusan yang didapati. Keputusan ini juga disokong oleh teori susunan muzik barat, yang dapat mengenal pasti kedudukan instrumen gamelan mengikut keutamaan. Tambahan pula, pelbagai repertoir gamelan dalam notasi *balok* (cipher) tradisional telah diterjemahkan kepada sistem notasi barat kerana lebih mudah difahami oleh kebanyakan pemuzik.

Kajian ini menyediakan garis panduan kepada aktivis gamelan masa hadapan yang ingin mengetahui dan memahami lebih banyak maklumat tentang gamelan Melayu sebelum membeli suatu set gamelan yang baru. Kajian ini juga boleh dijadikan sebagai sumber rujukan kepada aktivis gamelan dan menyedarkan para pembaca untuk meneroka secara lebih mendalam lagi tentang instrumen gamelan. Diharapkan melalui kajian ini, bunyi indah gamelan boleh diperindahkan lagi.

Kajian ini terbahagi kepada lima bab. Bab 1 mengandungi pengenalan kepada kajian ini, di mana objektif kajian dan persoalan kajian ditentukan. Bab 2 mempersembahkan sejarah dan kajian sastera yang merangkumi sastera perkembangan dan pembangunan susunan instrumen gamelan Melayu serta pelbagai teori susunan muzik barat yang boleh diaplikasikan dalam kajian ini. Metodologi kajian dijelaskan dengan teliti dalam Bab 3. Bab 4 menunjukkan hasil kajian dan paparan analisis, serta perbincangan tentang beberapa sampel susunan instrumen yang berlainan. Suatu rumusan tentang kesimpulan dan penemuan serta cadangan kepada kajian masa depan telah ditekankan dalam Bab 5.

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### CHAPTER 1

#### INTRODUCTION

#### **1.0 Introduction**

The gamelan *Melayu*, which is also known as gamelan Terengganu, is the most common gamelan ensemble in Malaysia, except for certain places such as Johor. Traditionally, the gamelan is only played during certain occasions such as ritual ceremonies, special community celebrations, shadow puppet shows, and for the royal family. Gamelan is also used to accompany dances in court, temple, and village rituals. Besides providing music for social functional ceremonies, it also provides a livelihood for many professional musicians and specialized craftsmen who manufacture gamelan. Today, although gamelan music is still used for ritual ceremonies and the royal family, it is also performed as concert music in social and cultural gatherings to welcome guests and audiences. It is also used to accompany many kinds of traditional and modern dances, drama, theatrical and puppetry.

The gamelan *Melayu* ensemble consists of seven main gamelan instruments, namely, *saron peking, saron baron, saron demung, bonang, gambang, kenong,* and a group of *gongs*, which consists of *gong kempul, gong suwukan* and *gong agung*. The current setup in the gamelan ensemble consists of one of each instruments mentioned above. However, the limited number of the instruments that could play different parts of the music arrangement in the current setup of gamelan *Melayu* ensemble results in a slow development and expansion in the gamelan *Melayu* repertoires and compositions. It is

due to this that composers and arrangers of the repertoires could not expand their ideas, compositions and arrangements.

The composers here refer to the group of composers that are trying to move forward and come up with new ideas for new compositions and also new arrangements for existing gamelan compositions. However, the number of instruments available and their roles set the composers back from new concepts. The researcher has no intention to make negative statements or judgments on what is considered right or wrong in the current setup. In fact, the aim is to suggest new possibilities for the gamelan ensemble in order to cater for new compositions and arrangements. The changes in the number of different instruments will be able to help the composer or arranger make better arrangements for each instrument according to their functions. They no longer have to play the same melody in the same direction, but they will be able to play counter melodies and harmony with sufficient number of instruments. When the setup of gamelan is improved, composers and arrangements can come up with creatively new and better compositions and arrangements in greater number.

In this research, the researcher used the setup of *angklung* ensemble as an example for comparison. *Angklung* ensemble has a shorter history compared to the gamelan *Melayu*, but their setup is more improved and developed than that of the gamelan ensemble. There is a similarity between the *angklung* ensemble to the gamelan ensemble in the sense that the instruments within the ensemble are of the same family and has no specific functions despite their different range and registers. In contrast, the *angklung* 

ensemble applied the western orchestration theory into the instrumentation of their ensemble by changing the number of the instruments accordingly. For example, they have more numbers of smaller instruments, which are softer in volume, and lesser number of the bigger instruments, which are louder in volume. The reason behind the choice of instrumentation selection is to create a balance between the sounds produced from the instruments of different registers. If *angklung* has taken the initiative to move forward and improve their setup, then there is no reason for the gamelan setup not to take the same initiative as well.

Further investigation into the reason of the current setup of instruments in gamelan *Melayu* ensemble showed that the current setup is based on the first set of gamelan instruments that first arrived in Pahang. Since then, the "standard" setup of gamelan *Melayu* ensemble consists of the seven different instruments based on the first set of gamelan in Malaysia. There have been no studies done to further explore the setup for its functions and significance, or the need of improvement.

Tenzer (2011), considered the "gamelan" similar to the "orchestra". This corresponded to the Western sense, in which the word refers to an ensemble of music instruments that is played by musicians. With reference to the orchestration of the western orchestra, it is discovered that the current setup of the gamelan *Melayu* ensemble does not adhere to the principals of western orchestration, where the number of instruments are placed in a ratio that produce a balance sound and performance of a repertoire. Instead, the gamelan *Melayu* has only one of each type of instruments in its ensemble.

The balance of sound is a very important element in the arrangement of compositions and performance. One of the factors that influenced the balance is the number of each type of instruments. If we compare the current setup of instruments in the gamelan *Melayu* ensemble to the western orchestration theory, the gamelan *Melayu* could not produce a balance sound when performing a repertoire. This is because there is only one of each type instrument in the setup, regardless of its register and the function. When only one of the instruments is playing the melody line, the other instruments play the doubling. As soon as the other instruments play the first beat, the accompaniment sound would tend to overpower the melody line. As a result, the melody line is drowned out in the midst of the heavy accompaniment.

For analysis purposes of this research, the western standard notation system instead of the *balok* (cipher) notation is used. This is due to the reason that not everyone can comprehend the *balok*, whereas the western standard notation is more comprehendible by most musicians.

Togok



Figure 1.0 Togok: Balok and western notation (full instrument score)

Figure 1.0 above demonstrates the current arrangement of the *saron* family in *Togok*, a traditional gamelan repertoire, based on the current setup of gamelan. The first stave is the traditional *balok* notation, followed by its transcription in western notation for the full gamelan ensemble. The *saron peking* plays the doubling of the melody line. The *saron baron* plays on every beat, whereas the *saron demung* only plays on the first and

Score

third beat of the melody. Regardless of the role and tempo these instruments are playing, they are all playing the same thing – the melody. They move in the same direction, and there is no counter-melody or harmony, resulting in an unbalanced sound of melody, counter-melody and harmony system.

Another factor to be taken into consideration is the balance of the sound produced from each instruments. The loudness of an instrument corresponds with its size. *Saron peking* is the smallest in size, thus producing the smallest volume. The size and volume increases from *saron baron* to *saron demung*. When all these instruments are played together in the gamelan ensemble, *saron peking*, the smallest in size and volume, will be drowned amidst the louder volume of the other two larger instruments. The listeners would then have to strain their ears to catch the melody of the music.

## **1.1 Statement of Problem**

Although gamelan *Melayu* has been around since the 19<sup>th</sup> century, there have not been many published literatures regarding the significance of the set-up of the instruments in gamelan *Melayu*, and also the range and functions of each instrument. Most of the literatures were about the history of gamelan *Melayu*, and there were few literatures on the current situation of the gamelan *Melayu* in Malaysia. As such there is a limited choice in music repertoire for the gamelan *Melayu* due to the number of instruments and range of sounds each instrument produces. A new setup is needed to move this ensemble along to further improve and develop it.

### **1.2 Objective of Research**

This dissertation presents an academic study of the development and the set-up of the instruments in gamelan *Melayu* in Malaysia. It focuses on gamelan *Melayu* in present day Malaysia and the set-up of the instruments in the gamelan *Melayu* ensemble, and how restructuring the set-up of instruments could enhance and improve the sound and performance of the gamelan *Melayu* ensemble. The specific objectives of this study are:

- I. To enhance the notation for gamelan repertoire by combining the western and cipher notation.
- II. To determine and analyse the different amplitudes of each instrument in gamelan *Melayu*.
- III. To improve the quality of sound based on proper analysis of the restructure of instrumentation in gamelan *Melayu*.
- IV. To design an alternative instrumentation setup for gamelan that caters for both traditional and new repertoires.

# **1.2.1 Research Question**

The main focus of this research is to restructure the gamelan *Melayu* set-up in the aspects of i) balance of sounds and ii) function. This research addressed the following questions:

I. Gamelan repertoires have always been using the cipher notation, which only notates the melody part. This study will transcribe the part played by each instrument in western notation so that readers can get a clear understanding on the function of each instrument.

- II. There are a variety of sizes and timbres in gamelan instruments. However, there is no solid proof or proper analysis regarding the loudness of each instrument. This study will investigate the loudness of each instrument based on solid analysis of data that are obtained through music technology equipments.
- III. Although gamelan is getting popular and widely performed in Malaysia, there has been no research or even questioning regarding the significance of the current setup of instruments in gamelan. A proper analysis based on solid evidence is necessary in finding out the required instrumentation in order to achieve an optimal balance of sound.
- IV. Through a proper analysis, alternative instrumentation setups can be created for different repertoires and requirements. These alternatives will be analysed, and the outcome will determine the suitable instrumentation setup for different repertoires and arrangements.

# **1.3 Importance of Research**

The performance tradition of gamelan *Melayu* has been passed on since 1800s from the first performance of gamelan in Malaysia. Since then, the popularity of the gamelan *Melayu* has spread, both in performance and also academic. The setup of the instruments in gamelan *Melayu* is based on the first gamelan *Melayu* and has been passed on until today. Although there are many sets of gamelan in Malaysia, the institutions and individuals to whom the sets belong do not understand the significance of the setup of the instruments in gamelan *Melayu*. This research intends to stir up the interest on the orchestration of the instruments in gamelan *Melayu* in order to produce the optimum sound. Therefore, a study and proper analysis on the instrumentation of the current gamelan *Melayu* is very crucial in improving the sound and arrangement; proper

instrumentation creates a balance sound, which then provides a wider scope for more creative arrangements, and indirectly promotes the gamelan *Melayu* to another level.

Despite the efforts to improve the instrumentation set-up in gamelan *Melayu*, there has been no proper written works to explain with solid reasons about the changes that are happening. Therefore, this research is an attempt of scientific investigation to find out results using scientific methods, as well as explaining it with theories. All the pictures and the transcriptions, as well as arrangement of the gamelan repertoires are original efforts done by our research team comprising my supervisor and I.

A set of gamelan is a significant, if not hefty, financial investment and if purchased without prior understanding and knowledge, it will be a waste of resources. Thus this research also provide guidelines for future gamelan enthusiasts who would like to understand more about the gamelan *Melayu* before purchasing the gamelan in the near future. Thus, this research could enlighten them on the different registers and functions of the instruments in the gamelan *Melayu* ensemble which has been a part of Malaysia's tradition and treasure for about two centuries. This research also attempts to serve as a reference for gamelan activists, and promote awareness among readers to explore more in-depth into gamelan instruments.

## **1.4 Outline of Research**

This research is designated into two halves. The first part, which consists of chapter 1 and chapter 2, forms the foundation of the research. Chapter 1 starts with a brief

introduction of gamelan *Melayu* and the current instrumentation setup. The importance of the study is determined, followed by the limitations encountered in this research. Research objectives and research questions, followed by the general explanation of the research methodology were also stated in this chapter.

Chapter 2 presents the literature review of this research. This chapter covers the literatures on the history and development of the instrumentation setup in gamelan *Melayu*, and ends with the western theory of orchestration, which will be applied into the gamelan setup in chapter 4.

The second part of this research consists of the remaining chapters, which are chapters 3, 4 and 5 of this dissertation. Chapter 3 addresses the implementation of the research methodology used for this research. There is a detailed explanation on how the research methodologies are carried out during this research and how the researcher carried out each research methodology to contribute to the data collection during the research.

