

# ***Comparison of Music Composing Software: Evidence from Sibelius, Cubase and Garage Band***

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**Abstract:** In recent years, the development of music composition software has revolutionized the way music is created and produced, making it more accessible and efficient. This essay compares three prominent music creation platforms, i.e., Sibelius, Cubase, and GarageBand, highlighting their unique features and societal benefits. Sibelius, renowned for its robust music notation tools, caters primarily to composers, educators, and students focusing on score-based music. Cubase, a professional digital audio workstation (DAW), offers advanced editing, mixing, and production capabilities, making it ideal for both studios and educational environments. GarageBand, with its intuitive interface and integration across Apple devices, serves as an excellent entry point for beginners and an effective educational tool. Together, these software programs showcase how technological advancements are shaping the music industry, making creation, learning, and production more accessible to a wider audience. The significance of this research lies in understanding how different music software platforms serve varying needs, enriching the creative process and contributing to the democratization of music education.

**Keywords:** Music Composing, Sibelius, Cubase, Garage Band

## **1. Introduction**

The emergence of virtual digital music generated by modern computer-based composition systems firmly places it within the broader category of electronic music. Although the formal term “electronic music” gained prominence in the 20th century, its conceptual foundations can be traced back to as early as 1837. During this period, British inventors William Fothergill Cooke and Charles Wheatstone developed the electric telegraph, a system that used electrical impulses to transmit messages through wires. While their invention was primarily a milestone in communication technology, it indirectly laid the groundwork for the future of electronic sound manipulation [1]. The ability to transmit and control electric signals opened up new possibilities for rethinking how sound and, by extension, music could be created and reproduced.

With the invention and eventual proliferation of computers in the mid-20th century, the field of electronic music experienced a significant acceleration in development. From the very beginning of the computer age, musicians and technologists alike were eager to explore how these new machines could be harnessed to aid in the creation of music. One of the most influential pioneers in this area was Max Mathews, often regarded as the “father of computer music” [2]. In the 1950s, Mathews developed the first computer music program, establishing the fundamental principles that would later

define the discipline. His contributions marked a turning point, proving that computers could not only assist in music production but also function as instruments.

In the decades that followed, several important institutions were established to support the growing interest in computer-generated music. These include the Institute for Research and Coordination in Acoustics/Music (IRCAM) in France, the Center for Computer Research in Music and Acoustics (CCRMA) in the United States, and the International Computer Music Association (ICMA), founded in 1975 [2]. These organizations played a key role in fostering collaboration between scientists, musicians, and software developers, and were instrumental in advancing research into digital sound synthesis, algorithmic composition, and interactive music systems. Computer music can be understood in two main dimensions. First, computers serve as sequencers—that is, tools used to store, organize, and manipulate musical note sequences. In this role, the computer functions as a digital recording and playback device, arranging rhythmic and melodic patterns. This kind of sequencing allows for precise control over musical structure and timing, and it has become an essential part of modern music production workflows. Second, computers can also act as sound generators. Through digital signal processing, computers are capable of creating, modifying, and combining sound waves to produce entirely new timbres and textures. This has led to the development of complex software synthesizers that can emulate traditional instruments or generate abstract, synthetic sounds that were previously unimaginable. During the 1970s and 1980s, advances in digital storage and processing technology led to the creation of digital synthesizers, which became more affordable and accessible over time [3].

A major milestone in this evolution came in 1983 with the introduction of the MIDI (Musical Instrument Digital Interface) Standard 1.0 [3]. MIDI allowed electronic instruments and computers to communicate with each other using a universal protocol. This innovation standardized digital music interaction, allowing for seamless integration between hardware and software, and officially marked the entry of computers into the music production domain. Nowadays, a wide range of music-related software applications have emerged to support composition, arrangement, performance, and education. These include notation tools like Finale and MuseScore, digital audio workstations such as GarageBand, and programs focused on sound design, accompaniment, and teaching [4]. Each of these tools offers unique functionalities tailored to different needs, enabling both amateurs and professionals to engage with music in innovative ways. This essay is going to explore how these various composition software programs are used in different contexts and analyze their impact on modern society. This essay will examine the benefits and drawbacks of these technologies, looking at how they have reshaped the creative process and democratized access to musical production.

