

The Impact of Music Education on Children's Intellectual Development

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Abstract: As society continues to develop and the demand for talent continues to rise, children's music education is taking on a progressively larger share of society. This paper is composed of two parts: bibliometric and theoretical analysis. A cluster analysis of keywords was conducted on 2000 articles on the topic of "music education for children's intellectual development". The results show that the main focus of previous research in the field of "music education for children's intellectual development" has been on children's academic achievement, perception and physical qualities. Less research has been conducted on children's attention, memory, and observation. Secondly, this paper analyses the effects of music education on children's attention, memory and observation from five specific perspectives through theoretical analysis. The results show that music education significantly improves children's attention, memory and observation skills, thus promoting their intellectual development.

Keywords: Music education; Children's intelligence; Attention; Memory; Observation

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1. Introduction

The trend towards diversification of talent in society has contributed to the development of music education, resulting in 'music education for children's intellectual development' becoming a hot topic of concern for all sectors of society today. Research on the subject of children's music education has raised awareness of the importance of children's music education, bridged the gap between the lack of children's music education in society and further improved the theoretical system relating to children's music education and children's intellectual development.

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2. Literature Review

The bibliometric approach reveals that most of the previous research on 'music education for children's intellectual development' has focused on academic achievement, perceptions, and physical fitness. For example, with regard to the impact of music education on academic achievement, Holochwost, SJ (2017) states that music education can increase children's academic achievement^[1]. Compared to students in the control group, students who had received music education had superior performance in other subjects. In addition, Jaschke, A. (2018) explains that music education is effective in improving children's language skills and after systematic training in music education, children's vocabulary in both Chinese and English improves significantly^[2]. In addition to this, music education has a close relationship with the development of children's perception and physicality. Gromko, JE (1998) states that auditory training in music education significantly contributes to children's perceptual development^[3]. Meanwhile, Gromko, JE & Russell, C (2002) explains that children who have received music education show higher levels of perception in terms of tunes and coolers^[4]. In terms of music education and children's physical development, Hallam (2010) describes a positive correlation between music education and children's physical development^[5]. At the same time, Navarro Ramón and Chacón-López (2021) demonstrate that music accelerates blood circulation in children and that the inevitable use of physical expression in the teaching or performance of music can further promote coordinated movement of the whole body, thus promoting physical development and improving physical fitness^[6]. In summary, international trends and research suggest that music education for children is mostly concerned with academic achievement, perception, and physical fitness. Less research has been conducted on the effects of music education on children's attention, memory and observation. This paper explores the impact of music education on children's intelligence from three perspectives: attention, observation, and memory, and explores new ways to promote the sustainable and diverse development of music education for children.

3. Data Sources and Bibliometric Analysis

(1) Data sources

This paper uses Web of Science as a search platform to search the literature in SCI and SSCI databases under the themes of "music education", "intelligence" and "children or students". The type of literature was limited to research papers. The language was limited to English, and the search period was 2013-2021. The final search and statistics yielded 255,678 valid and relevant articles.

(2) Data analysis tools

The data statistics and analysis tool used in this paper is primarily the VOSviewer application.

(3) Bibliometric analysis of 'music education for children's intellectual development'

In this study, the articles retrieved from the SCI and SSCI databases were sorted by relevance, and the top 2000 articles with strong relevance were selected for full literature export. The data are then combined, censored, counted and analysed using the VOSviewer application in conjunction with traditional bibliometric methods. The result is a visualisation of the current state of the art in the field of "music education for children's intellectual development" over the last ten years, with a comprehensive overview and a multi-faceted presentation of the top words and developments in the field.

1) Music education for children in the area of intellectual development - national analysis

In this study, 25 countries were selected when the number of national issues was limited to 10 or more. As (Figure 1)