The results obtained from the methodologies are displayed in chapter 4, which are used as the basis for the analysis of three different samples of instrumentation setup. It is followed by the discussion and arguments on how each setup contributes to a different sound projection. Chapter 5 is a summary of the entire research. This chapter concludes the results and implication of the study, addressed the limitations of the study, as well as providing suggestions for future researches.

## **1.5 Research Methodology**

The research methodology that has been proposed for this dissertation is qualitative research. This methodology of research has been chosen as most of the data collection will come from interviews, observations, and background reading from previous sources pertaining to Gamelan *Melayu*. Qualitative research consists of two main methods – the primary and the secondary method, which will be explained below. The implementation of this proposed research methodology is explained in detail in chapter 3.

# 1.5.1 Primary Method

The primary method relies on obtaining first-hand information relating to the research. To collect data utilizing the primary method, the researcher will be using interviews, observations and video recordings. This will entail interviewing prominent figures well versed in the field of Gamelan *Melayu* in Malaysia. The researcher will also be visiting different organisations and associations to observe the setup of the instruments and also interview various gamelan *Melayu* composers regarding their statements on the issue of the setup of the instruments.

### **1.5.2 Secondary Method**

The secondary method, unlike the primary method which uses information obtained first-hand, involves data collection via secondary sources. This method is useful during the initial research process where books, journals, articles, conference papers, published dissertations, validated websites and video recordings serve to reaffirm and support the viability of the research topic of this investigation.

As the primary method for data collection involves a great deal of time and effort, not to mention resources needed for travel to several different states to meet with the interviewees, the secondary method is more accessible to the researcher as the resources are easily obtained from the university library, such as books, publications, and video recordings. Additionally, the Internet will be used to obtain information that may not be available in other sources. This will allow the researcher to ascertain that there is enough evidence and data to make the primary method of qualitative research worthwhile.

## **CHAPTER 2**

#### LITERATURE REVIEW

#### 2.0 Introduction

The set-up of the instruments in the gamelan *Melayu* has been passed on for about 200 years without much change to its arrangement. With a lack research in exploring the significance of the gamelan ensemble, the possibilities for new music compositions and arrangements are limited to the instruments that are part of the ensemble. This chapter presents the literature sources on the western theory of orchestration and the relevance and application of this theory into the gamelan *Melayu* set-up. It also covers the developments in the setup of the instruments of the gamelan in other places and how these developments could be applied to the gamelan *Melayu*.

## 2.1 History and origins of gamelan Melayu

Gamelan (Terengganu) was brought to the state of Pahang from the court of Riau Lingga during the ruling of Sultan Ahmad Muadzam Shah. It was first performed in Pekan, Pahang, as an accompaniment to the *Joget* Gamelan, a type of traditional dance, in 1811 on the occasion of the marriage of Tengku Hussain, the son of Sultan Abdul Rahman of Lingga, to Wan Esah, the sister of Bendahara Ali of Pahang. Gamelan dance and music flourished in Pahang during the 19<sup>th</sup> century, but after the death of Sultan Ahmad Muadzam Shah in 1914, it declined in popularity because of lack of patronage. It was fortunate that the daughter of the late Sultan, Tengku Ampuan Mariam, who was

an accomplished dancer and musician of the *Joget* Gamelan, transferred it to the court of Terengganu after she married Tengku Sulaiman, later known as Sultan Sulaiman Badrul Alam Syah, the second son of Tengku Zainal Abidin of that state in 1913. Thereafter, it was known as Gamelan Terengganu, and today, it is under the patronage of the Terengganu State government (Mohamed Ghouse Nasuruddin, 2001).

Gamelan Terengganu is considered part of a court tradition even though throughout its existence in Peninsular Malaysia and its origin in Riau Lingga, it has been expanding in the palace courts. According to its history in the book "*Joget* Pahang - Gamelan *Melayu*", the gamelan *Melayu* is said to have originated in the palace of the Kingdom of Srivijaya<sup>1</sup> between the 7<sup>th</sup> and 13<sup>th</sup> century AD and later flourished in the royal court of the Riau Sultanate. It eventually found its way to the Pahang royal court in the 19<sup>th</sup> century (Ahmad Farid Abd. Jalal, 2008, pg. 84).

Gamelan Terengganu is classified as Malay tradition or gamelan *Melayu*. As this particular art of gamelan is not brought directly from Java, it is therefore not considered Javanese gamelan. It is the gamelan *Melayu* that was previously developed in the courts of Srivijaya (Harun Mat Piah, Siti Zainon Ismail, 1986, pg. 11-13).

The gamelan *Melayu* is one of the oldest musical ensembles found in the royal courts of the Malay Peninsula (Ahmad Farid Abd. Jalal, 2008, pg. 84). The oldest gamelan in Malaysia, over 200 years of age, is the first set of royal gamelan of the court of

<sup>&</sup>lt;sup>1</sup> Also spelled as Sriwijaya.

Terengganu, and is currently displayed at the History and Malay Sultanate of Pahang gallery of the Sultan Abu Bakar Museum in Pekan, Pahang.

Today, the instruments of the gamelan *Melayu* from Istana Terengganu are kept inside the Tokoh Museum in Kuantan, Pahang. According to Ahmad Omar Haji Ibrahim (2005, pg. 163), these instruments symbolize the tradition of the Riau-Lingga Palace, Pahang, and Terengganu, and are used as the basis for the gamelan *Melayu* ensembles that exists today.

## 2.2 Development of gamelan Melayu

The first set of gamelan was brought to the state of Pahang from Indonesia. When it arrived, the gamelan music was adapted to the Malay style from the ensemble, repertoire and the selection of instruments. Although the gamelan instruments originate from Indonesia, it became known as gamelan *Melayu* in Malaysia. The repertoires for the gamelan *Melayu* are all composed for dance, instrumental and singing. Furthermore, the instrumentation setups of the gamelan *Melayu* are also the same setup for different performance, whereas in Indonesia, the ensembles have already been developed into different setups for different functions.

After being adapted to the Malay style, the gamelan *Melayu* developed a distinct identity that puts it apart compared to the Javanese, Balinese and Sundanese gamelan from Indonesia. (Ahmad Farid Abd. Jalal, 2008, p.34). The music of gamelan is most closely associated with Indonesia and Malaysia, and within the genre, many types may

be heard. The gamelan *Melayu* is specific to the culture and the characteristics of the Malays in the Malayan peninsula, producing a cadence and sound, which are quite distinct from those of Java and Bali (Ahmad Farid Abd. Jalal, 2008, p.34-35).

Mubin Sheppard (1983) stated that although most of the instruments were of Indonesian design, the music and the dance movements were classified as Malay by an Indonesian musical specialist in 1967. This is supported by Ahmad Omar Haji Ibrahim (1973) who stated that the gamelan tradition in *Tanah Melayu* (then Malaysia) begun around the 1800s and early 1900s. It grew to having its own unique characteristics and expanding its variety of gamelan music repertoire through *Joget* gamelan. Singing and playing gamelan music as an instrumental music for entertainment became part of tradition in the palace courts (Ahmad Omar Haji Ibrahim, 1973). Matusky (2008) too acknowledged that the accurate style of gamelan *Melayu* is based on the tradition from the 19<sup>th</sup> century to mid-20<sup>th</sup> century.

Arguably, according to Ahmad Farid Abd. Jalal (2008), the most developed form of gamelan in the Malay peninsular is to be found in the Pahang Sultanate. The effort to revive the gamelan *Melayu*, with the support of the Royal Court of Pahang, its patron since the 1800s, is an admirable mission.

In 1970, the music of the gamelan evolved to incorporate influences from Pahang, Terengganu and Riau-Lingga. Thus, as an art form, the *Joget* Pahang or the gamelan Pahang is unique, not just in terms of its instruments but also in its musical arrangement with cultural influences spanning three states (Ahmad Farid Jalal, 2008, p. 48).

Since the 1980s, there has been renewed public interest in the gamelan *Melayu*. Ariff Ahmad (1997) of University Malaya continues the effort to revive the interest in gamelan *Melayu* music, with many new pieces being written out for the ensemble, and gamelan performances has being expanded from accompaniment for *Joget* gamelan to various occasions. Besides University of Malaya, various other local institutions of higher learning also joined in the revival of gamelan.

The gamelan *Melayu* flourished as a living art form, entertaining both the royal families and communities, not only because of its captivating music, but also through the creation of dance teams within the palace itself. According to Ahmad Farid Abd. Jalal (2008, p.22-23), the magnetism of the dance and the sophistication of the music even enthralled the famous British scholar-administrator, Frank Swettenham, and a host of other colonial officers. One of the officers was the renowned expert on Malay culture, Mubin Sheppard, who discovered the gamelan set that was kept at Istana Kolam Terengganu and initiated the revival of gamelan in 1966. Since then, the *Joget* gamelan was eventually taken out of the court and performed in public at the International Conference of the Traditional Drama and Music of Southeast Asia at University of Malaya, Kuala Lumpur in 1969 (Shahanum Mohd. Shah, 2009). Through these performances, we have a corpus of invaluable data on the gamelan Pahang, which is a priceless resource even today. Today, new pieces are composed not only to accompany dance, dance drama and theatre, but also for the gamelan instrumental repertoires. The gamelan is performed for ceremonies, the entertainment of the masses and being concertised (Shahanum Mohd. Shah, 2009). Instead of being associated with dance, gamelan *Melayu* is starting to emerge as an independent instrumental performance. The gamelan performances of today tend to focus on the music and are rarely performed as an accompaniment (Ahmad Farid Abd. Jalal, 2008, pg. 48).

In recent years, several Malaysian composers began writing for gamelan ensembles or music that used some gamelan instruments. New ideas and concepts arose, and the gamelan was taken away from its traditional usage by some composers (Shahanum Mohd. Shah, 2009). According to Shahanum Mohd. Shah (2009), various techniques have been applied to create a more diversified and unique sound of the gamelan. In addition to adding instruments, the use of different sounds and effects can be created by using different playing techniques. Composers tend to change the technique of playing gamelan instruments through manipulation of speed, creation of harmony, or to produce a particular sound. Composers such as Abdul Khalil, Hanafie Imam, Nasir Hashim, Sunetra Fernando, Pak Ngah, Akmal and many others have been using their own methods and style in order to improve gamelan *Melayu*.

In present day gamelan ensembles, a few groups favor an expanded version of the gamelan ensemble. This is done by doubling for certain instruments and including instruments that are not part of the basic original set. For example, in the traditional gamelan layout, one *saron* and the *bonang baron* each would suffice to play traditional

repertoire. Now, a typical set-up might include two *saron baron* and two *saron peking* for each to play different parts (Shahanum Mohd. Shah, 2009). There have also been attempts to restructure the instrumentation setup in gamelan but those are mainly based on the different arrangements or playing techniques by each composer. However, there is no solid research or analysis to prove how different instrumentation can produce varying sound to balance the gamelan.

Today, the gamelan *Melayu* has found a permanent place in the cultural tapestry of multi-ethnic Malaysia. As described in by Ahmad Farid Abd. Jalal (2008) in the preface of his book, "The gamelan *Melayu* is here to stay. And with continued efforts to promote it, such as with this book, it will continue to thrive.

#### 2.3 Gamelan as an orchestra

Gamelan is a type of orchestra, which originates from Indonesia (Kuswanto et al, 2012). The word "gamelan" originates from the Javanese word "gamel" which means to hit or to hammer. This is further explained by Lindsay in her book "Javanese Gamelan", stating that gamelan gets its name from the Javanese word 'gamel', which means a type of hammer, like a blacksmith's hammer. The name 'gamelan' refers to the method of playing the instruments – by striking them – as they are almost entirely percussion (Lindsay, 1979).

Tenzer (2011), similarly, also viewed the word "gamelan" as orchestra, or the music played by the orchestra. This is in correspondence to the Western sense, of which that

word gives an image of a group of people making music together. To be precise, "gamelan" refers to the instruments themselves, which exist as an inseparable set, and not to a group of individuals who gather to play upon them. In other words, gamelan instruments exist as a group, any lack of instruments from the ensemble, and it will not be considered a gamelan ensemble. In a similar way, a *kenong* ensemble is not a gamelan ensemble (Tenzer, 2011, p.13).

