

## The Virtual Javanese Gamelan - Teaching Manual

Welcome to **The Virtual Javanese Gamelan**. We are very proud to present this as the first of our interactive music modules and hope that you will enjoy using it.

### 1. Introduction

The **Virtual Javanese Gamelan** is conceived as a rich learning resource for any individual, school or institution needing to gain experience in this particular aspect of World Music.

The product provides an immersive learning environment, through which material on Javanese music is delivered, integrating performing, composing and appraising. The user is able to explore this 'virtual' musical world at their own pace taking responsibility for their own learning, and share the results of their experience by exporting performances, compositions, evaluations and test scores in appropriate file formats.

The interface of the product is very user-friendly and intuitive. It involves little by way of a learning curve, enabling the music to become the prime focus immediately. And there is no need for any peripheral musical devices such as MIDI keyboards. All of the sounds are contained and controlled within the application.

Interest in Gamelan Music, outside Indonesia, has exploded over recent decades, along with the World Music movement in general. In formal education, from primary school to university, it provides an ideal vehicle for mixed ability teaching, stretching the most gifted, while providing a satisfying sense of achievement for players of less complicated parts. The activities in our product reflect this range. It is possible, therefore, to achieve differentiated learning both by task and outcome, through familiarity with the tasks and careful direction and support.

The **Virtual Javanese Gamelan** is designed to be a flexible resource. An individual user's learning can be self-directed, and cover all of the activities within the module. Alternatively, teachers may wish to direct and control learning, either for individuals or groups, by only covering certain activities, eg. composition, or by specifying a focus for certain sessions. Suggestions for an 'ideal' route, suitable for a formal educational experience, appear below. However, given an 11-14 year old mixed ability group, following the UK National Curriculum, completing activities from all of the areas within the module, at appropriate levels should approximate to 6 hour long sessions.

While we have tried to make the activities as realistic as possible, using carefully recorded samples from Gamelan Sumber Laras, it should never be regarded as a replacement for the real thing. We very much hope that this module will accelerate learning for each individual, and enable them to make greater gains if and when they are able to play on an actual Gamelan, or its equivalent in the music classroom.



QuickTime 6.2 or higher installed

## **Macintosh:**

### **Minimum:**

G3 running at 400Mhz

Mac OS 9.2 and above

64Mb of RAM (after the system software has loaded)

650Mb of free hard disk space.

Support for 16 bit colours running at 800x600 and sound

16x CD ROM drive or higher

QuickTime 6.2 or higher installed

### **Recommended:**

G4 running at 1ghz or higher

Mac OSX 10.3.4 and above

512Mb of RAM.

650Mb of free hard disk space

Support for 24 bit colours running at 800x600 and sound

24x CD ROM drive or higher

QuickTime 6.2 or higher installed

## **4. Running the Application**

It is recommended that no other applications should be running at the same time as **The Virtual Javanese Gamelan**.

## **5. Playback**

It is recommended that stereo headphones are used when working with the application, or if playback needs to be shared, that a hi fi system or self-powered monitors are used. Very small speakers, similar to the size found on a laptop will not capture the depth and clarity of the lower pitched instruments.

## **6. Saving and Printing**

It is very useful to be clear about how the application handles these aspects from the start.

In various activities, users are prompted to save or export their work.

It is important to know that the application does not do this automatically, and that it is necessary for users to both create a directory and navigate to it in order to securely save and store their work. This may be a folder on the local hard drive of the computer in use, or a user area on a public drive on a network.

Anyone with knowledge of Microsoft applications will find that this is familiar territory. However, it is recommended that this is drawn to the attention of users before they start serious work on the application.

Printing from within the application is not supported. In order to achieve this, files will need to be imported into a third party piece of software, such as a word processor.

## 7. Preview / Export

**Due to the file size of the sampled sounds, everyone needs to be aware that compiling a piece for preview or export may take several minutes, depending on the speed of the individual machine.**

The Export function compiles an audio file for playback on third party software or for import into other applications for further creative work.

## 8. The 'Back' button

Please note that this button will return the user to the activity's menu screen. It does not function like the back button of a web browser.

## 9. Gamelan Music

Before describing the activities in greater depth a few basic points about Javanese Music may help.