## 2. Description of music composing softwares

Computer music software can generally be categorized into five main types: composition software, score notation software, timbre editing software, computer accompaniment tools, and music education applications. These software tools serve a variety of functions within the process of digital music production, where computers are used to collect, manipulate, and refine audio materials to create complete musical works. In the composition and arrangement process, digital music production software enables users to integrate a wide range of sound sources and manipulate them flexibly. These programs allow for sophisticated audio processing—adjusting pitch, tempo, effects, and other parameters—to shape the sound to meet specific artistic or technical requirements. Audio processing refers to the transformation of digital audio data into signals that can be edited, played back, or exported. Through this, musicians can craft high-quality sound textures and dynamics directly within the digital environment [5].

Notation software, on the other hand, is specifically designed for score editing and printing. Unlike other types of music software, notation programs typically exclude MIDI editing features and instead

focus on visual elements. They come equipped with various playback and recording functionalities and provide a wide range of predefined musical symbols [4]. Programs such as Finale and Encore are commonly used in modern music composition. These tools make it easy to input expressive markings such as slurs, staccatos, crescendos, and decrescendos, offering composers precision and control in visualizing their ideas. Timbre editing software is another key category that supports the design and adjustment of synthesized sounds. These programs allow users to modify sound characteristics through an intuitive graphical interface, making it easier to sculpt complex tones and textures [4]. They are especially useful when working with virtual synthesizers, providing a platform for detailed sound customization. Computer accompaniment software is designed to streamline the arrangement process by simplifying complex tasks. These programs typically divide the workflow into two core steps: selecting a musical style and inputting chord progressions. Popular software like Band-in-a-Box and Super Jam offer a wide variety of preset musical genres, ranging from pop and jazz to classical and folk [4]. Some even include templates inspired by the styles of famous composers such as Mozart or Haydn, making it easier for users to emulate that aesthetics in their own work.

Music education software represents one of the most diverse and widely used categories in the realm of computer music. These applications cover areas like harmony training, ear training, rhythm practice, and more. Designed with interactivity in mind, they transform traditionally repetitive exercises into engaging learning experiences through vivid visual interfaces [4]. This type of software is especially valued by educators and learners for its practical applications in both training and creative development.

Overall, each type of computer music software plays a unique role in modern music production, contributing not only to the technical quality of compositions but also to the accessibility and efficiency of the creative process.

### 3. Sibelius software

Sibelius is a powerful music notation software used for writing, recording, and arranging music. It allows users to create and edit compositions in the form of block notation, making it an essential tool for musicians, composers, and educators. Sibelius was developed by British twins Ben and Jonathan Finn in the mid-1980s. Initially, it was designed for the Acorn Archimedes computer in 1986. Later, it was rewritten in C++ and officially released for Windows and Mac in 1998 and 1999, expanding its accessibility and user base. One of the key features of Sibelius is its flexibility in music input. In addition to manually entering block notation, users can input music by playing instruments such as the piano or guitar. This feature enhances the composition process, making it more intuitive and efficient. Sibelius offers several notable advantages, including a smooth display, high-quality virtual instruments, easy recording capabilities, and a user-friendly MIDI plug-in [6]. The software's well-designed interface ensures precise and accurate note placement, significantly improving the workflow for musicians and composers. Sibelius quickly gained popularity in the educational sector due to its ability to integrate plug-ins and extensions. Users can suggest and even develop custom plug-ins, further expanding the software's functionality. Additionally, Sibelius is highly compatible with MIDI (Musical Instrument Digital Interface), allowing for immediate sonic feedback. This real-time interaction enables users to hear their compositions as they work, facilitating a more engaging and efficient creative process. MIDI captures essential musical data, such as key presses (using predefined MIDI numbers from 0 to 127), note duration (on and off times), and velocity (how hard a key is pressed, which influences volume output). Through interfaces such as WYSIWYG notation displays and MIDI piano rolls, Sibelius provides both visual and auditory feedback, making it an excellent tool for learning and refining musical compositions [7].