The researcher agrees with Tenzer's interpretation and views the gamelan *Melayu* as an orchestra. Although all the instruments in the gamelan *Melayu* are percussive and hammered, there is a variety of techniques, timbre, and layers of music in the gamelan *Melayu*. Gamelan is not only a combination of rhythm; it is also a combination of timbre and technique. However, the instrumentation in gamelan *Melayu* does not adhere to the principles of the western orchestration theory which makes it unique.

In his book "*Joget* Pahang~Gamelan *Melayu*: The Classical Ensemble of the Pahang Royal Court", Ahmad Farid Abd. Jalal (2008) stated that in Malaysia, the gamelan is strictly referred to as an ensemble that consists of instruments that are only struck or hammered. Nik Mustapha Nik Mohd Salleh, an ethnomusicologist, specified that gamelan *Melayu* is a generic name used to refer the Malaysian gamelan ensemble connected to *Joget* gamelan, a dance initiated in the nineteenth-century court of Pahang. In contemporary practice, its pentatonic scale has been so altered that the ensemble, with its combination of only seven instruments, has become a unique tradition of its own (Nik Mustapha, 1999).

Although a wide variety of gamelan styles and ensembles are found in different parts of the Malay world, they all share the same theoretical concepts, instruments and techniques. Although the gamelan ensembles in Indonesia has a larger number of instruments and a more complicated rhythm in their repertoires compared to the gamelan *Melayu*, they share the same concept of the cycle and layers of music, the same type of instruments within the ensembles, and the hammering technique used to execute sound from the instruments (Ahmad Farid Abd.Jalal, 2008, pg. 22-23).

Ahmad Farid Abd. Jalal (2008) mentioned different types of gamelan styles and ensembles. The larger ensembles have already existed in Indonesia. The setup is not limited to one setup, but different setups based on the different needs of the performance, such as instrumental, *wayang kulit* or singing. However, it is a different scenario in Malaysia. Even then, there has been no proper analysis on the setup of the gamelan instruments in Malaysia. Most of the gamelan groups have been using the same instrumentation setup for instrumental, dance and singing. Even the arrangement of the repertoire is the same for all the performance.

The performance of the gamelan depends on the instruments used. The components of the gamelan come in many combinations and sizes (Tenzer, 2011, pg. 13). This ensures that each set of instruments has its own characteristic sound and tonal personality (Tenzer, 2011, pg. 31). The set of instruments in this case refers to each section of instruments in gamelan, for example, the set of *saron*, which consists of *saron peking*, *saron baron* and *saron demung*. When conducting this research, the researcher discovered that the different combinations and sizes and range of the instruments in
gamelan produce a different tonality, timbre and register. Figure 2.1 shows the range and register for the *saron* instruments as on the keyboard.



Figure 2.1 Range and registers of saron family on an 88-key piano keyboard

Gale (2001, pg. 194-199) stated that good balance is not going to be achieved if every section has the same number of players, agrees this. This statement, again, strongly supports the necessity to revise the instrumentation in terms of numbers in gamelan *Melayu*.

Many scholars discussed about the different keys and tunings of the gamelan. However, there is no mention of the significance and theory behind the current instrumentation in gamelan *Melayu*, apart from the fact that it is based on the setup of the first set of gamelan that arrived in Pahang. The possibility of the different production of sounds through the alteration of the number of the instruments in the gamelan is broad. There is also an opportunity to expand the gamelan *Melayu* arena which will be discussed in chapter 4.

#### 2.4 Instruments of gamelan Melayu

Most of the instruments in gamelan Terengganu are classified as idiophones; instruments that produce sound by vibrating as a whole without strings or membranes. Gamelan instruments are made from bronze in the shape of plates as well as metallophones – tuned metal bars struck with a mallet to produce sound, which are similar to a xylophone. There is, however, a membranophone; an instrument that produces sounds via a vibrating membrane, known as the *gendang*.

The instruments of the first gamelan in the palace courts of Terengganu are used as the basis for the gamelan ensembles today. The gamelan *Melayu* ensemble usually comprises seven different musical instruments, namely, the *gong*, *gambang*, *saron peking*, *saron baron*, *gendang*, *kenong* and *bonang*. Ahmad Farid Abd. Jalal (2008), in his book "Joget Pahang ~ Gamelan *Melayu*" described the combination of these instruments as "creating harmonies of gamelan *Melayu*, an orchestral of mystical melodies which when accompanied by the elegant movements of the dance, epitomises Malay artistry" (Ahmad Farid Abd. Jalal, 2008, pg. 34-35).

The basic instruments used in royal palaces are thought to have comprised of the following basic instruments: *saron baron, saron peking, gambang, kenong, bonang, gendang, and gong agung* and *gong suwukan* (Matusky, 2008). Other instruments such as the *demung* were thought to have existed but they were never used and most probably lost. New instruments were added to the ensemble as a collective effort by musicians of the National Cultural Complex to experiment with other instruments namely *kempul, slentem* and *bonang penerus* (Shahanum Mohd. Shah, 2009).

The following is the description of each instrument that is found in the current gamelan *Melayu*:

# 

# 2.4.1 Saron peking

Figure 2.2 Saron peking taken at University of Malaya gamelan ensemble

This instrument is the smallest in size and of the highest register in the gamelan *Melayu*. Its function is the doubling of the main melodic theme played by the *saron baron*, i.e. one note is played on the beat, while the other anticipates it or is played after the beat. Based on the piano keyboard, *saron peking* ranges from **B5** to **B6**.

#### 2.4.2 Saron baron



Figure 2.3 Saron baron taken at University of Malaya gamelan ensemble

This is a metal xylophone consisting of six pieces of rectangular graduated keys resting on a thin cord lining the edges of a rectangular wooden resonator. The keys are loosely secured with thin metal pins, nailed at both edges of the resonator, and are separated from each other by a narrow gap to allow for unimpaired sound. The higher-pitched keys are smaller and thicker than the lower-pitched ones. *Saron baron* plays the main melodic theme, striking each note per beat, and ranges an octave lower, from **B4 to B5**, compared to *saron peking*.

# 2.4.3 Saron demung



Figure 2.4 Saron demung taken at University of Malaya gamelan ensemble

This is the biggest of the three *sarons* and it has the lowest register, **B3** to **B4**. It duplicates the main theme played by *saron baron*.

# 2.4.4 Gambang kayu



Figure 2.5 Gambang kayu taken at University of Malaya gamelan ensemble

This instrument is three to four octaves long, consisting of graduated wooden keys laid on a trough-like structure. Played with a pair of knobbed sticks, it functions as an elaborating instrument, ornamenting the main theme of the *saron baron* at double the speed and striking two notes an octave apart simultaneously or alternately. Both the *gambang kayu* and the *bonang* function as the main melodic instruments, for each introduces the main theme before the entrance of the rest of the ensemble. *Gambang kayu* covers three octaves, from **B3** to **A5**.

#### 2.4.5 Bonang (penerus and baron)



Figure 2.6 Bonang penerus and bonang baron taken at University of Malaya gamelan ensemble

This instrument has 10 knobbed gongs of different pitches, each suspended over a square compartment by two cords running the length of its rectangular frame. These gongs are divided into two rows with the lower register gongs closer to the player. The higher register gongs ascend from right to left, while the lower ones ascend the other way round. The *bonang* is played with a pair of padded wooden drumsticks. Like the *gambang kayu*, the *bonang* elaborates the main melodic theme and is played in octaves, either striking the notes simultaneously or alternately. The first note is played on the up beat and the second note on the downbeat, or vice versa. Either the *bonang* or the *gambang* can introduce the melodic theme. There are two types of *bonang*, namely *bonang penerus* and *bonang baron. Bonang penerus* is of a higher register, covering **B4** to **A5**, whereas *bonang baron* is of a lower register, covering **B3** to **A4**.

# 2.4.6 Kenong



Figure 2.7 Kenong taken at University of Malaya gamelan ensemble

*Kenong* consists of three knobbed gongs of different sizes and pitches, which are laid over two wooden resonators – one holding two gongs and the other one gong, with each resting over a note hole on top of its respective resonator. The *kenong* divides the melody into sections based on tempo, which mark every one or two bars. *Kenong* ranges from **B3** to **A4**.

# 2.4.7 Slentem



Figure 2.8 *Slentem* taken at University of Malaya gamelan ensemble

This instrument was added to the later gamelan *Melayu* ensemble (Shahanum Mohd. Shah, 2009). The shape of this instrument is similar to that of the *saron*, but larger in size, and played with a different mallet. This instrument covers the range from **B2** to **B3**.

# 2.4.8 Gong (kempul, suwukan and agung)



Figure 2.9 Gong kempul and suwukan taken at University of Malaya gamelan ensemble

The *gongs* initially consists of a pair of gongs made up of the higher-pitched *gong suwukan* and a lower-pitched *gong agung. Gong agung* marks the final beat of the gongan cycle (the time span between the gong agung strikes) while *gong suwukan* heralds it one bar earlier. However, a full range of smaller *gongs*, namely *gong kempul*, is normally added to the present gamelan *Melayu* (Shahanum Mohd. Shah, 2009).

# 2.4.9 Gendang



Figure 2.10 Gendang taken at University of Malaya gamelan ensemble

This is a barrel-shaped drum, which provides the rhythmic patterns, and acts as the "conductor" during a gamelan *Melayu* ensemble performance.



Figure 2.11 Position of the instruments on an 88-key piano keyboard

Figure 2.11 illustrates the position of each gamelan instrument on an 88-key piano keyboard. This is obtained by comparing the frequencies (**Hz**) of the pitches in gamelan instrument with the frequencies of the piano keys (**Hz**).

#### 2.5 Western theory of instrumentation in orchestration

In the western ensembles, the instruments playing the main melody or the smaller instruments are mostly, if not always, the highest in number during a performance. The the string section in an orchestra for example. In a full orchestra, the number of violins 1, violins 2, violas, cellos and double basses are sixteen, fourteen, twelve, ten and eight respectively. In a smaller orchestra, the number of each instrument from violin 1 to double bass is eight, six, four, three, and two (Rimsky-Korsakov, 1950, pages 6-7).

The following table illustrates the number of players required in present day orchestras, either in the theatre or concert-room.

	Full orchestra	Medium	Small		
		orchestra	orchestra		
Violins 1	16	12	8		
Violins 2	14	10	6		
Violas	12	8	4		
Cello	10	6	3		
Double basses	8-10	4-6	2-3		

 Table 2.1 The number of players required in present day orchestras (Rimsky-Korsakov)

Violins are the smallest instrument in the string family, and they are the most in number compared to the other, whether in a large orchestra or a small orchestra. The reason is that they play the main melody, so a higher number is need so that they can be heard clearly when performed together. Figure 2.12 explains this further in detail.



Figure 2.12 Bar graphs showing the number of string instruments in an orchestra

Figure 2.12 shows clearly the descending amount of number according to the instrument. The smallest, which is the violin, is the highest in number, and the biggest, which is the double bass, is the smallest in number. The reason for this is that first violins very often play the main melody whereas the instruments have fewer numbers due to the loudness of the sound they produce or that they are part of the accompaniment. Similarly, in gamelan *Melayu*, the instruments are of the same family and almost all have the same timbre, differing only in the size, registers and the style of playing. Therefore, each instrument has some differences in amplitude. If each instrument is the same in number, the instruments with lower amplitudes playing the main melody will easily be drowned amidst the other louder instruments.

The art of orchestration today is sophisticated and intricate. It is also highly subjective, depending greatly on the taste and even the partiality of the composer or orchestrator (Samuel Adler, 2002, pg. 4-6). Not only has the size of orchestra increased over the time, but also its use has grown more sophisticated. When it does not matter what instrument plays a certain part, the composer relinquishes responsibility for the orchestration; and, at least form today's perspective, he or she is not much concerned with timbral problems.

In the same manner, the musical landscape in gamelan has gone, and is going through rapid changes due to modernisation and globalisation. The changes seen in the musical style, repertoire content, playing techniques and attitudes toward the gamelan can be related to changes in the Malaysian culture or society, as well as to changes in the ideas held by people and the meanings the assign to their culture. As a result of these changes, traditional modes of culture expression are being restructured and this transition is helping to create a climate for rediscovering Malaysian culture. Societies are shaping their past to fit the present needs and this includes the change in musical practices and sound system and conception of the instrument has affected the very nature and guise of composers. Its social and musical contexts are changing while the gamelan sound stays the same (Shahanum Mohd. Shah, 2009).