- It is goal orientated. In rhythmic terms, unlike Western Music, the stress falls on the second of a pair of beats rather than the first. This principle is reflected in all structural levels. Thus Lancaran form features a unit of 16 beats, called a Gonggan, felt in 4 groups, called Gatras, of 4 beats in which the stress is felt on the 2<sup>nd</sup> and 4<sup>th</sup> beats of each of these groups.
- It is anticipatory. Following the above principle, melodic patterns move towards an important stress point, known as the Seleh note. In this project a melodic style known as Balungan Nibani is used, in which the notes of the main melody fall on the stress points, beats 2 and 4, of each gatra. The seleh note of each gatra is beat 4, of each pair of gatras beat 8, and of each gongan beat 16. All of the instruments involved in supporting or elaborating, rather than playing, the main melody, anticipate these seleh notes in specific ways.
- Seleh notes have a hierarchy. The most important being the seleh note, or final note of the cycle, the next being the seleh note of the Gonggan, and so forth.
- The importance of the seleh note is reflected in performance. Gamelan pieces, after a brief introduction, start on the seleh note of the cycle. In a Lancaran this would be beat 16 of the final phrase of the piece, marked by a stroke on Gong Ageng, the largest of the gongs. In practice this is rather like starting a piece on an anacrusis or up beat. In order to avoid confusion and lengthy explanation, this has been rationalised in both the performance and composition activities in the application.

- Two scales are used in Javanese music; a 5 note scale – laras slendro, used throughout the VJG, and a 7 note scale laras pelog.
- In a Javanese Gamelan the instruments can be divided, by function, into 4 main groups.
  - Main Melody, or Balungan (meaning ‘skeleton’)
  - Structure, or Punctuation or Colotomic
  - Embellishment
  - Leadership. There is no conductor. The Kendhang (drums) player leads the performance, signalling changes of tempo, which in turn indicate when the piece is about to stop.

#### 10. An Ideal Route : The Portfolio Approach and the Activities

Asking students to explore Javanese Music by compiling a portfolio of work may be an ideal way of both conceptualising and coordinating work in this module.

The contents of the portfolio could then be specified in terms of, at least one performance of Kebogiro on an instrument of their choice and its evaluation, one composition and its evaluation, a listening activity and its test score, and a report on Indonesia and its music.

#### My World

This section of the application offers a profile, for the current session, of what activities have been visited and how much progress has been made. It is also possible to save this information on a session by session basis.

While it should be possible to start almost anywhere in the module, a rich experience would be gained by adopting the following sequence, which is described below.

	<b>Phase</b>	<b>Activity in The Virtual Javanese Gamelan</b>
a)	Research	<b>Indonesia quiz ; Indonesian Music quiz</b>
b)	Performance	<b>Play</b> : Instrument of choice - Saron; Bonang Panerus; Kempul & Gongs; Evaluate
c)	Listening and Appraising	<b>Listen</b> : Kebogiro; Build up of instruments plus quizetc
d)	Composition	<b>Compose</b> : Choose 1; 3 or 4 cycle templates; Route A or B embellishment; Evaluate

e)	Further Listening	<b>Listen</b> : Kebogiro Simple or Decorated versions plus appropriate quiz
f)	Report on Indonesia and its Music	<b>Resource Links; Evaluate</b> – Report template

a) Research

i) By following ‘Indonesia’ users would gain orientation, background information and cultural context. There is a multiple choice quiz which can be taken at any point.

ii) ‘Indonesian Music’ narrows the focus, firstly to the role of the arts in Indonesian culture along with another multiple choice quiz, and then to the Gamelan itself. It is here that users can encounter video footage of a full performance of Gamelan Sumber Laras, and see demonstrations of each individual instrument.

b) Performance

Here it is possible to learn a part in a performance of Lancaran Kebogiro.

A choice of three ‘virtual instruments’ is available, and these are accessed via a screen offering some brief background information on the piece.

Each of the instruments represents a different level of difficulty in performance.

The ‘Kempul & Gongs’ is the part of greatest simplicity; but is still challenging because of its low pitch, and the less defined attack of the gongs.

The ‘Saron’ , being the staple instrument from the group of instruments playing the main melody, is of intermediate level.

The ‘Bonang Panerus’ represents the greatest challenge, since it not only involves more notes and an expanded range, but rapid passages and a switch between sets of samples.

**The introduction and when to start.**

In order to avoid confusion, and offer a clearer graphic representation of the piece, the ‘Guided Play’ performance starts on Beat 1 or Phrase A, rather than on its up beat. The backing track includes this upbeat, so that when the piece has been absorbed and confidence has risen, it is possible for the user to supply it.

In all three instruments, the easiest way to deal with this is to use ‘Guided Play’ mode, as described below. This will show the user when to come in.

