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Choosing a Composition Program

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Composition programs include sequencers, scorewriters, auto-accompaniment, and integrated programs. They can be thought of as musical word processors that allow you to record, edit, arrange and publish music. These "music processors" share many common features: most will allow you to edit, copy, cut and paste music; record from a MIDI keyboard; transpose; and print. This technology enables anyone to create and edit their own music, with professional results. This article explores some of the possibilities offered by these programs, and addresses the challenge of selecting the software that will best meet your needs - and your budget.

Composition programs are invaluable tools for the music educator. After the initial learning curve, technology can help save you time in creating your own materials for classroom use.

Just like a word processor, notation programs allow teachers to create professional looking worksheets and arrangements for their students. You can easily save your music for future use and further editing, as necessary. Transposing to a better vocal or instrumental range becomes an easy task. Arranging music for a beginner band or for odd instrumentation can take a matter of minutes, instead of hours.

A sequencer is an indispensable tool for rehearsals where you do not have an accompanist, or where you the accompanist! Record each voice or part onto a separate track, and then use the sequencer as a "virtual tape deck." Most sequencers allow you to start and stop at any point, change tempos, instruments, solo and mute parts and even transpose on the fly.

Auto-accompaniment programs are great tools for creating your own accompaniments for any ensemble. Accompaniments created by these programs or with a sequencer, can

be used in class and recorded to tape or CD for students to practice with.

In addition to its role as a teacher tool, technology can provide valuable assistance in developing student creativity. From creating or arranging simple melodies to complex multi-part compositions, students can be involved in the creative process without the burden of first mastering the skills of music writing or transcription. Using software, students can create music beyond their performance ability, and immediately hear the results. Their creations can be shared with others, and they can make immediate changes based on peer and teacher feedback and assessment.

True discovery learning can occur, as students learn from their own compositions or arrangements. As they experiment and assess the effects of various elements of their creation, they can be guided to make generalizations and look for those rules in other music.

For example, programs like Band in a Box will allow students to experiment with different harmonizations and styles by making simple choices. Once they are satisfied with the how the I, IV and V chords sound with their melody, students can discover the relationship between the notes in the chords and the melody. They can also experiment with tension and release, and learn more about functional harmony – all out of a desire to understand their own creation!

Technology enables students to interact with music in many new ways. Programs like Cubase or Sonar include an Overview that allows users to define and manipulate the overall structure of a composition. A canon can be shown graphically, and the parts of a fugue can be labeled, copied and rearranged as necessary. Working with form is incredibly easy when this type of view is available.

Students can use these building blocks to arrange the music into different order, or to create their own theme and variations.

Sequencer vs. Notation Program

To most newcomers to music technology, the distinction between a sequencer and a notation program (or scorewriter) can be confusing. Even to long time users, the need for two separate programs has been an uncomfortable issue. The problem has been partly resolved by programs that integrate sequencing and notation into one package.

Although the difference between the two has become muddled over the years, a sequencer is mostly concerned with how music sounds. In other words, a sequencer is a tool for recording, editing and arranging music. The first sequencers did not even have a notation view that allowed you to look at traditional music. Instead, you had to work with a graphical roll view. Although most sequencers let you view and print notation, they are usually very limited in terms of page layout and markings.

Sequencers have traditionally been more flexible when it comes to recording in real time. Advanced features such as tempo maps allow you to set-up the tempo and changes ahead of time. Some scorewriters are starting to adopt this flexibility, such as Sibelius's "flexi-time" recording that follows your tempo. Another strength found in most sequencers is the ability to quantize (line up the rhythms) your music in a number of different ways. For example, you can define a "groove" or pattern that most rhythms should line up to, and then choose a percentage of how close the notes should be to the groove.

Notation programs (or scorewriters) put the emphasis on how the music looks. They provide more flexible page layout and publishing control. However, scorewriters sometimes lack advanced playback control, quantizing and other features that are focused on how the music sounds. Many companies are starting to include many of these basic features that were once lacking.