The art of orchestration is highly personal. The orchestral sound of Wagner, for instance, is vastly different from that of Brahms, even though these two composers lived at the same period. In this regard, orchestration is similar to harmony, melody or any other parameter of music. It is therefore imperative that one acquires the basic skills of the art in order to make it personal at a later time. Mastering the technique of orchestration leads one to a deeper understanding of the sensitivity with which the great masters of composition have handled the symphony orchestra and how each made this remarkable instrument serve his or her musical ideas in the clearest and most vivid ways (Lovelock, 1968, pg. 123).

This is similar in the case of the orchestration of gamelan. As performing arts is a subjective matter, the presentation rests on the preference and interpretation of each individual. The selection of instruments and manipulating the style of playing are some of the ways to influence the effect of music (Lovelock, 1968). Thus, this option is available in developing a new basis for the orchestration of gamelan *Melayu*. Whether or not the orchestration is recognised and accepted, it is a personal choice, especially for different arrangers and composers.

In his book, "The Elements of Orchestral Arrangement", Lovelock (1968) addresses two questions in reducing the instruments for a smaller orchestra; what instruments must be kept in and what instruments can be reduced. He suggested that instruments that play every essential (melody) and fundamental harmonic basis should be maintained and the instruments that can be reduced are unessential doublings or thickenings of the texture (William Lovelock, 1968, pg. 123). This addresses the main concerns in orchestrating a performance for a reduced ensemble – instruments that must be kept in and instruments that can be left out.

When the above statement is applied in gamelan, it implies that unessential doublings of the instrument can be left out when reducing the gamelan ensemble for a smaller performance. Correspondingly, in a bigger ensemble, certain instruments needed to be increased proportionately in order to create a balance sound during performance. People would balk and relate the changes in the setup of gamelan as jeopardizing the authenticity of the ensemble. However, modifying the setup does not jeopardise the gamelan *Melayu* as it is highly subjective depending on the individual's preference and composer.

#### 2.6 Physics of sound

### 2.6.1 Amplitude and frequency

Sound is produced when something vibrates. The vibrating body causes the medium (water, air, etc.) around it to vibrate. Vibrations in air are called traveling longitudinal waves, which we can hear – sound. Therefore, we can

relate the properties of sound to the properties of a wave.

The basic properties of sound are: pitch (frequency), loudness (amplitude) and tone. The frequency of a sound wave is what your ear understands as a pitch. A higher frequency sound has a higher pitch, and a lower frequency sound has a lower pitch. In this case, the *saron peking* has a higher frequency, thus it has a higher pitch, whereas the *saron demung* has a lower frequency, hence it has a lower pitch.

The amplitude a sound wave determines its volume. In other words, it determines how loud a sound will be. Larger amplitude means a louder sound, and vice versa.

The following table provides a summary of the terminology for sound.

Frequency How fast something vibrates			→ S How	<u>Pitch</u> How high or low we perceive it				
	Amplitude How much something	<i>→</i>	Intensity How much the medium	÷	Loudness How loud we perceive			
	vibrates		is displaced		it			

#### Table 2.2 Summary of terminology of sound

# 2.6.2 Measurement of sound

The decibel (dB) is a logarithmic unit used to measure the intensity of sound (amplitude). It is used to express the ratio of two values of a physical quantity,

often power or intensity. One of these values is often a standard reference value, in which case the decibel is used to express the level of the other value relative to this reference. The decibel (dB) is used to measure sound level to approximate the human ear's response to sound. Sound is usually measured with microphones and they respond (approximately) proportionally to the sound pressure. As mentioned earlier, decibel is a ratio. Therefore, when it is used to give the sound level for a single sound rather than a ratio, a reference level must be chosen. In this research, the reference level is 0 dB. A more detailed and through explanation of the measurement is included in chapter three.

#### 2.7 Conclusion

As stated by three lecturers from Gadjah Mada University, although being true to tradition is important, it is also important to respond to the needs of the time and can give increasing attention to the study of science and practical knowledge (Surjodiningrat et al, 1972, pg. 1-2). We need to have the skill and sensitivity to show what is relevant and significant in our tradition. As Shahanum Mohd. Shah (2009) stated, the gamelan sound stays the same although its social and musical contexts are changing.

With the limited literature on research and studies concerning the gamelan, it is clear that a study is needed to be conducted with proper analysis of the instrumentation in order to delve deeper into the art of the gamelan *Melayu*, and at the same time come up with a proper technique to improve the current setup. This will create a new paradigm shift in the instrumentation setup of the gamelan which will cater for more creative and different arrangements and compositions in gamelan *Melayu*. As a result, the changes could produce a greater development in arrangements and compositions, and also new ideas for a new generation. Overall, this chapter has highlighted the important details

mainly on: a) the roles and functions of the instruments in the gamelan *Melayu* ensemble, b) the theory of western orchestration, and c) the importance of balance in music.

#### CHAPTER 3

#### **IMPLEMENTATION OF RESEARCH METHODOLOGY**

#### **3.0 Introduction**

This chapter explains in detail on how the research methodology proposed in Chapter 1 is implemented in this research in order to obtain the data. This research is a qualitative research whereby the study will be split into two parts. The data and information collection for this research are obtained using both primary and secondary methods, which will be discussed further in this chapter. The data collected is then analysed and discussed in detail in the next chapter.

#### 3.1 Primary method

Primary method relies on obtaining first-hand information relating to the research. The data collected through this method is more authentic, reliable and objective because it is from first-hand experience and has yet to be published. This includes interviews with informants, observations at designated institutions to obtain the data for the research, surveys and ethnographic research.

To collect data utilising the primary method, the researcher used interviews, observations and video recordings. This entailed interviewing prominent figures well versed in the field of gamelan *Melayu* in Malaysia. The researcher has also visited different organisations and associations to observe the setup of the instruments and also interview various gamelan *Melayu* composers regarding their statements on the issue of

the setup of the instruments.

As mentioned, the primary methods used in this research are interviews, observations, video recording, transcription of gamelan repertoires, and measurement of amplitudes for each gamelan instrument which are explained in detail as follows:

#### 3.1.1 Interview

Gamelan teachers, practitioners and composers were interviewed in order to obtain information and also their opinions regarding the instrumentation of the instruments in gamelan *Melayu*. The interviews provided in-depth information as the interviewees are knowledgeable and experienced in the subject of gamelan *Melayu*.

One of the gamelan teachers interviewed was Mr. Saha. He teaches gamelan in Sultan Zainal Abidin University (UniSZA) in Kuala Terengganu and has led the university's gamelan group during their participation in the world gamelan festival in Terengganu for five consecutive years. Throughout his participation in the world gamelan festival, Mr Saha has witnessed the development of gamelan ensembles from other countries such as Japan, Europe, America, and not to mention, a few groups from Indonesia.

According to Mr. Saha, these groups have restructured their setup of instrumentation, and as a result, they manage to produce more new repertoires

and create a better-balanced sound. With a new instrumentation setup, the composers have managed to sort out three dimensions in quality of sound - the melody, counter-melody and chord in gamelan, which differs from the previous arrangement where all the instruments focus on the melody. There are enough instruments to cater for each category. For example, they have enough numbers of *saron peking* to play the melody so that *saron baron* can play the counter-melody and *saron demung* can play the chord, or according to the arranger's preference.

Another supporter of a more diverse gamelan is Mr. Akmal. He is a composer and gamelan teacher at the University of Malaya who has observed many gamelan *Melayu* performances throughout his career. He stated that there should be a research conducted regarding the instrumentation setup of gamelan *Melayu* because the current setup is limiting the creativity of the composition. Professor Shahanum Mohd. Shah from Universiti Teknologi Mara (UiTM) also agrees that the setup of gamelan *Melayu* can be improved in order to cater for more creativity in arrangements and compositions.

Mr. Abdul Khalil is a gamelan lecturer from the Akademi Seni Budaya Dan Warisan Kebangsaan (ASWARA). He is the first Malaysian to transcribe traditional gamelan songs like '*Lambang Sari*' and '*Togok*' that were played in the Terengganu palace into notes which helped preserved the songs that has been a part of Malaysia's culture and tradition. Mr. Abdul Khalil agreed that there should be changes to the gamelan set-up to develop the traditional Malay

orchestra. He has planned to create a bigger gamelan ensemble for future performances. Although he is not a composer and plays only the traditional repertoires, he is open to testing out a new side of instrumentation setup. He agrees with the new setup to achieve a better sound, and creating a bigger ensemble can provide a better opportunity for many composers to compose new arrangements for the traditional repertoire.

Mr. Abdul Khalil had collaborated with (Pak Ngah) in a number of events where they combined multiple gamelan groups in order to come up with a bigger sound. In contrast, (Pak Nik), who is also from ASWARA, does not share the same vision in the instrumentation setup. He mentioned that the instrumentation does not affect the dance. In his opinion, the gongan cycle is the most important matter in accompanying the dance. As long as the playing style maintains within the gongan cycle, there is no problem in accompanying the dancers. These two contrasting opinions often take place between two musicians with different aims. From the interview, it is obvious that Pak Nik does not look at the gamelan as the whole, as his main focus is on dance. To him, arrangements of the melody and counter melody in gamelan do not affect the accompaniment for the dance, because the main issue is the gong cycle. Although Pak Nik did not share the same enthusiasm in modifying the instrumentation setup, this does not imply that he disagree with Mr Abdul Khalil. He would also be glad to see development in the gamelan; it is as simple as that the current instrumentation setup is good enough for his main concern, which is the accompaniment for dancers.

The attempts to improve the gamelan set started as early as the year 1990 in order to cater for more creative compositions. Then, Pak Ngah, together with other gamelan composers, such as Dr. Nasir and Mr. Abdul Khalil collaborated to form a gamelan ensemble that comprised of a combination of three gamelan groups from UM, KBN and UKM to participate in the Asian Folklore Festival 1990 held at Stadium Negara to represent Malaysia. They came up with a new composition<sup>2</sup>, which included an addition of *serunai* from *wayang kulit* into the performance. This new composition not only requires a bigger ensemble, it also contains a new element, which is the *serunai*, in the arrangement. The response from the audience was overwhelming. This is an achievement that brought the gamelan Melayu into a new direction. From that moment on UM started moving towards a new paradigm shift in gamelan, which led them to perform at the Asian University Folk Arts Festival (AUFAF) later in 1991. With five new repertoires composed by Dr Nasir from UM, not only is the instrumentation setup bigger, it also expanded into other forms of music such as *silat* and *wayang* kulit. Initiated by Dr Nasir, this development was then continued later by Sunetra Fernandez, and then Akmal, who is the current tutor of the UM gamelan.

The approach towards creating a bigger ensemble the combination of a few ensembles could be developed faster if people can understand the concept of a 'standard' key in gamelan. Throughout this research, it is discovered that there are several different 'keys' of gamelan in Malaysia, namely **C**, **B** flat, **E**, **G** and **F**. When the teachers-in-charge were interviewed as to why the gamelan is in

<sup>&</sup>lt;sup>2</sup> This song later become a popular song and won the song competition in 1995 in Muzik-Muzik on TV3.

different keys, they could not provide a definite answer. In fact, some of them did not even realise that the gamelan is played in different keys. The differences in keys caused limitations in the collaboration of gamelan groups, as different keys cannot be combined together. This is why it is better to expand the instrumentation setup within the same key in gamelan group. With the initiative from this dissertation, the researcher hopes to increase awareness of people towards the different keys in gamelan as well, especially in the future of the gamelan *Melayu* for potential buyers. Besides considering the instrumentation setup of the gamelan, the group also needs to take into consideration the key they want to purchase, which in this case is **B flat**, as it is the standard tuning to the western orchestra.

During the interviews, a few of the composers and gamelan teachers admitted that they have already attempted to produce with different and new compositions. However, their efforts are limited due to the instrumentation setup. Although there are some differing opinions among them, in the end, their aim is to improve the gamelan sound. This research will propose a new paradigm shift in instrumentation setup based on analysis from music technology and western theory in orchestration setup, which will be discussed in detail in chapter four.

