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Michele Della Ventura, *editor*

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New Music Concepts Inspired Education and New Computer Science Generation

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Editor

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Preface

This volume of proceedings from the conference provides an opportunity for readers to engage with a selection of refereed papers that were presented during the International Conference on New Music Concepts, Inspired Education and New Computer Science Generation. The reader will sample here reports of research on topics ranging from a diverse set of disciplines, including mathematical models in music, computer science, learning and conceptual change; teaching strategies, e-learning and innovative learning, neuroscience, engineering and machine learning.

This conference intended to provide a platform for those researchers in music, education, computer science and educational technology to share experiences of effectively applying cutting-edge technologies to learning and to further spark brightening prospects. It is hoped that the findings of each work presented at the conference have enlightened relevant researchers or education practitioners to create more effective learning environments.
This year we received 57 papers from 19 countries worldwide. After a rigorous review process, 24 paper were accepted for presentation or poster display at the conference, yelling an acceptance rate of 42%. All the submissions were reviewed on the basis of their significance, novelty, technical quality, and practical impact.

The Conferece featured three keynote speakers: Prof. **Giuditta Alessandrini** (Università degli Studi Roma TRE, Italy), Prof. **Renee Timmers** (The University of Sheffield, UK) and Prof. **Axel Roebel** (IRCAM Paris, France).
I would like to thank the Organizing Committee for their efforts and time spent to ensure the success of the conference. I would also like to express my gratitude to the program Committee members for their timely and helpful reviews. Last but not least, I would like to thank all the authors for they contribution in maintaining a high-quality conference and I hope in your continued support in playing a significant role in the Innovative Technologies and Learning community in the future.

March 2020

Michele Della Ventura

Conference Chair

Michele Della Ventura, Accademia Musicale Studio Musica, Treviso, Italy

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Supporting Music Performance in Secondary School Ensembles through Music Arrangement

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Abstract. Music performance in educational settings has had a long history that spans through multiple eras and genres. In K-12 education, one of the primary objectives that schools have is to expand and diversify performance opportunities for students. Schools address the need for student-based performance opportunities through the creation of bands, orchestras, and a variety of ensembles. In a music curriculum, schools design performance-based music courses to cultivate students' talents. Due to complexities (such as funding and resources) that newly-established schools may face, the expansion of music ensembles can become an arduous process. This research discusses compositional approaches to diversify instrumental ensembles in K-12 education by adopting music arrangements to fit the musical needs of the students. This study exemplifies the musicological and analytical viewpoint of music adaptation in various music genres – popular, classical, and traditional, as well as pins emphasis on compositional arrangements through pedagogical outlook.

Keywords. Instrumental ensemble, K-12 education, music arranging, music performance.

1 Introduction

Music performance is a vital component of K-12 education. It fosters creativity, imagination, and critical thinking skills [1]. In music performance courses, students play in small and large-scale ensembles, which include choirs, orchestras, and bands. Many schools struggle to integrate students in a collaborate performance with a plethora of skill levels. Due to instrumental ensemble students having music performance gaps, teachers often find it challenging to combine students with different musical abilities and different instrumental expertise in a classroom setting. As a result, students with no prior music experience have very little or no opportunities to develop or perform at concerts. Music education without music performance-related pedagogy is not ideal when applied to students' general education [2]. It is also damaging to the school's

vision and teaching philosophy. Therefore, not all students have the opportunity to perform at the concert-like events.
This paper discusses approaches and compositional practices in how teachers can arrange and distribute the music based on students' playing abilities. This research dissects accompaniment structures, melodic patterns, and strategies to harmony and counterpoint in relation to music content distribution, allowing students with different performance abilities to play music on the same stage. Music concerts should not be considered a 'privilege' for students. Instead, music concerts should be thought of as an educational setting where students can develop skills in reasoning, memory, language, productivity, engagement, and self-regulated studying habits [3]. The research focuses on music arrangements to fit the educational needs of the students as part of student-centered teaching pedagogy.