One of Sibelius's most significant contributions to music education is its ability to support interactive composition through real-time playback and editing. This feature makes it a valuable tool

for students, teachers, and composers alike, as it democratizes music notation and simplifies the process of professional-quality music publishing. In the field of vocal training, Sibelius can be used as a basic accompaniment tool when learning fundamental vocal techniques. The process typically involves three key stages: 1. Selecting appropriate basic vocal teaching materials. 2. Using Sibelius to create a customized vocal accompaniment. 3. Testing and refining the vocal accompaniment with Sibelius software [7].

In addition to vocal training, recent studies have highlighted Sibelius's effectiveness in teaching counterpoint composition. Students can use the software not only to write counterpoint melodies but also to listen to them in real time, which significantly accelerates the learning process. Traditionally, composing counterpoint manually on staff paper is a time-consuming task that requires careful planning and revision. However, Sibelius streamlines this process, allowing students to focus not only on counterpoint rules but also on the musicality and artistic expression of their melodies. By reducing the time spent on notation, students can dedicate more attention to the creative and theoretical aspects of composition [8]. Sibelius helps in vocal training [6]. Overall, Sibelius is a versatile and innovative tool that enhances the music learning experience. Its advanced features, real-time feedback, and user-friendly interface make it an essential software for music students, educators, and professionals. Whether used for vocal practice, counterpoint exercises, or general composition, Sibelius continues to play a crucial role in modern music education and production.

#### 4. Cubase software

Cubase is a comprehensive digital audio workstation (DAW) that integrates MIDI sequencing, audio editing and processing, multi-track recording and mixing, sound source management, and video scoring. First developed in the early 1990s by Steinberg, Cubase has evolved into one of the most powerful and widely used music production software programs in the world. It was among the earliest tools to introduce real electronic music synthesis, setting a benchmark for digital music technology. With its world-class features and constantly evolving capabilities, Cubase remains a top choice for music producers, composers, and sound engineers.

One of the most impressive aspects of Cubase is its ability to manipulate time and pitch [9]. Users can stretch or compress time while maintaining the original pitch, or alter the pitch independently of time, making it an essential tool for both corrective and creative processes. Additionally, it allows users to seamlessly re-edit and rearrange songs, making it easier to refine musical compositions. Cubase also offers a customizable user interface, enabling producers to organize their workspace according to their preferences and workflow. This level of customization improves efficiency and enhances the overall music production experience. Beyond traditional music production, Cubase can integrate both virtual and real recording studio environments, allowing for smooth interaction between live and digital elements. It includes advanced features for managing virtual instruments, effects, and sound libraries, making it a versatile tool for musicians and composers. By using Cubase's sophisticated composition applications, artists can transform everyday sounds into musical elements that would otherwise be impossible to recreate with traditional instruments. This ability expands creative possibilities and enriches musical arrangements.

A significant feature of Cubase is its extensive support for Virtual Studio Technology (VST). VST plugins offer a vast range of effects, instruments, and sound libraries that enhance the creative process, enabling users to explore new sonic possibilities [10]. These built-in tools and presets make it easier for composers to experiment with different textures and harmonies, leading to innovative compositions. By providing a comprehensive suite of effects, filters, and mixing tools, Cubase allows musicians to fine-tune their projects with professional-level precision.

During the COVID-19 pandemic, researchers and musicians turned to Cubase to facilitate remote music production. One notable use was in the creation of virtual choirs, where individual vocal

recordings were compiled into a cohesive performance [10]. Cubase's advanced audio processing tools enabled producers to edit and align multiple tracks, adjust volume levels, apply effects, and ensure overall sound clarity. The software's high-quality audio editing capabilities ensured that virtual choir performances maintained a professional and polished sound, even though the singers recorded their parts separately from different locations. Cubase also plays a crucial role in music education, particularly for college composition students [11]. Aspiring composers can quickly learn how electronic composition techniques align with sequencing capabilities and orchestration methods. For example, students can record a MIDI track, assign different virtual instruments to the same sequence, or modify the MIDI data in real time. These functions provide a hands-on learning experience, bridging the gap between traditional composition techniques and modern digital music production.