For those that would prefer to count, the following may be useful.

The piece starts with a Buka or introduction. Each note played by the instruments in the buka represents the pulse in the 16 beat cycle. Here is the buka, heard on the Bonang, joined after 4 beats by the drums.

L5 L6 1 2 1 3 1 2 5 . 5 .

The dots indicate that the previous note is held for two beats.

Thus the buka is 12 beats long, immediately followed by Phrase A beat 1. (The 12<sup>th</sup> note of the buka is the seleh note of the cycle, and really the start of the piece)

AIMS :

In all three levels, the ultimate objective should be a recorded performance of the piece, which is then available for assessment

For each user according to their ability :

- To sustain, accurately, an independent part in an ensemble performance
- To foster musical skills, playing in time, playing in the correct place, and playing the correct pitches
- To appreciate the role of a part or instrument in a multi-layered piece
- To foster an aesthetic appreciation of an instrument, ensemble and music from a given culture
- To reinforce an appreciation of the vitality of tradition in a given culture

Full performance is achieved when the user plays their part against a backing track of the rest of the ensemble. This backing track has been deliberately created, in live performance, with the chosen part missing, in order to enable the user to carry the part, independently in real time. The virtual instrument is controlled from the QWERTY keyboard as directed on screen.

It is worth reinforcing this point with students, as some may think that the mouse is used to click on the graphic representation of the instrument on screen in order to activate sounds.

The interface, common to all three instruments in the performance area, has been designed to support a variety of approaches and learning styles. The intuitive transport bar is used to activate the backing track

‘Tutorial’ offers text based instructions on the features in the performance area, along with advice on how to prepare the part.

The performance area’s default setting is ‘Free Play’ mode in which the virtual instrument can be played without the backing track, enabling practice strategies to be employed such as playing at half speed, possibly assisted by the number notation of the piece.

Some users, who may respond more to an aural approach, may benefit from ‘Guided Play’ mode. When the ‘Play’ button is activated, a perfect performance of the part is laid over the backing track. At the same time the correct keys, pots or gongs light up on the graphic representation of the instrument, on screen. The part can then be covered in real time by the user. This can be used either as a reference to hear how the piece, or selected passages, should be played, or as reinforcement, rather like playing next to a strong player, sharing the same part in performance, until the part has been learned.

Away from the application, some teachers may prefer to introduce the piece to students, in time-honoured fashion, by having them sing the main melody, learning it by rote before they approach the virtual performance tasks.

Whatever approach is taken, however, any user should be able to find something that is both challenging yet achievable among the three choices on offer.

The ‘Saron’ task, in which the main melody of Kebogiro is played, is fairly straightforward, and self-explanatory once this area of the application is visited.

Though the ‘Kempul & Gongs’ area offers a more simple part, since these instruments ‘punctuate’ the melody, more QWERTY keys than the piece requires have been deliberately provided. Avoiding these, along with the possibility of hitting ‘wrong notes’, provides more of a challenge for the player and more reliable evidence of ability for assessment.

As mentioned earlier, the Bonang Panerus task, carries unique challenges. This instrument provides the most complex layer of embellishment in Kebogiro. There is, therefore, more of learning curve involved in this area, since the instrument itself features an expanded range. In mapping QWERTY keys to samples, therefore, more keys, other than the number keys have been utilised.

The real instrument is played with two mallets, and is therefore capable of producing more than one note at a time. In a technique called Gembyang, featured in both performance and composition activities, the Bonang Panerus plays patterns in octaves. Since computer keyboards are not designed to allow two key presses simultaneously, a slightly different approach has been necessary to create this in a virtual performance, whereby a particular single key pressed triggers a sample of a given note in octaves.

However the Bonang Panerus part in Kebogiro requires another technique to be used in the middle cycles of the piece, called Imbal and Sekaran, a rapid undulating pattern in which single notes are played.

In order to enable this to occur, therefore, the SPACE BAR has been utilised to switch, or toggle, between octave samples and single note samples.

So for the user :

- In the opening and closing cycles of the pieces, they will control the octave samples via the ASDFG keys.

- Just before the cycles involving Imbal and Sekaran, they will need to hit the SPACE BAR in order to turn the octaves off and the single notes on. The single note samples will be controlled from the QWERTY and ASDFG keys.
- Just before the return to the final cycle in the piece, they will need to hit the SPACE BAR again to revert to octaves controlled by ASDFG.

