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A Comparative Study of GarageBand and FL Studio in K-12 Music Education

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Abstract: Contemporarily, various composing software is developed. This study explores the application of two popular music production software programs, GarageBand and FL Studio, in educational settings. The primary goal of the research is to compare and contrast the features, ease of use, and suitability of these software programs for music education, while also offering a perspective on future developments in the field. Through a review of existing literature, the study highlights that while the use of computer music composition software has become increasingly widespread, its application in K-12 education remains limited. The findings suggest that while both GarageBand and FL Studio offer valuable tools for music creation, there is still a need for specially designed software to meet the developmental needs and learning preferences of students of different ages in K-12This research emphasizes the potential to enhance the integration of computer music into education by developing more age-appropriate software, ultimately fostering creativity and music skills at an earlier age and encouraging greater emphasis on music technology in future educational frameworks.

Keywords: Computer music, k-12, composition software.

1. Introduction

Music created for any phase of the computer life cycle is commonly referred to as computer music [1]. In the development of computer music, MIDI has played a crucial role as a standard for digital music device communication, enabling different electronic instruments and software to effectively exchange musical information, thus greatly expanding the possibilities of music creation [2]. MIDI does not transmit audio signals but rather conveys digital control information about notes, rhythm, volume, timbre, and more, making music creation and production more flexible and efficient. Today, MIDI has flourished and become the de facto industry standard. Despite its limitations, it remains applicable to various tasks [2]. MIDI technology helps open the door to traditional, notation-based composition for students while also providing limited opportunities for music creation that would otherwise be impossible in traditional vocal and instrumental performance settings [3-7]. More musicians and instructors are now able to experiment with new sound fields or improve their teaching strategies thanks to the development of computer music software. Computers and synthesizers have a huge impact on music education [3].

As digital technology continues to advance, these programs have not only encouraged composition technology innovation but have also become more and more significant in music education. There has been significant advancement in the practical use of several music technologies. For example, students' creative experience is no longer limited by their ability to read music. On this basis, students

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can create more freely and do not have to worry about the potentially annoying problem of notation later [3]. New software applications give people greater freedom in building complex arrangements, and musicians have more opportunities to maximize their creativity through software advances [4]. In software-enhanced music education, the role of teachers has not diminished but rather grown in comparison to traditional teaching [5]. One needs to be aware of how music technology has evolved as a teacher. The role of music teachers must change in the context of contemporary electronic music and popular music creation since it encourages students' creativity and aids in composition [4]. An increasing number of studies are focusing on the role of computer music software in music education; commonly used software includes Garage Band and FL Studio, but different software is suitable for different teaching scenarios and teaching objects. Many modern music creations are largely dependent on the powerful editing capabilities of computers, and many musical developments are entirely dependent on computers [1].

Practically speaking, more intelligent computer programs can shorten the time needed for music processing, enabling more in-depth study and communication [6]. Notably, there is a significant learning curve associated with the development of some new software, so educators should take the time to investigate these programs and how they might be used in the classroom. According to this theory, pupils' music education will be substantially enhanced by teachers' technological proficiency [4]. As a general rule, teachers who lack adequate knowledge will suffer in a number of ways. Teachers must thus become proficient in music technology and associated software and programs and stay current with the most recent advancements in this area [5]. This article primarily examines how two distinct music composition programs, i.e., Garage Band and FL Studio, are used in music education, particularly in K–12 settings. It also examines how these programs affect instructional strategies, student learning, and the development of musical talents. Although music curricula in various countries advocate for the use of technology in music creation, and this practice is becoming increasingly common, there is little research on the impact of technology-enhanced learning interventions on creativity in K-12 music education [8, 9].

2. GarageBand

Apple introduced GarageBand, a digital audio workstation, in 2004 with the goal of facilitating and simplifying music production. Its basic interface and user-friendly operation stem from its original design, which was intended primarily for non-professional users. GarageBand's features have grown more potent with the ongoing advancement of technology, enabling the creation of music on the go. GarageBand is a free program that can be used on Apple devices and is appropriate for novices, teachers, and independent musicians. It features a vast collection of virtual instruments and sound effects, as well as multi-track recording, audio editing, MIDI input, and more. It enables users to compose music without the need for expert performance abilities, and Live Loops simplifies the process of producing electronic music. Furthermore, the AI-powered Drummer can automatically produce drum beats based on various musical genres, giving consumers more creative options.

Application-wise, GarageBand is frequently utilized in K–12 music education, where it can successfully assist students in learning audio editing and songwriting. It is also utilized in music therapy and podcast production. By enabling musicians to record and compose music at any time and from any location, GarageBand's mobile edition now encourages mobile production even more. GarageBand has grown to be one of the most widely used music production programs worldwide thanks to its robust features and user-friendliness. Väkevä believes that GarageBand, as an entry-level software, makes loop-based music creation accessible to almost everyone [10]. There are many related cases. For example, Jaffurs realized that she had neglected students' musical interests in teaching by observing their collaboration and creation in GarageBand, and then worked hard to change this situation. She began to listen to students' opinions and encourage them to share their

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musical experiences in class, thereby promoting students' musical identity and participation. In the end, Jaffurs realized that teaching should respect and integrate students' musical culture to achieve more effective learning, and it is important that they create and perform music in an informal environment, such as a garage band, which encourages them to freely express and explore their musical interests [8]. A summary for the software is listed in Table 1.