#### 3.1.2 Observation

The researcher visited several public higher education institutions in Malaysia, namely Universiti Kebangsaan Malaysia (UKM), Universiti Malaya (UM),

Universiti Teknologi MARA (UiTM), Akademi Seni Budaya Dan Warisan Kebangsaan (ASWARA), Universiti Sultan Zainal Abidin (UniSZA) and Universiti Sains Malaysia (USM) to observe the setup of each gamelan ensemble. Each institution houses its own set of gamelan *Melayu*. The researcher noted that most of the gamelan ensembles are playing the same standard gamelan repertoire with the same standard arrangements. Hence, the gamelan setups in these institutions are almost similar, with the exception of one or two different instruments. However, when the researcher interviewed the teacher-in-charge, none of them could give a solid explanation of why the gamelan is being set up in that manner.

The gamelan in UniSZA showed a more progressive development in their setup and also their repertoires. This is because the gamelan group has been exposed to the international gamelan field during their participation in the world festival and has seen the advancement made by other countries. Hence, they have modified their setup in order to cater for more new compositions and arrangement.

Similarly, UM and ASWARA also developed their instrumentation setup, and their performances are more towards creative arrangements for both old and new repertoires. As these two gamelan groups are from the music department, and they would have an inclination to write new compositions, and even new arrangements for older repertoires. The music department has also produced younger composers and creative works in gamelan. As such, they needed to improve their instrumentation setup in order to cater for this new paradigm shift towards better performances in sound quality, creativity and productivity.

Meanwhile, UKM, USM and UITM still maintained the old setup of seven basic instruments. It was discovered that they are more focused on traditional repertoire and dance. Hence, the need to develop the instrumentation setup is not their priority. Nevertheless, as what is happening in UM, UniSZA, and ASWARA, they are also developing composers from younger generations and as a result, a generation gap is happening. Although students are taught in the traditional method, they would have their own ideas and desires to develop new repertoires. Perhaps in the future, these three universities might follow suit.

# 3.1.3 Video Recording

During the conduct of interviews and observation of performances and instrumentation set-ups, video recording is needed in order to record the information obtained from both methods of data collection. Video recording involves audio and visual documentation that is vital in focusing on the content of interview as well as coordination and playing of the gamelan during performances and practice. The researcher conducted video recordings from interviews with gamelan teachers and composers, as well as observation of practice sessions, performances and instrumentation set-ups at the different institutions. The data collected is a durable and shareable record that can be repeatedly viewed and analysed in slow, fast motion, or even freeze-framed. These techniques allowed the researcher to revisit the data over a period of time in order to recall the information obtained during the interviews and observations. Furthermore, the video recordings also helped focus on details that may have been missed during fieldwork observation which would bring up new research possibilities from the data. By providing a visual recording, the researcher can also give proof to the authenticity of the data, which would increase the reliability of the information and thus, making the results from this research are more solid and reliable.

In order to analyse the quality of sound more comprehensively, the video recording was carried out in multiple places. Besides the recording studio, gamelan performances in other venues such as in the hall, classroom, the openair area and other places were recorded. With these recordings, the researcher analysed and compared the sound quality of each performance. The researcher found that when the gamelan was performed in an open-air area, the *gambang kayu* cannot be heard, and when it was performed in a hall, the *gambang kayu* is drowned by the *gongs*. When it was played in a studio, a better microphone was needed to be able to focus on the volume of a few of the instruments, especially the *gambang kayu* and *saron peking*. Although the video recording is done at a variety of places, they all showed similar results – unbalanced sound projection. The reason is because the number of instruments itself was already unbalanced, so when it was performed, it will definitely produce an unbalanced sound. Although performances in recording studios and halls can be enhanced through the use of microphones and doing sound checks, we should not solely rely on that. Sound checks should be a secondary solution to enhance the sound projection of a performance. The primary solution is to balance up the number of instruments, so that a good and balance sound could be produced before enhancing it with a good sound check.

#### **3.1.4 Measurement of frequency and amplitude.**

The instruments used for this research are obtained from the gamelan ensemble in University of Malaya (UM). Each instrument was recorded individually, with the pillers (*bilah*) being recorded separately. With the help from Mr. Simon Ho, who is an experienced sound engineer, and Mr. Akmal, an experienced gamelan player and composer, the process of measuring the frequency and the amplitude was conducted at the Cultural Centre's recording studio in the UM. The measurements of the instruments frequency are measured through a frequency detector. Mr. Simon Ho operated the frequency detector while Mr. Akmal played the instruments in order to find out the frequency for each pitch of the gamelan instrument. The frequency results were recorded down by the researcher.

The next step is to proceed on to finding the amplitude of each instrument. An extra ten gamelan players were recruited with the assistance of Mr. Akmal to participate in the measurement process. The additional players were enlisted to increase the reliability of the measurement of amplitude as the results from only a single gamelan player might not be reliable. In addition to that, the measuring process was conducted in a soundproof recording studio and measured using an instrument microphone, Shure SM57, to detect the sound from each instrument. A measuring tape was used to measure the distance between the microphone and the measured instrument in order to ascertain that the distance between the microphone and instruments are constant (12 inches). This step is to ensure that the data collected is accurate.

The amplitude of each instrument was measured using a Behringer X32 digital mixer. The digital mixer will display the audio level (amplitude) of each pitch of the instrument, and the results were then recorded in a notebook. Amplitude represents the volume of sound – the louder the sound, the higher the amplitude. For this research, the amplitude zero decibels (**dB**) is set as the maximum level.

The ten gamelan players took turns to play every instrument and the sounds produced were then measured and recorded. After taking ten readings from ten different gamelan players, the researcher calculated the average reading for each instrument by summing up the total of the ten readings and dividing it by ten (the number of players)

# **3.1.5 Transcription**

There were two transcriptions done in this research, namely the transcription of the sound of gamelan instruments onto the register of 88-key piano keyboard and transcription of gamelan repertoire notation, which are explained below:

# 3.1.5.1 Transcription of the range of gamelan instruments on the piano keyboard

Every pitch produced by the gamelan instrument, from the *saron peking* to the *gong*, is transcribed and put into the octaves on an 88-key piano keyboard. Based on the results of the frequency of each range of instruments, the researcher transcribed the range of each instrument on the piano keyboard by comparing the frequencies of the piano keys and the gamelan instruments. For example, *saron peking* has a frequency range of 916.8 – 1864.1 Hz, which is similar to the frequency range of C6 – C7 on the piano, hence it is deduced that *saron peking* ranges from C6 – C7.



Figure 3.1 Position of saron peking on an 88-key piano keyboard

The purpose of this transcription is to provide a clear illustration of the octave coverage of gamelan instruments on an 88-key piano keyboard, and to enhance the understanding of readers during the analysis in western theory based on the piano keyboard.

#### 3.1.5.2 Transcription of notation of gamelan repertoire

Repertoires of most gamelan music, be it traditional or new composition, uses the traditional *balok* notation. In order to aid listeners in understanding the orchestration and arrangement of the gamelan *Melayu*, the researcher transcribed the gamelan repertoire into the western notation using the finale software. The standard and common gamelan repertoires such as *Geliung, Topeng* and *Timang Burung* were transcribed. From the western notation, the arrangement and orchestration for each repertoire can be clearly seen. These transcriptions are also used in the analysis of the arrangement of each instrument, and to determine the importance of the instruments based on the western theory. As an example, in the transcription, it is illustrated clearly that *saron peking* plays double beats, *saron baron* plays single beats, and *sarong demung* plays alternate beats. It is deduced that *saron peking* plays an important role in the melody of gamelan repertoire. However, from the amplitude results obtained previously, it is discovered that *saron peking* has low amplitude; it could not produce a loud sound. Thus, from both the score transcription and the analysis of the amplitude, we can infer that more numbers of *saron peking* is needed in a gamelan ensemble based on its importance and sound projection.

#### 3.2 Secondary method

The secondary method, unlike the primary method which uses information obtained first-hand, involves data collection via secondary sources. Data from the secondary method is based on the findings from other researches that are relevant to this research. It involved the gathering of the results of other research through books, journals, reports, articles or the Internet. The compilation of the data obtained through this method is summarised, analysed and discussed in chapter two for the purpose of supporting the topic of this research. This method is useful during the initial research process where the secondary sources serve to reaffirm and support the viability of the research topic of this thesis. Unlike the primary method which takes a great deal of time and effort, not to mention the resources needed for travel to several different states in order to meet with the interviewees, the secondary method is more accessible to the researcher as the resources are easily obtained from the university library, such as books, publications, and video recordings. Additionally, the Internet is accessible to obtain information that may not be available in other sources. This will allow the researcher to ascertain that there is enough evidence and data to make the primary method of qualitative research worthwhile.

#### **3.2.1 Content Analysis**

At the initial stages of this study, the researcher analysed and compiled information from books and literatures in order to find out the definition of gamelan, its development, and also the orchestration of the instruments in gamelan *Melayu*. Publications pertaining to gamelan Indonesia and western orchestration techniques were also studied. This is to ensure the viability of this research and also to compile relevant information to support this research. During the compiling of information through the analysis of secondary resources, it is found out that there is little to no specific publications or literatures regarding the orchestration of gamelan *Melayu*. Due to the limitation of literature resources, the researcher turned to the Internet for more information from official and recognised websites.

#### **CHAPTER 4**

#### **RESULTS, ANALYSIS AND DISCUSSION**

#### 4.0 Introduction

This chapter is divided into two parts – the first section contains the analysis of the results obtained through the methodologies mentioned in the previous chapter whereas the second section consists of three samples of instrumentation setup and discussion of how a balanced sound can be achieved by restructuring the instrumentation set-up based on the amplitude and also the arrangement of the repertoire.

#### 4.1 Results and analysis

In the analysis of the measurement of amplitude, the researcher has divided the instruments into three categories, which are melody, counter-melody and chord. The melody category consists of *saron peking*, *saron baron*, *saron demung* and *gambang*. *Bonang penerus* and *bonang baron* fall into the counter-melody category - although these instruments do play the melody, but they are more on the improvisation parts. The chord category comprises the *slentem*, *kenong* and *gong*.

During the measurement and recording of results, zero decibels (dB) is used as a reference level, which in this is case, as the maximum level. The sound level in dB is a measure (on a logarithmic scale) of the ratio of the sound pressure or sound intensity to this reference level. The logarithm of one is zero, so zero dB corresponds to the

reference level. The lower the audio level is, the more negative the decibel value is. For example, -32 dB is softer than -15 dB, and vice versa.

The following are amplitude results for each instrument that have been obtained through the aforementioned research methodology.

#### 4.1.1 Saron peking

	1	T										
Pitch	Frequency	Amplitude (dB)										
(SPN)	(Hz)	1	2	3	4	5	6	7	8	9	10	Average
1 (Bb5)	916.8	-47	-46	-48	-47	-47	-47	-48	-47	-47	-47	-47
2(C6)	1037.3	-48	-48	-47	-47	-48	-48	-48	-47	-48	-48	-48
3(D6)	1171.2	-48	-48	-40	-48	-48	-48	-47	-48	-48	-48	-48
5(F6)	1407.0	-46	-48	-48	-47	-48	-48	-49	-48	-48	-48	-48
6(G6)	1554.6	-49	-49	-48	-49	-49	-49	-49	-49	-49	-49	-49
<i>i</i> (Bb6)	1864.1	-48	-50	-49	-49	-50	-49	-49	-49	-49	-49	-49
Average amplitude for saron peking							-48					

Table 4.1 Frequency and amplitude results of saron peking

Table 4.1 above shows the frequency (**Hz**) and the amplitude (**dB**) of the six pitches in *saron peking*. The frequency is parallel to the pitch, which means that the higher the frequency is, the higher the pitch is. Amplitude denotes the volume of the sound, which means that the higher the amplitude is, the louder the sound is, and vice versa. The ten readings of amplitude represent the ten

samples from each of the ten players. The ten readings are then summed up and divided by the number of players to obtain the average amplitude for each pitch. The overall amplitude for *saron peking* is then obtained by summing up the average amplitude for each pitch, before dividing it by the six pillers of the *saron*. The following bar graph below illustrates the results in Table 4.1.



Figure 4.1 Graph chart of the ten samples of amplitude for each piller of the saron peking

From the graph, the vertical axis represents the amplitude, whereas the other axes represent each pitch. Each group of bar charts stands for the different pitch, with each color representing each of the 10 samples. The average amplitude of each pitch is as follows, pitch 1 has amplitude of -47 dB, pitch 2, 3, and 5 has amplitude of -48 dB respectively, and pitch 6 and *i* both have the amplitude of -49 dB. It appears that, the higher the frequency of the instrument pitch, the lower the amplitude. This means that the higher pitches of the instrument have a softer
sound. *Saron peking* has overall amplitude of -48 dB, which is rather low compared with the other instruments, which will be discussed later.