2 Music Practice for Ensembles in K-12 Education

Humans have been performing music since ancient times. From ancient Greek civilizations to modern orchestras and bands, instrumental performance expanded in many directions [4], [5]. There are many types of ensembles implemented by K-12 education institutions [6]. Small-size ensembles may include duet, trio, and quartet performances. Large-scale ensembles may include full orchestras and bands. Instructors in schools often have individual approaches when it comes to teaching and presenting music to students. Curriculum updates regularly occur to align with the learning styles. Schools often utilize different types of ensembles, depending on the student body. Large choirs, jazz bands, and symphony orchestras are only possible with a large number of students. The significance of the performative component of the K-12 music education has been outlined in previous research found in works by Freer (2011), Pellegrino et al. (2015), and Kertz-Welzel (2018) [7-9].
One of the most prominent performance-based classes in K-12 education is a choir. The human voice is the earliest instrument. Choir class is one of the simplest methods to introduce ensemble performance in the music curriculum. The choir class can then be diversified into a more varied music program that would include other performance courses that could potentially integrate with theory, history, technology, and composition in a project-based learning environment. Due to the range of performance levels that students have, it is a challenge for schools to establish and potentially expand a band. To adapt to student-centered learning, schools aim to establish music departments and incorporate various performances, concerts, clubs, competitions, and other forms of extra-curriculum activities. Schools need to develop various types of ensembles in the forms of music classes and clubs as part of the main curriculum and extracurricular activities. Music arrangement can allow instructors to adapt the music for students with a variety of performative music levels.

3 Performance Gap in Instrumental Ensembles

Depending on the region and the system of education, secondary schools have diverse

approaches to music pedagogy and teaching philosophies. Since the majority of students do not plan to major in music, their levels of expertise will differ. Similarly, the amount of time that students spend practicing their instruments also varies. This translates into an achievement gap – the difference between the 'theoretical' and 'realistic' situations in an educational environment. The achievement gap – this study will refer to the 'achievement gap' as 'music performance gap' – reveals information on each student's performance level. It becomes more difficult for instructors to find appropriate repertoire when the music performance gap is too high. This is why instructors aim to have music ensembles, where students have near-similar playing levels.
Established school systems, for instance, may offer *Fundamentals of Band Performance* for beginners, while offering *Honors Band* for advanced musicians. While this is an ideal situation, not all schools have the ability to structure multiple classes for music performance. On the contrary, the abilities to arrange and re-arrange a variety of music will allow pedagogues in K-12 education to bridge the performance gap by adapting the music to the educational standards of the students and allowing all students to play in one ensemble.

4 Music Arrangement

Music arrangements and transcriptions have been prevalent throughout the history of music. Franz Liszt, for instance, transcribed Beethoven's symphonies for piano [11]. Nikolay Kashkin arranged Tchaikovsky's ballet *Swan Lake* for piano [12]. There have also been accounts of traditional music arrangements [13]. Due to the range of students' musical interests, instructors need to be confident in arranging all types of repertoire for their pupils. One of the most significant steps in deciding on the type of arrangement in K-12 education is choosing the appropriate performance level for students. Composers often create music with an emphasis on aesthetics, artistry, musicianship, and lyricism. While all these concepts are prevalent, an arrangement must likewise be educationally-informative, challenging, and enthusiastic for students to play. In other words, an advanced horn player may lose interest in performing a piece with a transcribed melody from the first book of Suzuki's violin method training. Similarly, students with no performance experience may not find fascination in learning syncopation or juxtaposition of complex rhythms.
Figures 1 and 2 show an excerpt from the opening section of *La Cumparsita* (1916) by Gerardo Matos Rodríguez [14]. This arrangement is set for 1-2 saxophones, 1-2 horns in F, 6-10 soprano diatonic xylophones, 6-10 alto diatonic xylophones, 1-2 timpani, 3-5 triangles, 1 cymbal, 2 pianos (four hands), 3-5 guitars, 1 bass guitar, 2-4 violins, and 2-4 erhus.