Table 1: Summary of GarageBand

GarageBand	
Platform & Cost	Free, available on Apple devices
Key Features	Multitrack recording, audio editing, MIDI input, virtual instruments, Live Loops, AI drummer
Target Users	Beginners, teachers, independent musicians
Tech Development	Enhanced features, supports mobile creation
Applications	K–12 education, music therapy, podcast production
Educational Impact	Beginner-friendly, encourages creativity, improves engagement
Advantages	Easy to use, versatile, creative freedom, education-friendly

3. FL Studio

FL Studio, formerly known as FruityLoops, is a digital audio workstation (DAW) software developed by the Belgian company Image-Line in 1997. Initially, FL Studio started as a simple MIDI sequencer, but over time, after many updates and expansions, it has gradually developed into a powerful all-round music production tool. FL Studio supports Windows and Mac operating systems, and provides multiple versions to meet the needs of users at different levels. Its basic functions include multi-track recording, audio editing, audio mixing, virtual instrument plug-in support, and effect processing. FL Studio has built-in rich virtual instruments such as synthesizers, drum machines and samplers, as well as many plug-ins for audio effects. In addition, it also provides powerful MIDI functions to support user-defined notes, rhythms and arrangements. FL Studio's "step sequencer" and graphical interface design enable users to efficiently arrange music, create and edit.

Table 2: Summary of FL Studio

FL Studio	
Platform & Versions	Windows & Mac, multiple versions for different levels
Key Features	Multitrack recording, audio editing, mixing, virtual instruments, effects
MIDI Functions	Custom notes, rhythms, arrangements
Application Fields	Electronic music, hip-hop, pop, film soundtracks
Target Users	Producers, DJs, composers, sound engineers
Advantages	Easy to use, flexible, beginner-friendly
Educational Use	Commonly used in music education and creative teaching

FL Studio is widely used in fields such as electronic music, hip-hop, pop music and film soundtracks. With its ease of use and flexibility, it has become the first choice of many professional music producers and amateurs. It supports VST plug-ins and is compatible with other audio software, further expanding its application scope. The main target groups include electronic music producers, DJs, composers, and sound engineers. FL Studio has a low entry threshold and an intuitive interface,

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making it very suitable for beginners. It also has a high degree of customizability and deep functions, making it suitable for professional users with certain experience to perform complex creation and mixing, becoming an important tool in the global music production community. FL studio is also quite common in actual teaching applications. For example, Kruse & Hill once used this software in a teaching of exploring hip-hop music and achieved good results [9]. A summary of FL studio is given in Table 2.

4. Comparison, limitations and prospects

It is confirmed that GarageBand and FL Studio are two popular music creation softwares, and they have many similarities. First of all, both provide a wealth of virtual instruments and sound effects, allowing users to create music in a variety of styles. Secondly, they both support multi-track recording and editing functions, allowing users to flexibly produce and adjust each part of the music. In addition, both GarageBand and FL Studio provide easy-to-use interfaces, allowing beginners to get started quickly. The comparison features are shown in Table 3.

Table 3: Comparisons of the features

Feature	GarageBand	FL Studio
Multi-track recording	Supported	Supported
MIDI editing	Basic	Advanced
Built-in instruments	Dozens of presets	Extensive library
Automation control	Basic Comprehensive	Comprehensive
Beginner-friendly	Yes	Less suitable for beginners
User interface complexity	Low	High
Educational usage	Widely used in K-12	Common in higher education

However, there are also significant differences between the two in some aspects. First of all, the applicable population is different. GarageBand is mainly aimed at beginners and amateur music producers. It is simple to operate and has relatively basic functions, which is very suitable for entry-level learning. FL Studio is more suitable for music producers with a certain foundation. It provides more advanced functions and flexible workflows, suitable for different needs from beginners to professionals. Secondly, the complexity of the software is also different. FL Studio has more plug-in support, automation control, and a variety of audio processing options, suitable for more complex music production needs. In comparison, although GarageBand is simple and easy to use, its functions are relatively limited, suitable for those who want to easily make songs without in-depth audio editing.

Looking ahead, as music education becomes more popular and technology continues to develop, this study can foresee the emergence of more music production software for younger students. Such software will focus more on ease of use and interactivity, helping young users develop their interest and skills in music creation. At the same time, more gamification elements can be introduced to make learning music production more interesting and attractive.

5. Conclusion

To sum up, the development of computer music software has brought unprecedented opportunities for music creation and education. With the continuous advancement of technology, computer music has not only changed the way music is made, but also made music creation more accessible and easier to learn. Computer music software such as GarageBand and FL Studio provide intuitive and powerful functions, making it easy for both beginners and professionals to create music. GarageBand as a music

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production tool for beginners, allows users to quickly start making music with its built-in virtual instruments, looping sound effects and simple and easy-to-use interface. FL Studio provides more professional-level functions, including advanced audio editing, audio effect plug-ins, and complex arrangement options, which is very suitable for electronic music producers and more experienced music creators. This software not only improve the efficiency of creation, but also provide students with a practical platform to help them develop practical skills and stimulate their creativity while understanding music theory. Therefore, the introduction of computer music has great potential in music education, which can enable students to deepen their understanding of music through interaction and practice. Even though the possible use of computer music software in music education was examined in this study, there is still a dearth of pertinent research on the subject in the body of literature, particularly in the area of general music education (K–12). While professional music production and higher education are the primary areas of current study, there is still a pressing need to integrate these technologies in non-professional educational settings. By incorporating music production tools in schools, community programs, and informal learning environments, one can foster creativity and critical thinking at an early age. These technologies have the potential to provide students with hands-on experiences that enhance their understanding of music, sound, and technology, ultimately helping to bridge the gap between formal education and the rapidly evolving world of music production. Future studies should thus concentrate on the real-world application effects of computer music software at various educational levels, particularly how it affects technical proficiency, creative capacity, and musical expression ability.

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