In conclusion, Cubase is a powerful and versatile DAW that continues to push the boundaries of music production. With its extensive range of tools for composition, editing, mixing, and mastering, it serves as an indispensable resource for musicians of all levels. Whether used for professional studio recordings, live performances, or educational purposes, Cubase remains at the forefront of digital music technology, shaping the future of sound production.

## 5. Garage Band

GarageBand is a comprehensive music production software developed by Apple Inc. in the United States. Designed as a simplified version of Apple's professional digital audio workstation, Logic Pro, GarageBand retains powerful music creation features while offering a more intuitive and accessible interface. One of its standout advantages is its compatibility across Apple's ecosystem, including macOS and iOS devices [12]. This means users can access GarageBand on their Mac, iPad, iPhone, and other Apple products, allowing for seamless music production on the go.

One of GarageBand's biggest strengths is its ease of use, making it an ideal choice for beginners and experienced musicians alike. The software features an extensive library of virtual instruments, including pianos, guitars, drums, and orchestral sounds. It also offers as many as 50 synthesized tones, enabling users to experiment with different textures and styles [13]. Additionally, GarageBand includes an intelligent instrument interface optimized for touchscreen operation, making it easy for users to compose and arrange music with just a few taps.

Another significant feature of GarageBand is its integration with high-quality percussion sounds, curated by world-class musicians. These built-in drum kits and rhythm patterns help users create dynamic and professional-sounding tracks without the need for live recordings. The software also incorporates advanced digital music technology, allowing users to process and manipulate sound with remarkable precision [13]. This enhances the authenticity of recordings and broadens the expressive possibilities of music production.

GarageBand is widely used in educational settings, particularly in music classrooms. With its visual representation of sound waveforms and MIDI notation, students can better understand musical structures and improve their listening skills [8]. The software allows learners to experiment with singing, harmonizing, and playing different instruments, providing an interactive and engaging way to master musical techniques. Because of its straightforward interface, students can quickly grasp fundamental concepts such as rhythm, melody, and harmony.

Beyond traditional music lessons, GarageBand also includes a variety of virtual instruments, such as the erhu, zither, guitar, bass, and more. These instruments can be played directly through the touch screen, with realistic responses in both tone and playing techniques. This hands-on experience enables students to simulate professional performances and create high-quality musical compositions in a short period [14]. Even those without prior musical training can experiment with different sounds and develop their musical abilities.



In addition to its role in music education, GarageBand serves as a powerful tool for fostering creativity and innovation. When students use the software to compose and arrange music, they enhance their concentration, pitch accuracy, and sense of musical timing [14]. Over time, they develop a stronger ability to recognize musical elements, analyze sound structures, and improve their audio and vocal performance skills. The software also encourages innovative thinking, allowing students to experiment with different styles, instruments, and arrangements.

The modern and visually appealing design of GarageBand makes it an attractive choice for learners of all ages. Its engaging interface, combined with interactive features, transforms the process of learning, playing, and composing music into an enjoyable and immersive experience. Whether used for casual experimentation, formal music education, or professional music production, GarageBand remains a highly valuable tool in the world of digital music creation.

## 6. Comparison, limitations and prospects

In Sibelius, although technological advancements have made music creation more accessible, certain limitations remain inherent in the platform. While the enhanced graphical user interface and MIDI-based auditory feedback have improved usability, users are still expected to have a foundational knowledge of Western Staff Music Notation (WSMN) to navigate notation-based software like Sibelius or Finale effectively [7]. This reliance on visual input poses a particular challenge for users with visual impairments. Despite the development of Braille music tools, visually impaired musicians continue to face significant barriers when engaging with WSMN-centered software, which restricts their ability to participate fully in digital music composition.