To add to the difficulties of this task, the layout of notes on the on-screen Bonang Panerus, does not follow a logical progression in ascending order of pitch from left to right.

This is all far worse in print than in the application, where time spent learning the order of the notes on the QWERTY keyboard, and seeing how they light up on the instrument on screen, plus the use of 'Guided Play' mode, will not only demonstrate how this has been solved, but reap dividends in performance accuracy.

Following a recording and saving of a performance, students should be encouraged to undertake a Performance Evaluation.

#### c) Listening and Appraising

It may now be appropriate to reinforce some of the concepts encountered in performance, by undertaking some of the activities in the 'Listen' area.

AIMS :

For each user, according to their ability :

- To identify accurately instruments from the Gamelan
- To identify structural features in a piece of music
- To identify accurately musical elements such as tempo and tempo change
- To understand and use musical vocabulary and terms specific to a culture

The 'Background to Kebogiro' area would provide some easily digestible information about the piece that has just been performed and is just about to appraised.

Students may be directed to tasks as appropriate, the following descriptions should offer some guidance.

The area contains three tasks involving listening and answering multiple choice questions on different versions of Kebogiro.

A good 'entry level' task would be the 'Build up of instruments' version. This is not a traditional performance of the piece, but a special version in which instruments are added one at a time, supported by questions focussing on recognition.

The 'Simple Version' and test, would be a good choice for younger listeners, or students who need to build confidence in structural listening. The performance in this version does not include interlocking patterns.

The 'Decorated Version' features both Bonangs playing Imbal and Sekaran, and its accompanying test offers the greatest level of challenge. If this is too challenging for any student at this stage, perhaps it could be revisited after they have completed a composition.

#### d) Composition

Having gained insights into this music through performance, users can now be encouraged to deepen their knowledge and understanding through composition.

AIMS :

For each user, according to their ability :

- To produce a multi-layered heterophonic composition using the principles of Javanese Music.
- To devise repeating patterns that inter-relate, within a given form
- To understand heterophony
- To understand the role of different instruments and compositional procedures within a cultural convention and style.
- To understand the importance of structure, on every level, as a means of controlling the balance between unity and variety within a piece.
- To become equipped for further composition, using rigid techniques, in a context of free choice away from the application.

#### Our Approach

The composition area provides a directed approach in which the key compositional concepts are the prime focus. In practical and musical terms this means an encounter with the main nuclear melody of the piece, or Balungan, and how all other patterns are related to it or derived from it. As the piece grows, and choices are made, the application allocates notes to positions on a backing track, which can be exported and saved as a mixed-down stereo audio file, at various stages, allowing the piece to be revisited and edited later. The user is able, therefore, to concentrate on the techniques and composition away from any issues involving performance opening the possibility of creating work that may be beyond their ability to perform, yet be able to appreciate an accurate 'virtual' performance of their piece.

In order to achieve this, only certain compositional choices are accessible to the user. The overall form of the piece, a Lancaran, has been decided, along with the broad structure of each cycle of the piece and the tempo. Javanese pieces consist of a number of phrases, each of which is known as a Gonggan. In a Lancaran each Gonggan lasts for 16 beats. These phrases are arranged in an agreed sequence. This sequence, or cycle, is then repeated a certain number of times, usually at the discretion of the Kendhang player (drums). Thus, in the application, each composition cycle consists of 3 different phrases or Gonggans, arranged in an AABBC shape, and since the 'discretion of the Kendhang player' is a variable that cannot be reproduced, we have