Some developers are even starting to add artificial intelligence to playback, such as Sibelius's "expressivo" feature.

There are a few programs that attempt to integrate sequencing and notation into one package. Cubase SX, for example, integrates the most common sequencer features, while including flexible notation and page layout options. It uses a unique approach that allows music to sound different than it looks. This is a useful concept for students to understand – that printed music is interpreted, and not just played exactly as written.

Integrated programs can be a great solution if you need the features of both a sequencer and score writer. As with most integrated software, however, programs that combine both functions sometimes lack the advanced features that a dedicated program would provide. Developers who try to provide all of the features of both programs run the risk of creating an unwieldy program that becomes difficult to learn and use. It is important to determine your needs, and select a program or combination of programs that best match these needs. An integrated program may meet your needs, or you may need to find a dedicated sequencer, scorewriter, or both to achieve your goals.

Despite claims otherwise, there is no one program that is "the best." There are many very good programs, but each has strengths and weaknesses. They range in price from under \$100 to over \$400 or more, making it even more important to select the program that best fits your needs, and your budget!

There are many considerations to take into account when selecting a creativity program. Among other things, you should investigate how the software handles entering music, arranging and editing, playing back, and printing. We will discuss each of these factors in more detail, along with a quick look at automation, customization and interaction with other programs.

Even before investigating the factors already mentioned, two deciding questions should be

answered from the outset. First, consider how many parts will be required for your music. Many entry level programs are limited to sixteen parts. As well, many will not print the score and separate parts. This may be enough, but if eventually you require seventeen parts, your investment of time and money may be lost as you search for a more advanced program. Many vendors are starting to make mid-level and high-end programs, with upgrade paths that allow you to take the plunge to a more expensive program when the need arises.

A second question to answer concerns the ability to handle multiple voices. If you require stem directions to indicate SATB, for example, make sure that you select a program that can do this. As well, it may be important to be able to select, edit, modify only certain voices. More advanced programs allow you to automatically move voices around, extract and separate parts from the voices.

Entering Music

There are four main ways to enter music: recording in real time, step entry, mouse or keyboard entry and scanning. Real time recording in music is similar to speech recognition in word processing: although it is the most natural way to enter data, it also requires some adjustments on the part of the user, and the technology.

You can record directly to your computer from you MIDI keyboard through a midi interface. The keyboard can be as simple as an inexpensive 49 key controller, to a 64 voice synthesizer to an 88 key electronic piano with weighted action. If you do not have access to a midi keyboard, some software allows you to use your computer keyboard to record in real time, provided you do not try to access a range larger than an octave!

Just as voice recognition is still subject to errors, so is music recognition by a computer. One of the issues that arises from real time recording is that how music sounds and how it looks are often very different. Specifically, rhythm and voice allocations can be difficult

for a computer to discern. Some programs will be more demanding than others in terms of your accuracy. Correcting the way the music looks in some programs may also affect the way they sound.

Most notation programs allow you to control the level of quantization both before and after recording. It is wise to set the quantization to the shortest note value you will be playing. Quantizing to eighth notes, for example, will prevent the program from notating staccato eights as dotted sixteenths. Some programs such as Finale allow you to tap the tempo as you play. Others, such as Sibelius, will attempt to follow you if you gradually change tempo.

Another common problem is for a program to interpret a legato section as a number of overlapping voices. Some programs are smarter than others in discerning what you really wanted to display, but there is always a balance that needs to be addressed. If a program applies its own interpretation too often, you may not have the control when you need it. For example, many programs will assume that you have made a mistake and automatically correct it, but in some cases, it may not be a mistake. Working with demos of programs for at least four or more trials will usually give you insight into how the program thinks. Perhaps the future will bring a notation program with enough artificial intelligence to learn from your choices, such as the auto-correct feature found in many word processors.