Togok

Score

Figure 4.2 An excerpt of the Togok: Balok and western notation of saron peking part

Figure 4.2 shows the traditional *balok* notation of *Togok*, which is a traditional repertoire in gamelan *Melayu*. The whole performance is analysed and transcribed into the western notation to enable a clear illustration on the playing style *saron peking*. It is clearly seen from Figure 4.2 that *saron peking* plays two notes on every beat of the melody, both the downbeat and the upbeat. This shows that the instrument plays an important role in playing the melody. However, as shown in the previous table and graph, the *saron peking* has a comparatively low amplitude among the instruments, which is contradictory to its importance in playing the melody.

# 4.1.2 Saron baron

Pitch	Frequency	Amp	olitude	(dB)								
(SPN)	(Hz)	1	2	3	4	5	6	7	8	9	10	Average
1 (Bb4)	468.1	-32	-30	-30	-30	-30	-29	-30	-30	-30	-30	-30
2(C5)	520.4	-31	-30	-31	-31	-31	-30	-31	-31	-31	-31	-31
3(D5)	588.4	-32	-32	-31	-31	-32	-31	-31	-30	-31	-31	-31
5(F5)	701.4	-33	-31	-32	-33	-33	-32	-33	-33	-33	-33	-33
6(G5)	788.4	-35	-34	-34	-33	-34	-34	-34	-33	-34	-35	-34
I(Bb5)	915.9	-35	-35	-33	-35	-35	-34	-35	-35	-35	-36	-35
Averag	e amplitude f	for sar	on bai	ron								-32

 Table 4.2 Frequency and amplitude results of saron baron



Figure 4.3 Graph charts of the ten samples of amplitude for each piller of saron baron

The average amplitude for each pitch in *saron baron* is as follows: pitch 1 has an amplitude of -30 dB, both pitches 2 and 3 has amplitude of -31 db, pitches 5,6,and i has a decreasing amplitude of -33 dB, -34 dB, and -35 dB. The overall amplitude of *saron baron* is -32 dB, which is slightly higher than that of *saron peking*, indicating that it is louder than the *saron peking*. From the graph, the *saron baron* showed a similar result that is the higher the pitch, the lower the amplitude.

#### 4.1.3 Saron demung

Pitch	Frequency	Amp	litude	(dB)	5									
	(Hz)													
(SPN)	(112)	1	2	3	4	5	6	7	8	9	10	Average		
1 (Pb <sub>2</sub> )	236.6	-22	-21	-21	-22	-21	-21	-21	-21	-21	-21	-21		
(D03)														
2(C4)	264.4	-22	-21	-20	-21	-21	-21	-21	-22	-21	-21	-21		
3(D4)	297.1	-23	-22	-21	-22	-22	-22	-21	-22	-22	-22	-22		
5(F4)	352.4	-25	-23	-22	-24	-24	-24	-23	-24	-24	-24	-24		
6(G4)	397.4	-25	-24	-24	-25	-24	-24	-24	-24	-24	-23	-24		
I(Bb4)	471.1	-26	-25	-25	-26	-25	-25	-24	-25	-25	-25	-25		
Averag	Average amplitude for <i>saron demung</i>													

Table 4.3 Frequency and amplitude results of saron demung



Figure 4.4 Graph chart of the ten samples of amplitude for each piller of saron demung

The *saron demung* showed the highest overall amplitude in the *saron* family. It has an amplitude of -20 dB. This infers that the *saron demung* has the loudest sound among the three *sarons*. The average amplitude for each pitch in *saron demung* in the order of 1, 2, 3, 5, 6, i is -18 dB, -18 dB, -19 dB, -21 dB, -22 dB respectively. From the chart, we can see that the *saron demung* showed similar results to that of *saron peking* and *saron baron* – the higher the pitches, the lower the amplitude.

#### 4.1.4 Overall amplitude for saron family



Figure 4.5 Graph of overall amplitude for each instrument in saron family

Figure 4.5 illustrates the overall amplitude for each instrument in the *saron* instrument family. The line graph indicates three lines, each of them representing the average amplitude for the instruments. The green line represents *saron demung*, the red denotes *saron baron*, and the blue one signifies *saron peking*. It appears that *saron peking*, which is *the* smallest in size, has the lowest amplitude in the *saron* family, which means that *saron peking* produces the smallest sound volume. The *saron baron*, which is bigger in size than the *saron peking* has a slightly higher amplitude, and *saron demung*, the biggest of them all, has the highest amplitude. It can be inferred that the bigger the size of the instrument is, the louder is the sound produced. Furthermore, the bigger the instrument, the longer the sustainability of the volume produced by the instruments. However, sustainability is not taken into account in this analysis because the playing method for *saron* is to hit and hold. This means that the player would hit the note, and then hold the *bilah* (piller) with his/her other hand

to keep the sound produced from being sustained. With this method of playing, the sustainability of the instruments is not relevant because the players will hold the *bilah* after playing to stop it from sustaining.

# 4.1.5 Gambang kayu

	1	1										
Pitch	Frequency	Amp	litude	(dB)								
(SPN)	(Hz)	1	2	3	4	5	6	7	8	9	10	Average
1 (Bb3)	234.4	-47	-48	-47	-47	-47	-48	-47	-47	-47	-47	-47
2(C4)	262.9	-47	-47	-48	-47	-46	-47	-47	-47	-47	-47	-47
3(D4)	295.1	-48	-48	-48	-48	-47	-48	-48	-48	-48	-48	-48
5(F4)	352.4	-51	-50	-51	-51	-51	-51	-51	-51	-51	-51	-51
6(G4)	395.8	-52	-51	-51	-51	-51	-51	-51	-51	-51	-51	-51
1 (Bb4)	472.0	-53	-52	-52	-52	-51	-51	-51	-51	-51	-51	-52
2(C5)	529.7	-52	-52	-52	-53	-52	-52	-52	-52	-52	-53	-52
3(D5)	601.5	-53	-52	-52	-52	-52	-52	-51	-52	-52	-52	-52
5(F5)	707.1	-52	-53	-52	-53	-53	-53	-53	-53	-53	-53	-53
6(G5)	795.8	-54	-53	-53	-53	-53	-53	-52	-53	-53	-53	-53
1 (Bb5)	944.8	-55	-54	-54	-52	-54	-54	-54	-54	-54	-54	-54
2(C6)	1055.3	-54	-54	-55	-54	-53	-54	-54	-54	-54	-54	-54
3(D6)	1183.5	-54	-55	-54	-54	-54	-54	-54	-54	-54	-54	-54
5(F6)	1419.6	-56	-55	-56	-56	-56	-57	-56	-57	-56	-56	-56

 Table 4.4 Frequency and amplitude results of gambang

6(G6)	1605.4	-57	-57	-57	-56	-57	-58	-57	-57	-57	-57	-57
Averag	e amplitude f	or <i>Ga</i>	mbang	r I								-52

Table 4.4, continued: Frequency and amplitude results of gambang

Results of *gambang's* frequency and amplitude are documented in the table above. The lowest pitch in has amplitude of -47 dB, whereas the highest pitch has amplitude of -57 dB. Again, this showed a similar trend; the higher the pitch is, the lower the amplitude is. The average amplitude for *gambang* is obtained in a similar method as the *saron* family, by summing up the total average amplitude before dividing it by 15 pitches in *gambang*. As a result, the average of the *gambang's* amplitude is -52 dB. *Gambang* has the lowest amplitude recorded compared to the other instruments, rendering it as the softest instrument in gamelan. The graphs chart in Figure 4.6 provides a clearer illustration of the results.



Figure 4.6 Graph charts of the ten samples of amplitude for each pitch of gambang

From this graph, we can see that the higher the pitch is, the lower the amplitude is. *gambang* is the only instrument made of wood in gamelan, which justifies the low amplitude of the instrument. This is because wood has a muted timbre and low sustainability in nature.



Figure 4.7 Togok: Western notation of gambang playing

Figure 4.7 shows an excerpt of the *gambang* section in the traditional repertoire, *Togok*, that has been transcribed into the western notation. We can see that *gambang* plays both the downbeat and the upbeat of each main beat in octaves. From this observation, it is obvious that the *gambang* plays an important part in playing the melody. Due to its low amplitude, it has to play more notes in octaves in order to avoid being drowned out amidst louder instruments such as *saron demung, kenong* and the *gong*.

#### 4.1.6 Bonang penerus

Pitch	Frequency	Amp	litude	(dB)	5							
(222.2)	(Hz)											1
(SPN)		1	2	3	4	5	6	7	8	9	10	Average
1	0.52.0	22	22	22	22	22	24	22	22	22	22	22
1 (Bb5)	952.8	-32	-33	-33	-32	-33	-34	-33	-33	-33	-33	-33
2(C5)	536.0	-28	-28	-28	-29	-28	-27	-28	-28	-28	-27	-28
3(D5)	570.0	-30	-29	-29	-29	-29	-28	-29	-29	-29	-29	-29
5(F5)	702.4	-30	-30	-30	-30	-30	-29	-30	-30	-30	-30	-30
6(G5)	786.1	-30	-31	-31	-32	-31	-30	-31	-31	-31	-31	-31
1 (Bb6)	1938.0	-42	-40	-41	-40	-40	-41	-40	-40	-41	-40	-40
2(C6)	1054.0	-33	-33	-32	-34	-33	-33	-33	-34	-33	-32	-33
3(D6)	1187.6	-34	-34	-35	-34	-34	-34	-34	-32	-34	-34	-34
5(F6)	1427.7	-35	-35	-37	-36	-36	-36	-36	-36	-36	-36	-36
6(G6)	1616.8	-37	-37	-38	-38	-38	-38	-39	-38	-38	-38	-38
Averag	e amplitude f	or <i>bor</i>	ang p	enerus	8							-33

Table 4.5 Frequency and amplitude of each pitch for bonang penerus



Figure 4.8 Graph charts of the ten samples of amplitude for each pitch of bonang penerus

Figure 4.8 illustrates 10 pitches in *bonang penerus*, the lowest pitch having an amplitude of -28 dB and the highest with an amplitude of -40 dB. The overall amplitude of *bonang penerus* is -33 dB. Figure 4.8 shows the amplitude of each pitch in the way it is arranged in the instrument. The pitch has been rearranged in an increasing order in the following graph to provide a clearer illustration of the trend in the relationship of amplitude and frequency.





In figure 4.9, we can see that *bonang penerus* also shows a similar trend in results, that is higher pitches has lower amplitudes.

# 4.1.7 Bonang baron

Table 4.6 Frequency and amplitude of each pitch for bonang baron

Pitch	Frequency	Amp	litude	(dB)								
(SPN)	(Hz)	1	2	3	4	5	6	7	8	9	10	Average
1 (Bb4)	470.9	-15	-16	-16	-15	-15	-14	-15	-15	-15	-15	-15
2(C4)	272.0	-10	-12	-10	-10	-11	-10	-10	-11	-10	-10	-10
3(D4)	299.2	-11	-11	-11	-12	-11	-11	-11	-11	-12	-10	-11
5(F4)	356.1	-12	-12	-12	-12	-10	-12	-12	-11	-12	-12	-12

6(G4)	401.1	-14	-13	-13	-11	-11	-13	-13	-13	-13	-13	-13
1 (Bb5)	933.6	-20	-20	-21	-20	-21	-21	-21	-20	-21	-21	-21
2(C5)	536	-16	-15	-16	-16	-16	-15	-16	-16	-16	-17	-16
3(D5)	595.4	-17	-17	-17	-16	-17	-17	-16	-17	-17	-17	-17
5(F5)	710.2	-19	-18	-18	-18	-18	-18	-17	-18	-17	-18	-17
6(G5)	800.8	-20	-20	-19	-19	-18	-19	-19	-18	-19	-19	-19
Averag	e amplitude f	or <i>bor</i>	nang b	aron							)	-20

Table 4.6, continued: Frequency and amplitude of each pitch for bonang baron

Table 4.6 displays the results of the frequency and amplitude for each pitch in the *bonang baron*. The amplitude for the lowest pitch is -12 dB, and the highest pitch has amplitude of -24 dB. The overall amplitude of *bonang baron* is -23 dB, which is 10 decibels higher than *bonang penerus*. From this table, the frequencies of the pitches are lower than that of *bonang penerus*, which means that the pitches in *bonang baron* are lower than that of *bonang penerus*. This again points to the similar deduction – the frequency differs from the amplitude, which is illustrated in the graph chart below.