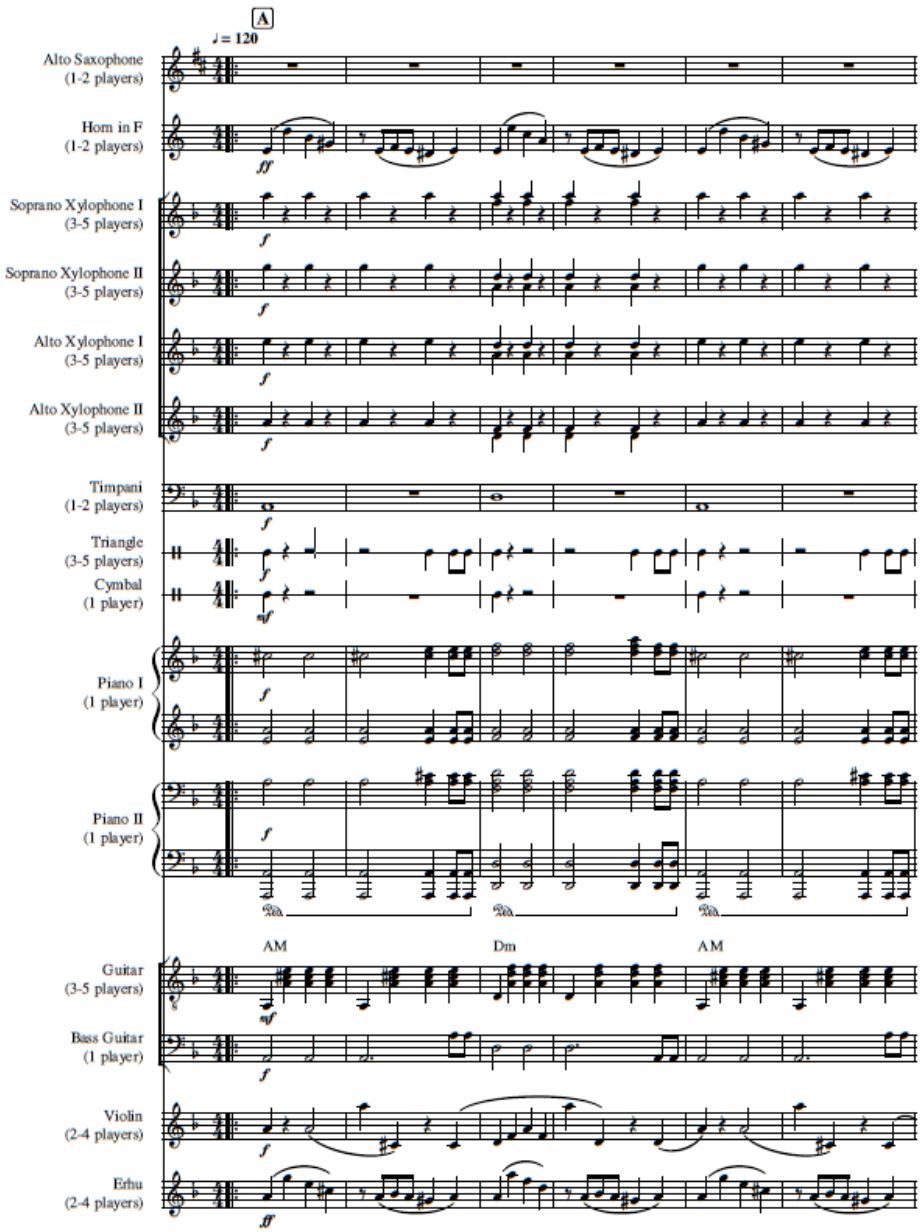

Fig. 1. Arrangement of La Cumparsita, mm. 1-6.