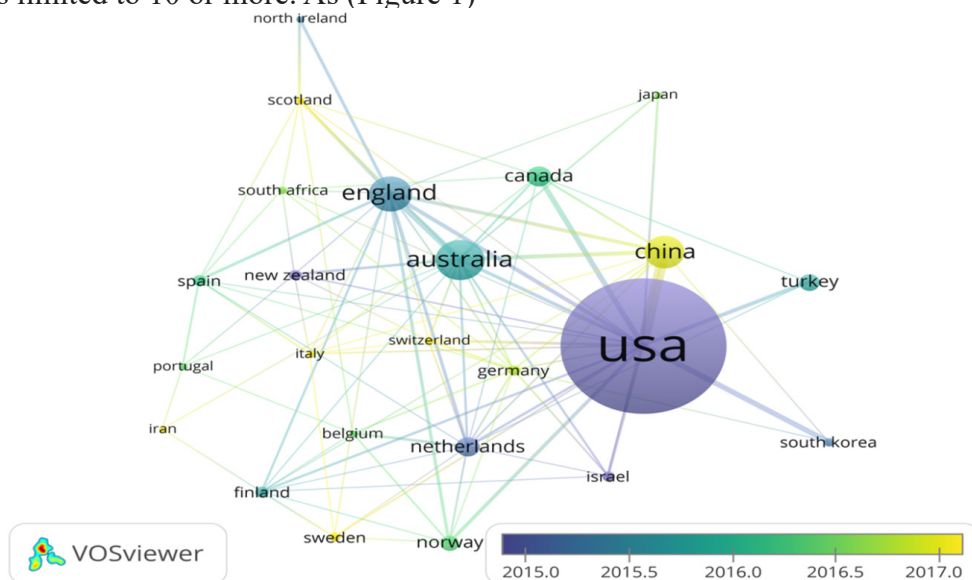


Figure 1. Relationship between articles and countries

It is clear from Figure 1 that the number of publications in the world is the United States is in the top position with 935 publications; Australia is second with 196 publications; The United Kingdom is third with 166 articles, while China and Canada are fourth and fifth respectively. Secondly, the size of the ball makes it clear that the US has significantly more issues than any other country in the world. A comparison of specific figures shows that the first (USA) is 4.7 times more likely

to be published than the second (Australia). In summary, the United States takes music education for children very seriously and is the most educated country in the world. In addition, according to Figure 4, China and the United States are the most connected and closest of the 25 countries, so China and the United States are the most relevant in the field of children's music education. At the same time, according to the timeline at the bottom of Figure 4, it can be concluded that: the United States has the earliest year of publication before 2014, followed by the United Kingdom, Australia and the Netherlands 2015-2016; China is the yellow ball is relatively late, with the year of publication after 2017, but China is the country with the fourth highest number of publications. This shows that Chinese music education is characterized by a "late start but fast development".

2) Music education for children in the field of intellectual development - analysis of topical keywords

In this study, when the number of keyword repetitions of 2000 documents was limited to 30 or more, 87 keywords were available, of which only 26 were relevant. As (Figure 2)

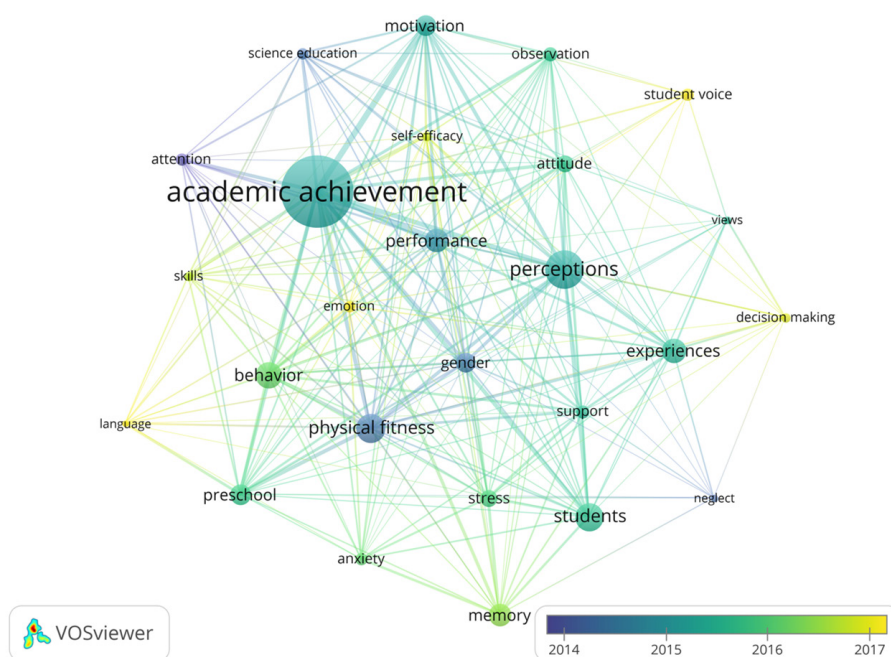


Figure 2. Relationship between articles and keywords

Based on Figure 2, it can be seen that previous research in the area of 'music education for children's intellectual development' was mainly focused on children's academic achievement, perception, and physical fitness. There is little research on children's attention, memory, and observation skills. Secondly, the figure shows that there is a strong correlation between students' attention and academic achievement, science education and self-confidence. Students' observational skills are strongly

correlated with their motivation and academic achievement, attitude and perception. Children's memory is linked closely to students' anxiety and stress levels and physical fitness. In addition to this, it is clear from the following timeline in Figure 5 that research on children's physical fitness, gender, and attention first appeared as early as 2014 in the literature, which is the purple ball in the figure. Observation, also referred to as the dark green ball, appeared around 2015. Children's memory, the light green ball, comes in later, after 2016.