With the ongoing development of artificial intelligence, its integration into Sibelius has the potential to further transform the composition process. AI could support composers by offering suggestions for harmonies, counterpoint, or full arrangements based on the user's initial ideas. For instance, after a melody is input, AI might propose harmonically suitable chord progressions or stylistically consistent orchestrations tailored to specific genres or emulate particular composers. Furthermore, machine learning could analyze a composer's past works or the styles of renowned musicians to generate new, stylistically coherent material. Personalized AI tools in Sibelius could also adapt to individual writing habits, offering tailored recommendations that make the creative process more efficient and user-friendly.

During the use of Cubase, users may encounter various issues related to installation and operation. As Cubase has relatively high hardware requirements, certain technical aspects must be considered during setup. For instance, it is essential to properly register the software using the required activation codes. When installing sound libraries, it's recommended to place them within the Cubase installation directory to ensure smoother access and integration. Additionally, configuring drivers and MIDI settings is a necessary step, which can be particularly challenging for beginners [9]. As a result, users need to have a solid understanding of digital audio workstations and must be proficient in operating Cubase effectively.

Moreover, the quality of specific instrument sounds, especially those of traditional or ethnic instruments—may need further refinement within the software [10]. If the built-in capabilities or third-party plugins fail to meet the composer's expectations, it can lead to unsatisfactory results and deviations from the intended musical outcome. Therefore, achieving the desired production quality in Cubase not only relies on the software itself but also on the user's technical skills and knowledge of music production.

In the future, Cubase could integrate AI-driven plugins or built-in virtual assistants capable of analyzing audio tracks and providing instant recommendations for EQ, compression, reverb, and stereo placement. These intelligent tools might help automatically balance instrument levels, identify and resolve frequency masking issues, and suggest mastering chains tailored for specific platforms

such as Spotify or YouTube. Additionally, with continued advancements in machine learning, Cubase's audio-to-MIDI conversion could become significantly more precise, even when processing complex, polyphonic, or highly expressive performances. Potential features might include real-time recognition of instruments and automatic generation of musical notation suitable for printing, streamlining the workflow for composers and producers alike.

GarageBand is primarily aimed at beginners and casual users, and as such, it doesn't include many of the sophisticated features found in professional digital audio workstations like Logic Pro or Cubase. Its limitations in advanced mixing, mastering, and signal routing make it less ideal for handling complex production tasks.

When it comes to MIDI editing, GarageBand offers only fundamental tools. It lacks more advanced functionalities such as MIDI transformation, intricate quantization settings, expression editing, and detailed automation curves—all of which are crucial for precise music composition. Furthermore, unlike dedicated notation software such as Sibelius, GarageBand does not provide a full-featured score editor. This absence of proper notation support can be a major disadvantage for composers who prefer writing or arranging music using traditional sheet music. Although GarageBand currently features Smart Drummer, future iterations could leverage AI to create more adaptive and expressive drum and bass lines—ones that respond not just to the song's structure but also to subtleties like mood, groove, and dynamics.

Looking ahead, GarageBand might also incorporate voice control and natural language processing. This would allow users to give simple spoken commands such as "Add a gentle piano intro," "Shift the guitar part up a fifth," or "Make the drums more intense." Such features would significantly reduce the learning curve and make music production even more accessible for beginners and casual creators.

## 7. Conclusion

In conclusion, different composition software programs can bring benefits to both individuals and society, making significant contributions to the development of human music. In summary, Sibelius, Cubase, and GarageBand each offer unique strengths that cater to different needs within the music creation landscape. Sibelius excels in music notation and composition, making it especially valuable for composers, educators, and students focusing on score-based music. Cubase stands out as a professional-grade DAW, equipped with powerful tools for advanced audio editing, mixing, and production, suitable for both studio and educational settings. GarageBand, with its user-friendly design and accessibility across Apple devices, is an ideal entry point for beginners and a practical tool for music education. Together, these platforms reflect the diverse ways technology continues to transform and democratize music creation and learning.

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