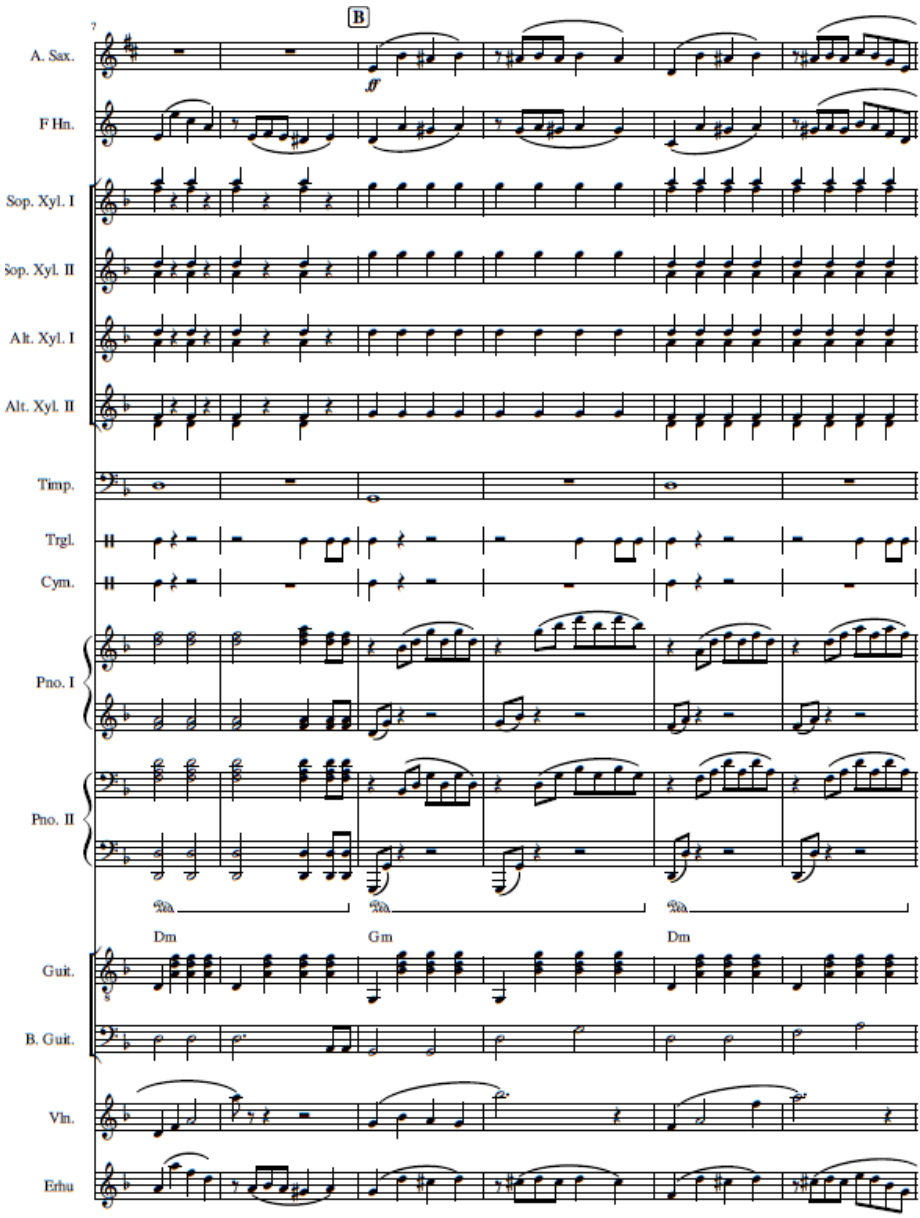

Fig. 2. Arrangement of La Cumparsita, mm. 7-12.

The score reveals multiple general observations. First, this is an arrangement for an untraditional ensemble. These instruments do not establish an orchestra; neither do

these instruments create a full concert or a marching band. This arrangement does, however, reveal that students of different playing levels can perform a variety of instruments in a collaborative manner. Second, it is evident that some instruments may not fare well in an ensemble environment due to their dynamic ranges. In this type of ensemble, it is very difficult for one to hear the guitars. However, the use of microphones and a variety of technologies can assist with emphasizing some of the quieter instruments. Third, the use of erhus reveals that this is a piece of music arranged for a Chinese school ensemble.
The compositional strategy in this arrangement is to subdivide the music into primary thematic material, secondary accompanimental material, and rhythmic musical material. Primary thematic material includes the instruments, which perform the main melody or the countermelody. These include the saxophones, horns, violins, and erhus. The saxophones, horns, and erhus play the main melody, while the violin plays the counter melody. As evident, the music that the violins play is simpler than what is offered for the other main instruments. For instance, in mm. 1-8, eleven of the twenty-one total notes are open strings. Changes in the arrangement may occur depending on the performance gaps between the violin and erhu players in the ensemble.
Xylophones, piano, guitars, and bass guitar play the secondary accompanimental material, which outlines the harmony and supports the primary thematic material. Students with little or no music experience may choose to play the xylophones. There are three separate xylophone parts, which are identical in rhythm and different in pitch. The opening of the A-section, found in the rehearsal mark A, contains music on beats 1 and 3, where the music on the strong beats interchanges with the rests on the weak beats. In the view of piano pedagogy, it is beneficial to have two students (four-hands) perform the piano rather than one in an ensemble setting, particularly for students who are not well-versed in rhythm or have not had much collaborative piano experience. From the stance of guitar pedagogy, students can practice alternating between the various harmonic regions of A major, D minor, and G minor. The bass guitar provides the harmonic outline, creating a counter-rhythmic structure.
Timpani, triangles, and cymbal make up the rhythmic musical material. These instruments are ideal for students who cannot read music notation and have had no prior music experience. Rhythmic instruments are essential, since there is very little music material, yet much room for error.

5 Conclusion

By arranging the music in K-12 education, students will have opportunities to perform in a variety of settings. Students will have a chance to perform music as an ensemble, focusing on traditional, classical, and popular works. Students will also develop different music skills in and out of rehearsals, as well as be able to apply the musical skills to non-musical subjects. Additionally, students can gain performance experience through playing opportunities at the school's concerts and events.

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This book presents a collection of selected papers that present the current variety of all aspect of the research at a high level, in the fields of music, education and computer science. The book meets the growing demand of practitioners, researchers, scientists, educators and students for a comprehensive introduction to key topics in these fields. The volume focuses on easy-to-understand examples and a guide to additional literature.

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