Traditionally, composition software has been the exclusive domain of MIDI. It is relatively easy for an electronic keyboard or even a guitar to send note on and off messages for the computer to record. Until recently, the options for non-keyboard players were to avoid real-time recording, or buy expensive pitch to midi converters. MakeMusic's family of products (Print Music, Finale, etc.) will convert single melodic lines to MIDI in real-time. This allows anyone with a microphone to sing or play into virtually any sequencer or notation program. However, the technology is still in it's infancy, and it is difficult for a computer to identify the fundamental pitch

when dealing with the overtones produced by complex waveforms such as guitar.

In many cases it is difficult to enter music in real-time, even with the tempo lowered. Step-entry is an efficient alternative that allows the pitch to be selected by playing a note on the MIDI keyboard, while the rhythmic value is manually entered. Many programs, for example, have a palette of note values that you click to select. Using the keyboard, however, is usually faster – Sibelius, for example maps the numeric key pad to specific note values. Finale also includes a quick reference sheet that lets you use the keyboard for speedy entry.

In addition to step-entry, you can enter pitches by clicking them on the staff or tapping their corresponding key on the keyboard. This is useful for situations where a midi keyboard is not available. On-screen keyboards or guitar fretboards are also available in some programs and can be used for step-entry or for real-time entry, provided you can move your mouse fast enough.

Another option for inputting music into the computer is through optical character recognition. Programs such as SmartScore or Photoscore allow users to scan music for further editing. (See our FAQ on scanning music.) If you are planning on scanning music, ensure that the notation program you select supports scanning - either with an integrated program or an add-on program. Note that most integrated scanning programs are "lite" versions that may be missing useful features.

User Interface

As improvements are made in Graphical User Interface (GUI) technology, software becomes easier to learn, and skills learned in one program can often be transferred to another program. Interacting with a GUI can be personal preference, related to how you want to interact with the computer. Some programs, such as those developed by MidiSoft closely mirror the standards of Windows, making it easy for users to learn the program, if they have some experience

with the operating system. Other cross-platform programs, such as Cubase or Overture, borrow metaphors from both platforms, making it similar, yet different from the respective platform. Developers are starting to pay more attention to the human-computer interaction, and programs such as Sibelius are offering refreshing new ways of pushing the technology to the background so that creating can take center stage. Sibelius's "virtual manuscript paper", for example, allows quick navigation anywhere in the score. Other important features to look for include an overview, rehearsal markers, and bookmarks.

In addition to the traditional notation view, computers provide alternative ways of viewing music. Sequencers, for example, usually default to a "track view" which shows a listing of all parts in a composition. Other useful views include print preview, a linear view that provides a continuous horizontal line, and separate part and score views.

Lyrics & Text

How a program edits lyrics and markings is an important feature to evaluate. Most programs allow you to type lyrics beneath the notation. Some require you to line up the lyrics and notes, while others automate this procedure. Manually aligning text and then realigning can be a very time consuming exercise. Programs such as Finale offer a separate text editing window, and even allow text to be imported from another program. It is important to determine the maximum number of verses that can be added, and if the staff size will adjust to accommodate the text.

Playback

Playback has not always been a strength of notation programs. Now, however, some notation programs will playback the dynamics, articulations, and even text markings that you enter. This can help bridge the gap between a sequencer and notation program. For example, rather than using a sequencer to record the appropriate effects for pizzicato strings, simply typing

"pizz" in Sibelius will automatically create the effect.

As well, the latest versions of Sibelius and Finale now include their own built in "soft synth" and "convert to wave" features that improve the sound quality of your playback and allow you to burn it to CD. However, for more professional playback, a sequencer with a VST or DXi soft synth will provide much better results. There are a number of extremely high quality soft synths and sample libraries that can make your music sound very realistic. Currently, there isn't support for virtual instruments or soft synths in notation programs.