Figure 4.10 Graph charts of the ten samples of amplitude for each pitch of bonang baron

From the figure above, it can be seen clearly that the highest pitch (highest frequency) has the lowest amplitude and vice versa. It is shown even clearly in the graph chart below (Figure 4.11), where the pitches are arranged in an ascending order.



Figure 4.11 Graph charts of the ten samples of amplitude for each pitch of *bonang baron* (ascending order)

### 4.1.8 Overall amplitude for bonang



Figure 4.12 Graph of overall amplitude for each instrument in *bonang* family

Graph 4.12 shows that average amplitude of *bonang* family. The red graph represents *bonang baron*, whereas the blue graph stands for *bonang penerus*. From this figure, it is obvious that *bonang baron* has higher amplitude compared to that of *bonang penerus*. This shows that the *bonang baron* is louder than the *bonang penerus*.

## 4.1.9 Slentem

**Table 4.7** Frequency and amplitude of each pitch for *slentem*

Pitch	Frequency	Amp	olitude	(dB)								
(SPN)	(Hz)											
(211)	(112)	1	2	3	4	5	6	7	8	9	10	Average
$\frac{1}{(\mathbf{Bh}_2)}$	117.9	-26	-25	-26	-26	-25	-26	-26	-26	-26	-26	-26

2(C3)	132.6	-26	-26	-27	-26	-24	-26	-26	-26	-26	-26	-26	
3(D3)	150.2	-27	-27	-27	-27	-26	-27	-27	-27	-27	-27	-27	
5(Ea)	177.6	20	21	20	20	20	21	20	20	21	20	20	
5(F3)	177.0	-30	-31	-30	-30	-30	-31	-30	-30	-31	-29	-30	
6(G3)	199.6	-31	-32	-32	-32	-32	-33	-32	-32	-32	-31	-32	
I(Bb3)	238.0	-33	-35	-34	-35	-35	-35	-35	-35	-36	-35	-35	
Average amplitude for slentem													

Table 4.7, continued Frequency and amplitude of each pitch for slentem

*Slentem* falls into the category of chord instruments in the gamelan *Melayu*. It is relatively large in size and has comparatively higher amplitude of -29 db. Similar to the *saron* family, *slentem* consists of 6 pitches (-1, 2, 3, 5, 6, and i) with each having amplitude of -26 dB, -26 dB, -27 dB, -30 dB, -32 dB and -35 dB respectively.



Figure 4.13 Graph charts of the ten samples of amplitude for each pitch of slentem

The graph chart above presents the amplitude results of *slentem*. It displays a similar trend with other instruments, that is, the frequency is divergent to the amplitude.

# 4.1.10 Kenong

Pitch	Frequency	Amp	olitude	(dB)								
(SPN)	(Hz)											
(~~~~)	()	1	2	3	4	5	6	7	8	9	10	Average
1	477.2	-19	-20	-20	-20	-21	-20	-20	-20	-20	-19	-20
(Bb4)												
$2(C_4)$	268.0	-18	-18	-18	-19	-18	-18	-18	-19	-18	-18	-18
3(D4)	298.9	-19	-18	-18	-19	-19	-18	-18	-18	-17	-17	-18
5(F4)	351.9	-20	-19	-19	-19	-19	-19	-19	-19	-18	-19	-19
6(G4)	398.6	-19	-19	-18	-19	-19	-18	-19	-19	-19	-19	-19
Averag	e amplitude f	for ken	ong			•		•		•	•	-19
	, T											

Table 4.8 Frequency and amplitude of each pitch for kenong

*Kenong* is relatively large in size compared to *slentem*, justifying its higher overall amplitude of -19 dB. There are six pitches in *kenong* – 1, 2, 3, 5, 6 with each having amplitude of -20 dB, -18 dB, -18 dB, -19 dB and -19 dB respectively. Unlike the *saron* family, *kenong* is not played with the "hit and hold" technique, resulting in a long sustainability of the note after it is played. The sustaining power, when combined with the high amplitude, causes the *kenong* sound even louder. Consequently, the smaller instruments with no sustainability and low amplitude will be drowned amidst the *kenong*.



Figure 4.14 Graph charts of the ten samples of amplitude for each pitch of *kenong* 

From the graph chart above, we can see that the amplitude reduces when the frequency increases; which means that the higher the pitch is, the softer the volume is.

# 4.1.11 Gong kempul and gong suwukan

Table 4	.9 Frequency	and amplitude	of each	nitch for	gong kempu	ı
I able 4	.) I requeriey	and ampintude	or cucin	phon 101	gong nempu	ı

Pitch/	Frequency	Amp	litude	(dB)								
Note	(Hz)		1	1	1	1		1	1	1	1	ſ
		1	2	3	4	5	6	7	8	9	10	Average
E	90.1	12	12	10	10	12	11	12	1.4	12	12	12
5	89.1	-13	-13	-12	-12	-13	-11	-13	-14	-13	-13	-13
6	104.8	-15	-15	-15	-14	-15	-15	-14	-15	-15	-15	-15
1	135.1	-16	-15	-16	-15	-16	-17	-15	-16	-16	-16	-16
2	153.2	-18	-18	-18	-17	-18	-18	-17	-18	-19	-18	-18
Average amplitude for <i>gong kempul</i>												-16

Table 4.10	Frequency	and amplitude	of gong	suwukan
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Pitch/	Frequency	Amplitude (dB)										
Note (Hz)		1					T		1	1	1	
		1	2	3	4	5	6	7	8	9	10	Average
1	119.6	-10	-11	-9	-9	-10	-10	-10	-10	-10	-10	-10
Average amplitude for gong suwukan					-10							

Tables 4.9 and 4.10 displayed the results of the pitches for *gong kempul* and *gong suwukan*, respectively. This research only selected a few pitches for the *gong* family because these are most commonly used in performances. Although there are six pitches in *gong kempul*, the overall amplitude of *gong kempul*, is at -16 dB. It is lower than that of *gong suwukan*, which is -10 dB. Similar to the *kenong, gong kempul* and *suwukan* are not played with the "hit and hold" technique. This also results in the long sustainability after the note is played. As the *gongs* are even bigger in size, they possess the highest amplitude amongst the instruments, and combined with the long sustainability of note, will easily drown the smaller instruments.



Figure 4.15 Graph charts of the ten samples of amplitude for each pitch of *gong kempul* and *gong suwukan* 

Figure 4.15 is a graph chart that illustrates the tabulated results in figure 4.9 and 4.10. In this graph chart, we can clearly see that the gong family has relatively high amplitude compared to the other gamelan instruments.

# 4.1.12 Overall amplitude for each instrument in gamelan Melayu

 Table 4.11 Overall amplitude for each instrument in gamelan Melayu

Instrument	Average amplitude (dB)			
Saron peking	-48			
Saron baron	-32	-33		
Saron demung	-23			
Bonang penerus	-33			
		-28		
Bonang baron	-20			

Gambang	-52
Kenong	-19
Slentem	-29
Gong kempul	-16
Gong suwukan	-10

Table 4.11, continued Overall amplitude for each instrument in gamelan Melayu



Figure 4.16 Bar chart of overall amplitude for each instrument in the ascending order of amplitude



Figure 4.17 Line graphs of overall amplitude for each instrument

A summary of the overall amplitude for each instrument is tabulated in Table 4.11 and illustrated in Figures 4.16 and 4.17. In Figure 4.16, the instruments are arranged in the order of ascending amplitude to display a clearer illustration in the amplitude ranking of each instrument. From the analysis of these figures, the *gambang* has the lowest amplitude of -52 dB, whereas *gong suwukan* has the highest amplitude of -10 dB. *saron peking* and *gambang* are two important instruments in playing the main melody, but both these instruments have the lowest amplitude amongst all the other instruments. In contrary, instruments belonging to the chord group such as *kenong* and *gong* have the highest amplitude among all the instruments. These results are not only obtained through analysis of video recordings, but also through ten samples from the participation of ten gamelan players in order to attain more solid results.

Based on the results and discussion above, the sounds produced by the main instruments of the gamelan are being drowned out amidst the other louder instruments due to the lower amplitude of the leading instruments. Musically, the amplitude of these instruments needed to be increased so that we can get a noticeably balance sound among the instruments.

#### 4.2 Discussion of the findings

The following discussion consists of the score analysis on different instruments in the gamelan ensemble. The gamelan composition of each instrument is transcribed into the western notation to demonstrate a clearer illustration on how each instrument is normally played in the arrangement of the repertoire. This is then followed by three samples of different instrumentation setups and the discussion on how each set-up produces different sound projection.

#### 4.2.1 Score analysis

**Balok Notation 1** 

Togok



Figure 4.18 Balok notation for Togok

Figure 4.18 is the traditional *balok* notation for one of the more commonly played traditional gamelan repertoire called *Togok*.

Togok



Figure 4.19 Western notation for actual playing of saron peking in Togok

The figure above illustrates the actual playing of saron peking in Togok. This notation is transcribed based on a performance on a set of gamelan in the key of **B** flat. It is clear that saron peking plays the doubling of the main melody. This means that, saron peking plays both the downbeat and the upbeat of each note in the melody. From this playing, it can be inferred that saron peking plays a relatively important role in playing the melody. However, due to its low amplitude, saron peking will be drowned amidst other louder instruments, despite the doubling of its playing.



Figure 4.20 Togok: Western notation for saron baron

As for the saron baron, it plays the main melody exactly as it is. From the results analysed and discussed earlier on, saron baron covers only 9% out of the overall amplitude in gamelan. The statistics proved that saron baron's amplitude is not parallel to its importance in playing the melody, thus other instruments could easily drown it.

Saron Demung 2

Togok



Figure 4.21 Togok: Western notation for saron demung

On the other hand, *saron demung* does not play the whole melody, but only certain notes and beats of the melody. From the analysis on the *saron* instument family, the *saron peking* and *saron baron* holds a more important role in playing the melody compared to the *saron demung*, but these two instruments have comparatively low amplitudes.



Figure 4.22 Togok: Western notation for gambang

The gambang plays a similar pattern as saron peking, but in octaves. The lower note is played by the left hand, whereas the upper note is played by the right hand. This is because the gambang has a wider range of notes, and perhaps due to its low amplitude, it needs to double the notes in order to be heard amongst the other instruments. Based on the results in the previous chapter, it is discovered that the *gambang* has the lowest amplitude compared to the other instruments. In this case, the *gambang* will easily be drowned by other instruments regardless of how many notes it is playing.



Figures 4.23 and 4.24 displayed the playing style of *bonang penerus* and *bonang baron* in *Togok*. It is clearly seen that both these instruments plays the countermelody of the downbeat and upbeat in different octaves. *Bonang penerus* plays the counter-melody at an octave higher than *bonang baron*. **Balok Notation 1** 

Togok



Contrary to the *saron* and *bonang* instruments, the *kenong* instrument plays only the last beat of every two bars, thus justifying its position in the chordal category. *Kenong* has a comparatively loud amplitude, thus when it is played once every two bars, it might drown the smaller instruments such as *gambang* and *saron peking*, both of which are playing the melody. Slentem 4





Figure 4.27 Togok: Western notation for slentem

In Figure 4.27, we can see that *slentem* plays a similar part as that of *kenong*. Although *slentem* is relatively low in amplitude, the part that it is playing is already covered by *kenong*, therefore sometimes it is possible to be omitted in certain performances. This also occurs in orchestras. As stated by Lovelock (1968), it is possible to omit instruments that are playing unnecessary doublings.



Figure 4.28 Togok: Western notation for gong

Although gong instruments have a comparatively high amplitude compared to the rest of the gamelan instruments, it only plays towards the end of the repertoire, signalling the ending, as shown in Figure 4.28. Thus, this will not affect or drown the melody line because it is only played towards the end.

Togok

Score



Figure 4.29 Full western notation of *Togok* 

Traditional

In Figure 4.29, the full score western notation of all the instruments in *Togok* revealed clearly that the *gambang* and the *saron peking* plays the most notes, but they have comparatively low amplitude. On the contrary, chord instruments such as the *kenong* and the *slentem* play every alternate beat, but they have comparatively high amplitude. As a result, smaller instruments playing the melody will easily be drowned amidst the loud accompaniment. The following is a comparison of four different restructuring of gamelan instrumentation based on calculations and orchestration in order to achieve a balance sound.