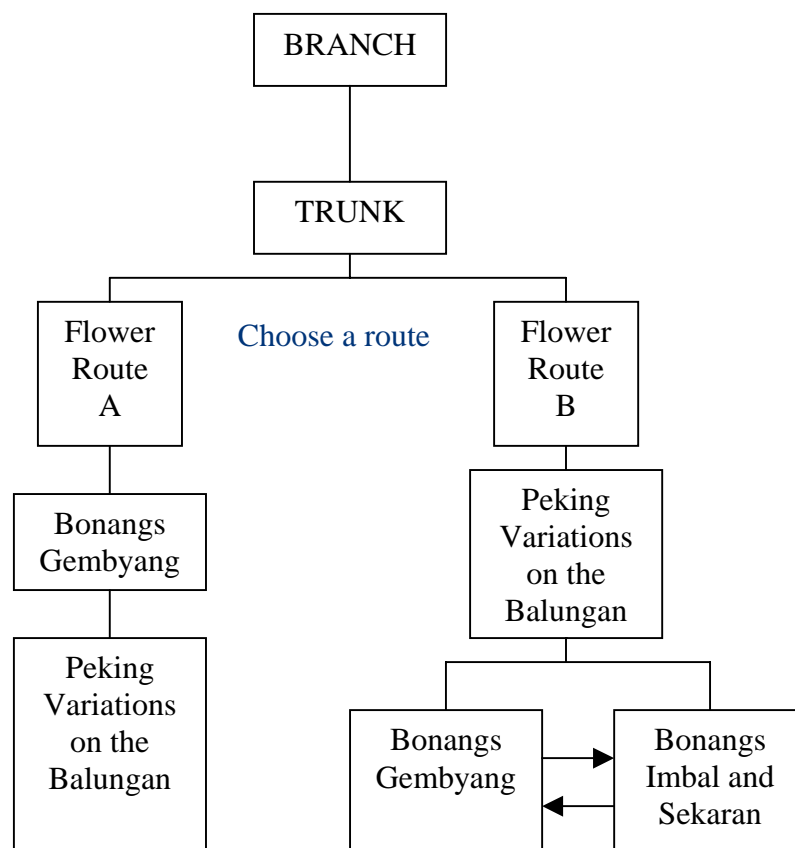
restored an element of choice for the user, by offering 3 levels of composition templates of fixed length.

Thus a choice is available of 1 cycle, 3 cycle and 4 cycle Lancaran templates, complete with Buka or introduction. Having made a choice of template, the user is then guided, step by step, into choosing notes for the appropriate instruments in each of the 3 remaining layers of the piece.

These 3 layers are conceptualised, using imagery borrowed from Balinese music, as the branch, trunk and leaves, or flowers, of a tree. The branch represents the Balungan, or main melody and its instruments; the trunk, the ‘punctuating’ or ‘colotomic’ layer, and the leaves or flowers the ‘embellishing’ layer.

In Javanese music there is a 4<sup>th</sup> layer summarised under the term ‘leadership’ represented by the Kendhang player. As mentioned above, it has not been possible to allow the user any control over this. Instead it has been provided since the backing track for each template consists of the Kendhang part, along with the Kethuk, which only provides one repeated note, and the strokes on Gong Ageng, the largest of the gongs.

Composition Map



Learning Strategies, support and pupil guidance

Although this is the most directed area of the application, differentiation is achieved both by task and outcome, which is sure to be apparent as the activities are described.

#### a) Background Information

All users would benefit from visiting the items from the Contents Menu of this area, before activating a composition, which cover various items of background information.

Even though this text-based factual information is broken down, some students may need additional one to one support in terms of accessing the text and also filtering out some of the detail.

#### b) Composing

At each stage, many users may benefit from keeping a written log, away from the application, of their composition choices. This could be an ideal way to finish a session, and provide valuable information for teachers if the work is to be assessed on completion.

##### i) Choosing a template

By implication, there is more scope for individual choice and demonstrating understanding in the 3 and 4 cycle templates.

The 1 cycle template is ideal as a quick introduction to some of the techniques, or for students who are finding some of the more advanced areas of the task too challenging.

All of the backing tracks for the composition templates are derived from live performances, in order to preserve a realistic 'human' feel on playback.

At this point it is worth mentioning that SAVE COMPOSITION creates a file that records the choices of notes in the various layers. When loaded back into the application, perhaps at a later date, a choice of template will have to be made again before a preview file can be created or exported. In other words, once the notes have been chosen, in the various phrases and layers, and saved as a composition, it is possible to choose a different template once the composition file has been loaded back into the application, making it easy to expand the piece at a later date.

##### ii) The Layers and Phrases

As soon as a template has been chosen the 'Branch' layer opens, revealing the composition interface, defaulting to Phrase A of the piece, for the first time.

An overview of the whole piece, and the AABBC layout of its phrases, appears as a time-line on the upper portion of the interface.

Below this, in the main portion of the interface, there is a grid, rather like a spreadsheet, in which the user is directed to enter notes in the correct place in the 16-beat phrase.

**Note input** is achieved, either by pressing the relevant QWERTY key, or by clicking on its on-screen version. As the note is entered, its sample is heard.

It is possible to experiment and change choices. However, students should be encouraged to fill all of the cells in the grid as the application will not accept any that are empty.

**Phrases** are selected by passing the mouse over the time-line above the grid and clicking on the graphic representation of the desired section. Notes for any phrase only need to be entered once; the application then assigns them to repetitions of the phrase elsewhere in the piece.