Although sequencers usually provide the option of creating breakpoints and structural maps of how playback should occur, notation programs typically rely on score markings to control repeats. Not all programs, however, will respect these markings, often making the use of a sequencer necessary.

A sequencer will usually play back the music the way you recorded it. If required, sophisticated transformations can help align your recordings to give a certain feel. Most programs, for example, can swing your recording. Some scorewriters also provide this ability, and through artificial intelligence, will even offer a somewhat musical interpretation of your notation.

Printing

Page layout and printing provides another challenge of balancing ease of use with the amount of control and flexibility provided to the user. Although some users may require the precise page layout control provided by Finale, others may find the necessary decisions time consuming and cumbersome. The ability to create templates in program like Finale, or the potential offered by editing and exporting house styles in Sibelius may be essential for demanding publishers, but overkill for general use. Many basic programs provide so few options as to make the page layout difficult to adapt to different uses – such as worksheets, ensembles, flash cards, etc. This is important to note, as many

teachers require the flexibility of a program that allows you to "bend the rules" by hiding barlines or leaving notes out of measures for worksheets. Many teachers start with an entry level program and soon realize that most worksheets and exercises are beyond the capabilities of beginning programs.

Most notation programs export or extract the parts to separate files from the main score file. This offers the benefit of being able to create a custom layout and annotations for each part, but requires the parts to be re-created each time a change is made in the score.

Other factors to consider are a program's ability to import or export graphics. Importing images can be useful for creating worksheets, since clip-art and other images can be imported and placed anywhere on the music. Many other programs allow you to export sections of the music as an image file to be used in a word processor for assignments or examples in other documents.

Despite claims otherwise, technology sometimes does not introduce efficiencies in certain situations. As the music software market becomes more competitive, companies start to look for features to set their product ahead of others. Sibelius, for example, will automatically insert a part in score order, with the correct clef, key signature and instrument patch change. Finale can accomplish this through plug-ins, while Cakewalk and other programs (including Sibelius) have a built-in scripting language that allow you to create macros to automate common tasks.

Conclusion

Since there is no one program that "does it all", eventually you may need to exchange your music from one program to another. MIDI is a universal file format that all music software and hardware understand. MIDI files are small and can be found everywhere on the Internet. Unfortunately, MIDI only provides note on and off messages. In other words, it tells your soundcard what notes to play on what instruments, for how long and

how loud. MIDI is a relatively old standard, designed for keyboards and sequencers. It was not designed with the idea of sharing music in the form musicians are most familiar – notation. Consequently, it lacks information about markings, repeats, or page layout.

An attempt was made a few years ago to create a new standard – the Notation Interchange File Format (NIFF). Unfortunately, very few companies have adopted it so far. Instead, MusicXML is now the current hope for finding a standard way of exchanging files between notation programs. Finale currently supports XML to some degree, with a plug-in available for Sibelius and other programs to save data in XML.

Perhaps more open standards will be developed in the future, allowing programs to easily exchange all types of musical data. For now, it is important to select a program, or combination of programs, that meets your needs.

Create a list of the features that are important to you, and then choose a few programs that include those capabilities. If possible, obtain a demo of these programs and try working with them. Find out how easily the program will carry out the common tasks that you hope to perform with the program. Remember however, that there is a learning curve with any program, and that it may be necessary to read a tutorial or the on-line help to find out the most efficient way of interacting with the program. Sibelius for example, features many shortcut keys that are a real time saver once you have learned them – but take a while to learn.

When making your final decision, be sure to keep in mind your current and future needs. Although it may be helpful to select a program that has a large user base, keep in mind that everyone has a unique way of creating music and interacting with computers - it is what makes us as musicians unique!

For a comparison chart of various notation programs available, visit <http://kellysmusicandcomputers.com/notationguide.asp>

For more information on music scanning software, read our FAQ at: <http://kellysmusicandcomputers.com/detailedanswer.asp?faq=48>

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