#### 4.2.2 Analysis of different samples of instrumentation setup

For the restructuring of gamelan instrumentation, the setup of *bonang baron*, *slentem*, *kenong*, and *gong* will be maintained as these instruments play the chord and have comparatively high amplitude. These amplitudes will be used a basis for determining the balance in the sound of each restructuring.

## 4.2.2.1 Sample of current set up

This first structure is the existing setup, which consists of one *saron peking*, one *saron baron*, one *saron demung*, one *gambang kayu*, one *bonang penerus*, one *bonang baron*, one *slentem*, one *kenong*, *gong suwukan* and *gong kempul*. The following pie chart shows the percentage of each instrument:



Figure 4.30 Pie chart of the overall amplitude of each instrument in percentage for sample of current setup



Figure 4.31 Bar graph of the overall amplitude of each instrument in percentage for sample of current setup (in increasing order)

From the above pie chart and bar graph, it is obvious that there is an uneven distribution of sound among the instruments. Out of 100 percent, *gambang* only

contributes 3 percent of the total sound projection. As a result, other instruments will drown it when they are all played together.

## 4.2.2.2 Sample 1

This instrumentation consists of three *gambang*, two *saron peking*, one *saron baron*, one *saron demung*, one *bonang penerus*, one *bonang baron*, one *slentem*, one *kenong*, *gong suwukan* and *gong kempul*.



Figure 4.32 Pie chart of the overall amplitude for each instrument in percentage for sample 1



Figure 4.33 Bar graph of the overall amplitude of each instrument in percentage for sample 1 (in increasing order)

The amplitude of the *gamban*g increased three times from the measurements in Table 4.6. This is because there are three *gambangs*, and the amplitude of *saron peking* doubled up because there are two *saron pekings*. From the graph above, the distribution of the amplitude is more even. The amplitude of the melody instruments is similar to the chordal instruments which resulted in a similar volume level.

#### 4.2.2.3 Sample 2

This instrumentation set-up consists of four *gambang*, three *saron peking*, one *saron baron*, one *saron demung*, one *bonang penerus*, one *bonang baron*, one *slentem*, one *kenong*, *gong suwukan* and *gong kempul*.



Figure 4.34 Pie chart of overall amplitude for each instrument in percentage for sample 2

Excluding the *gong kempul* and *gong suwukan*, the amplitude percentage of each instrument showed that it is at a balanced proportion, indicating that the sound of each instrument are at a similar level of volume. The *gong* is excluded in the comparison because the *gong* is only played towards the end of the repertoire and does not affect the overall amplitude. The distribution of amplitude is illustrated clearly in the graph below.



Figure 4.35 Bar graph of the overall amplitude of each instrument in percentage for sample 2 (in increasing order)

From this graph above, both the *gambang* and *saron peking* have comparatively high amplitude compared to the other instruments. in amplitude when *gambang* is increased to four and *saron peking* is increased to three, they now have comparatively high amplitude against other instruments. It is deduced that they can now be heard clearly when all these instruments are played together all at once. This could be a balanced sound as the melody can be heard clearly above all the other accompaniment instruments. The number of melodic instruments could be increased further to increase its volume. As Samuel Adler said, make the melody more prominent than the harmony notes.

# 4.3 Significance of research for improved notation (enhanced score)

To demonstrate the significance of this research, two gamelan repertoires that are produced based on the outcome of this research are discussed in this section. These two repertoires are taken from the play, *Jasa Putera*, which was held from 6<sup>th</sup> to 8<sup>th</sup> of November 2015 at the experimental theatre of University of Malaya, as shown in the figure below.



Figure 4.36 Poster for Jasa Putera



# Titah Ayahkanda

Figure 4.37 Titah Ayahkanda: Enhanced score with western and cipher notation
*Titah Ayahkanda* is one of the repertoires taken from the play, *Jasa Putera*, and is based on the outcome of the analysis from this research. As promised in chapter one, this score is a product combining the western and cipher notation. There is western notation on the stave, as well as the numeric notation below it to enable both formally and nonformally trained musicians to read and perform this arrangement with more ease.

As mentioned earlier in the previous chapters, everyone in the gamelan ensemble shares the same score; but after this research, individual scores are produced separately for each instrument for the same repertoire. The scores are attached as follow:

# Titah Ayahkanda





Figure 4.39 Titah ayahkanda: Score for gambang

Titah Ayahkanda



Figure 4.40 Titah ayahkanda: Score for bonang



## Titah Ayahkanda

Figure 4.41 Titah ayahkanda: Score for gong

Asian Colour is another example of an arrangement done based on this research.



Figure 4.42 Asian Colour: Enhanced score with western and cipher notation

99

Similarly, the individual scores for each instrument is produced, and are attached as follow:





Figure 4.43 Asian Colour: Score for saron



```
Gambang
```



Figure 4.44 Asian Colour: Score for gambang

### Asian Colour

```
Bonang
```







Gong



Figure 4.46 Asian Colour: Score for gong

#### 4.4 Conclusion

It is hoped that the analysis of this research would serve as an eye opener for the reader. This research attempts to provide a new restructuring of instrumentation based on the analysis and proof as to why and how the structure can generate a balanced sound in gamelan performance. The above samples of instrumentation set-ups are merely propositions as to how different set ups can produce different sound projections.

However, pitch and loudness do not mean the whole story. For example, if a clarinet and a piano play notes of the same pitch and loudness, the sounds will still be quite distinct. This is similar in the case of gamelan. If a *saron peking* and a *kenong* play at the same time with the same loudness, they will still sound different from each other. This is because musical instruments do not vibrate at a single frequency. A given note involves vibrations at many different frequencies, often called harmonics, partials or overtones. The relative pitch and loudness of these overtones gives the note a characteristic sound we call the timbre of the instrument. The different characteristics of frequency for the gamelan instruments can be explored further in future studies.

#### CHAPTER 5

#### CONCLUSION

#### 5.1 Summary of research

Current practices in contemporary gamelan *Melayu* music have indicated new ideas of using and playing the gamelan. Many composers and musicians are experimenting with the variety of musical sounds that can be obtained from the gamelan. New techniques other than the ones used to play traditional repertoire are introduced. This is seen in the way the instruments are played both stylistically and technically and how the gamelan is being used to explore the possibilities in range of colour, melody, tonal ability, and expression (Shahanum Mohd. Shah, 2009).

Throughout the investigation on the gamelan performances and events that were observed, it was noted that there is no obvious development in the repertoire and also the instrumentation setup in the ensemble. Similarly, the curriculum of gamelan pedagogy revealed no improvement or changes in the gamelan repertoire. It was observed that the style of playing and teaching are similar if not the same even with different gamelan teachers in different education institutions. In addition to that, most gamelan teachers use the traditional *balok* notation in their teachings.

Aside from the style of playing and teaching, the current setup has also a limited weight of sound for the instruments in the gamelan *Melayu* which restricts the creative course for a colourful and diverse arrangement for the different sounds produced in the gamelan *Melayu*. The expression, or in musical terms, dynamics, is very limited in the gamelan set-up. The only obvious change in the dynamics of the music is during the entrance of the louder instruments, such as *kenong* and *gong*. Small instruments such as *saron peking* and *gambang kayu* do not create a big change in dynamics. This caused the development of expression in music to be stagnant, especially in melody and counter melody.

Following the western theory of orchestration, the increase in the number of smaller instruments will create a higher audio level in performance. In a composition, the ideas, main melody and the counter-melody can be delivered better and clearer in the presence of the sufficient instruments. This also makes it possible for the ensemble to be developed into different categories – single melody, melody in octaves, counter-melody, and chord. For example, if the instrumentation consists of four *saron pekings*, then two can play the melody, whereas the other two play the counter-melody. This can enhance the melody to be richer and more affluent which is seen here in Figure 5.1.



Figure 5.1 Togok: Melody and counter-melody for saron peking

When the volume of the top melody line is increased for the instrumentation, it is easier to develop the expression/dynamics into *fortissimo, mezzo forte*, or *pianissimo*. This is

because there is enough weight in the melody as there are more numbers in the instrument. With only one instrument playing each part, this made it hard to convey any expressions in music. With an increased number, the smaller instruments now have sufficient weight and volume to express their parts.

There has been some admirable effort by the older generations to increase the volume of the smaller instruments by playing more notes. For example, the *saron peking* plays twice as much notes as the *saron baron* as shown in Figure 5.2.



Figure 5.2 Togok: Western notation of saron peking and saron baron actual playing

However, as the analysis shown in the previous chapter, this merely contributes to the rhythmic pattern instead of adding to the volume of the instrument. Similarly, the double melody in octaves played by the *gambang kayu* does not contribute to the volume either.

Gambang 1

**Togok** 



Figure 5.3 Togok: Western notation of gambang actual playing

The western orchestration theory demonstrates this clearly in Figure 5.3. A single violin playing two notes at the same time is not louder than two violins played simultaneously. This is one of the reason behind the different number of string instruments in a western orchestra – the most being the violin 1, followed by violin 2, viola, cello and the least is the double bass. If compared to the western orchestration theory, *saron peking* is the representation of violin 1, *saron baron* represents violin 2, *bonang penerus* represents viola, *saron demung* represents cello and *kenong* will be the double bass. Through this illustration, it is obvious that the smaller instruments needed to be more in number compared to the bigger instruments.

The results from the measurement of amplitude in the study proved that the amplitude is low for the smaller instruments such as *saron peking*, and the wooden instruments such as *gambang kayu*. Even with the method of playing double or single note, the volume will not be increased unless the number of the instruments is doubled up. This is a significant research because this has never been done before. The results and analysis will facilitate tremendously in the development of gamelan in the near future. This not only helps the instrumentation alone, but also for the composition and the rearrangement of the existing repertoires.

#### 5.2 Suggestion for future research

Although formal and non- formal education has stimulated interest and revitalised the gamelan tradition among the younger generation (Tan, 2008), more needs to be done to sustain interest in the gamelan. The younger generation needs to appreciate and get

involved in their music cultures actively in order to preserve and revitalise the music culture dynamically.

There are still many areas to expand in the research of gamelan *Melayu*. This research proposed a new perspective to the instrumentation set-up of gamelan *Melayu* in order to improve the sound, and consequently, the performance of a gamelan *Melayu*. However, there are still many limitations and lack of theorised literatures on the aspects of the key, the tuning, and the instruments itself in gamelan.

Besides the instrumentation setup, there are also other factors affecting the quality of sound. Even with the changes to the number of the instruments in the gamelan, the acoustic of the halls is one factor that could also jeopardise the balance of sound due to the high sustaining power and echo of the gamelan. Gamelan needs to be performed at a suitable venue, where gamelan can be the center of attention amongst the audience, and not just as background music amongst other noise. Gamelan has always been perceived as having a soothing and pleasing sound, even almost therapeutic. Even so, in the old setup, the focus of the sound is difficult if not possible to be detected. There is no clarity in the importance of which instrument, inferring that the gamelan is not arranged accordingly. The gamelan should be arranged in a way that makes it the highlight of the performance, rather than merely background music.

The needs of the audience are also another influent factor that can be researched on. In order to continue or improve the interest in the younger generations, we need to study the needs of the audience. If the instrumentation and the style of playing maintained stagnant, gamelan *Melayu* might cease to be performed in the future.

It is sincerely hoped that this research will help gamelan *Melayu* up to another level, not only to enrich the old repertoire by coming up with new arrangement and compositions, but also to mold the beautiful sound of gamelan into a better shape. In addition, this research will also hopefully facilitate future purchasers of a new gamelan group to acquire a better instrumentation setup for their gamelan ensemble.

The musical landscape of gamelan has gone though and is still going through rapid changes due to modernisation and globalisation. The changes seen in the musical style, repertoire content, playing techniques and attitudes toward the gamelan can be related to changes in the Malaysian culture or society, as well as to changes in the ideas held by people and the meanings they assign to their culture. (Shahanum Mohd. Shah, 2009)

Today, the gamelan *Melayu* has found a permanent place in the cultural tapestry of multi-ethnic Malaysia. As described in by Ahmad Farid Abd. Jalal in the preface of his book, "The gamelan *Melayu* is here to stay, and with continued efforts to promote it, it will continue to thrive."

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