4. Music Education for Children's Intellectual Development

Music education is a very effective way to promote the intellectual development of children Southgate, DE & Roscigno, VJ (2009) describes how music unites the wisdom of mankind^[7]. In the process of learning music children's eyes often have to look at the score, lyrics and notes, while their ears also need to listen carefully to the accompaniment. Therefore, music education develops children's attention, memory and observation skills as well as their ability to see and hear. Music education contributes to the development of children's attention, memory and observation skills, thus increasing their intelligence and wisdom.

(1) Music education for children's attention development

As children participate in the choir and learn to play their instruments, it is necessary to focus not only on the conductor's gestures and the changes in pitch, but also on the lines and integrity of the music and the emotions to be expressed. These requirements, in particular, require a high degree of concentration on the part of the pupils in the process of learning music. For example, after joining a choir, children learning to sing must firstly recognise and remember the movements of the conductor, and secondly observe the relative changes in melody and sound of each part as the conductor's movements change. At the same time, the children need to listen carefully to their own tone and pitch to avoid making dissonant sounds. All of these actions require the children to be highly attentive to the process of learning music. As a result of this training, the children in the choir are able to make musical gains and their attention spans are developed accordingly, which greatly enhances their intellectual development.

(2) Music education for children's memory development

In addition to improving a child's attention span, music education can also lead to a significant improvement in memory. When it comes to learning to sing in music education, pupils need to be quick and proficient in mastering and reciting lyrics. The day to day learning of new songs and recitation of new lyrics keeps the students' nerve centres in a constant state of active functioning. This promotes the development of memory and the use of the brain, which in turn promotes the child's intellectual development. A Canadian study has found that children who have

received music education demonstrate greater memory skills than those who have not been exposed to music education. Children who had received a year of music education showed higher scores on the music test and the memory test than children with no previous music study. At the same time, the results of the study also found that children who had studied music also showed an improvement in non-musical memory. This includes vocabulary memory, graphic memory, number memory and the child's overall IQ. This means that music education can contribute to significant memory development as well as increasing children's intelligence.

(3) Music education promotes the development of children's observation skills

Music education can be a powerful way to promote children's observational skills. In music appreciation, children are expected to listen carefully to see how the melody moves and how the rhythm changes. These music appreciation exercises help children to develop their powers of observation. Theorell. (2016) says that after about 15 times of music appreciation training, children who were previously confused about music could hear the main melody and rhythmic changes on the first play^[8]. Stronger observers can also identify subtle changes in rhythm within the same melodic phrase. In addition to this, the use of physicality in music education can also contribute to the development of observation in children. In music lessons, teachers clap their hands and stomp their feet to the rhythm or wave their hands in the air to the music. The children observe and imitate the teacher's movements as they learn the music, which accelerates the circulation of the children's blood, develops their coordination and promotes the interplay between the left and right brain, which further enhances the children's brain vitality while promoting their observation and intellectual development.

5. Conclusion

In overview, music education has been shown to have a beneficial effect on the intellectual development of children. This paper summarizes and analyses the previous literature to identify the relationship between the number of publications and their countries. In addition, analysis of the bibliometric graphs reveals that the topical terms used to describe the impact of music education on children's intelligence are mainly academic achievement, physical fitness and perception. Furthermore, according to the results of the bibliometric study, it can be seen that there has been little research on children's attention, memory and observation in the field of music education. This paper focuses on the effects of music education on children's intelligence - specifically, the effects of music education on children's attention, memory and observation. The results show that music education has a significant impact on children's attention, memory, observation and intellectual development. This suggests that music education is an integral part of children's

education and an effective means of promoting children's intellectual development and growth. In this way, this research complements previous research in the field of children's music education, improves the theoretical framework of children's music education on children's intellectual development, and promotes the rapid development of the children's music education sector.

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