**Layers** are selected by selecting 'Branch', 'Trunk' etc., from the menu on the left-hand side of the screen.

### iii) Support

At 'Branch' level, the upper right-hand section of the screen carries text based support.

From the 'Trunk' layer and beyond, support arrives in two forms. Clicking on a 'Tutorial' tab, or specified instrument tab, will open further detailed text based instructions on how to complete this layer.

However, each of these deeper layers opens with a demonstration grid, showing how to derive notes from the main melody, for each new instrument encountered. Clicking the 'Next' button opens the live version of the grid in which the notes can be entered. The live grid always displays the notes chosen in the 'Branch' layer as a point of reference.

It is worth noting that the live grid in these layers often contains cells for more than one instrument. Students may need to be advised to toggle between a 'tutorial' screen and the live grid, via the 'Next', button if they experience difficulty in remembering what to do.

### iv) Embellishment

It is hoped that all users will be able to produce a full-length piece featuring 'Branch' and 'Trunk' patterns.

Having reached this point, it is possible to review what has been achieved so far, listen to the piece, save it and choose not to proceed any further with composition. In this case, students would be advised to complete an evaluation and move on.

For those that wish to add further development to their pieces there is a choice of two routes. The way in which users are directed to use the techniques in both routes is designed to promote a satisfying final performance.

#### ROUTE A :

This is a straightforward route that introduces two embellishment techniques, the second of which, 'Peking : Variations on the Balungan' includes an element of choice for the user, allowing them to specify where it is to be used in the piece.

#### ROUTE B :

This route, more suitable for the adventurous user, includes the two embellishment techniques encountered in Route A, but deploys them within the piece in a different way. It also introduces a third embellishment featuring interlocking patterns between the two Bonangs known as Imbal and Sekaran.

This technique, in terms of choices of notes, is the nearest to a completely free choice anywhere in the application. It is worth pursuing as the effect, a rippling, shimmering 'hocket' between the two bonangs, ending with a melodic cascade, adds a spectacular final layer to the piece.

#### e) Further Listening

At this point students may benefit from another visit to the 'Listen' area. Either to attempt a more advanced task than on previous occasions, or to reinforce the concepts encountered during composition, through comparison with a recorded performance of an actual piece.

#### f) Research and Report

Following this, a suitable final task would be some directed further research, with a view to writing a summative report on Indonesia and its music. This may involve work away from the application. The 'Resource Links' area would be a good place to start, especially for web-based research. Knowledge and understanding gained from the musical activities encountered so far will help users make the most of any of the material encountered.

A report 'template' can be found in the 'Evaluate' area, which can either be used to enable achievement for users who may find report writing challenging, or as a start for more able students, especially if it is exported into a word processor.

## ASSESSMENT

Following a thorough route through the activities, the user's portfolio should contain a comprehensive amount of evidence to aid assessment on a continuous basis. Some of this will be in the form of self assessment, particularly if evaluations have been completed. If files from My World have been saved on a regular basis, it should be possible to gain an overall view of how much of the application has been used, and in some cases, how successfully, while performance and composition files will yield a wealth of information relating to understanding.

Clearly teachers will need to generate an appropriate scheme of assessment based on the particular programme of study or syllabus in current use. The activities in the application are based on providing opportunities for positive achievement, rather than data recall, as access to sources of knowledge are not withheld from any of the quizzes and tests. Depending on the view taken by individual teachers, and curriculum demands, it may be necessary to supplement the work achieved in the application with additional assessment tasks.

## FURTHER WORK

The **Virtual Javanese Gamelan** is an ideal tool to prepare students for work on a real Gamelan. While it is unusual for a school to possess its own Gamelan, there are a surprising number available for community use, in all parts of the world. Very often short day long courses are available, in some cases it is possible to hire a Gamelan for your own institution for a few days. Following leads in the resource links will soon reveal where they can be found.

The experience gained on The **Virtual Javanese Gamelan** can be transferred to live instruments in the classroom. Certainly the material presented in the application could be adapted to instruments capable of playing a pentatonic scale.

With imagination there are all sorts of possibilities. Gamelans have been made from scrap, including old springs, iron bars, and car hub caps. In the West there have been many developments combining live Gamelan with synthesizers or orchestral instruments. This process could be emulated within a 'virtual' world. Composition or Performance files from the application can be imported into sequencers capable of supporting digital audio, wave editors or digital samplers all of which open up possibilities for further transformation and creation.

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