

Music learning improves grades in Maths, English and Science ... but why?

An extensive study was released in late June which found that students who studied music in primary school and into high school were almost one year ahead of their non-musically trained peers in their Maths, Science and English performance. This study is getting a lot of attention on social media because it has such a large sample size (over 112,000 participants), the factors it controlled for (such as socio-economic status) and it distinguishes between the types of music learning (singing and instrumental).

This study is the focus of this month's BBB professional reading for a number of reasons – it is important for music educators to understand the parameters of the study and why these parameters help to make the findings so significant. The findings are being so widely publicised, so it is useful to be able to talk about the study, and the findings, with confidence and a little more information than just the news headlines.

Finally, this type of quantitative research can be useful; when preparing a proposal to expand your music program, when offering music learning to a wider group of students in your communities, to include in a funding grant application or to share with new parents at your schools. Firstly, let's look at the impact statement.

So you found something in your research ... so what?

More recently in research papers, an impact statement has been included at the beginning. This is not the research paper abstract, it is like a press release for academics. It points to the possible applications and implications of the research. I like these statements because they connect research back to the real world - which often they do not - giving it the practical application of helping us to understand and improve the world. Let's break down this study's impact statement.

Educational Impact and Implications Statement

“This large-scale study identified evidence of positive relationships between school music participation and high school exam scores in English, mathematics, and science using population-level educational records for over 110,000 students in British Columbia, Canada.”
(Gruhn et al., 2019)

The useful elements of this statement are the number of student records that went into the study. A population-level study is different to most of the studies in this field. Often the experiment based studies (those where participants are individually tested) can have as few as 20 participants and they are only measured once or twice. Similarly, cohort studies (where a cohort of students may be tracked over 1 to 5 years) usually only manage a participant group between 60-100 students.

“Would it be possible for both to coexist and to use music learning for musical AND cognitive development as the new paradigm?”

This study used historical student grade data rather than following students as they progressed through school in real time. The researchers looked specifically at the three subject areas that school leaders, policymakers and politicians consistently uphold as the primary areas of learning – maths, science and English – and connected music learning as a positive relationship to achievement in these areas.

This connection alone brings into stark review the current valuing of music as an additional area of study, a non-core subject, and one that is regularly supported by funding from outside the school budget (parental and philanthropic).

“Participation in school music (especially instrumental music) was related to higher exam scores, and students with higher levels of school music engagement had higher exam scores.” (Gruhn et al., 2019)

This sentence points to two important pieces of information – music learning within the school day and school environment was found to have an impact and music learning was more impactful if undertaken on a musical instrument.

Now, I can hear the singers in the BBB community jumping up and down right now, and if I have learned anything from this research field it is that, while these statements seem to point to an “instrumental music is better than singing (for cognitive development) argument” I strongly disagree. The research into music learning and language development shows that our brains are wired for music learning through song far before we get anywhere near a musical instrument. This is, in fact, the very basis of the musical skills our students transfer to learning a musical instrument. As my first band conductor would say “if you can’t sing it, you can’t play it” and this research is pointing to the fact that the cognitive benefits of learning music come from a foundational level of singing which is enhanced by playing a musical instrument.

It is worth delving into the research study (The PDF of the study is available for you in the further reading box over on the left of your screen or at the bottom of the reading on mobile!) and looking at the short section on Page 8 titled “Instrumental versus vocal music courses”. In this section, the researchers highlight the level of detail they went into to separate the instrumental and singing learning experiences of the participants. This level of delineation is unusual as other studies tend to define their participant groups as just ‘musician’ and ‘non-musician’ whereas this study sort to look at the different types of musician. It is important to note that the researchers separated the students who took one OR the other (instrumental or singing) but, I wonder what the academic results for the students who took BOTH might look like.

“The positive relationships between music engagement and academic achievement were independent of students’ previous (Grade 7) achievement, sex, cultural background, and neighbourhood socioeconomic status, and were of considerable magnitude: The group differences observed in our study were greater than average annual gains in academic achievement during high school.” (Gruhn et al., 2019)

Why do all of these factors - previous achievement, sex, cultural backgrounds and socioeconomic status - matter? They matter because we are researching children and children are a product of all of these factors. If you want to extract an understanding of how one factor, music learning, may impact on development, the researchers need to control for, or account for, all of these other factors. This study’s significance comes, in part, from the ability of the study’s design to take all of these factors into account and still find, with a high level of confidence, that music learning had the impact that they say it had on the students’ academic achievement. Educational research is a very tricky needle to thread, often poorly designed research can point to a connection that isn’t correct or valid, just because they haven’t looked at the whole picture.

“In other words, students highly engaged in music were, on average, academically over 1 year ahead of the peers not engaged in school music.” (Gruhn et al., 2019)

Besides this wonderfully quotable finding, it is important to note that they found this impact was evident in highly engaged students. In the research paper they have two categories that fit this description, ‘highly engaged’ and ‘very highly engaged’. This engagement was measured by the amount or number of music courses that were taken. The researchers relate the level of engagement to three possible influencing factors, from music learning, that could transfer to academic performance:

- Executive Functioning (the ability to plan, pay attention, strategise and manage emotions – we call them grown up skills),
- Motivation-related Characteristics (learning discipline, self-efficacy, and mastery-oriented learning experiences – basically all the characteristics we look for in an engaged student),
- Social-Personal Development (bonding and the sense of team accomplishment. This is something the researchers highlighted as being a result of participating to music making, which is collaborative and generally non-competitive. This positive experience in music makes for a positive experience in school and in student’s academic pursuits)

“In light of this study (the largest of its kind to date), as well as supporting evidence suggesting music learning in childhood may foster competencies (e.g., executive functioning) that support academic achievement, educators may consider the potential positive influence of school music on students’ high school achievement.” (Gruhn et al., 2019)

This study should give us, music educators, even more fuel to challenge the all-too-quick decision to cut music programs in schools. But, how does this paradigm sit with us, ‘Music should be learned by children to improve their other academic results’? This goes against the “alternate” paradigm of ‘children should study music for its own artistic sake’. I often ask why we only want to go with one paradigm, one reason for children to learn music. Is it possible for both to coexist and to use music learning for musical AND cognitive development as the new paradigm?

An artistically trained educator will be fascinated by the new cognitive connections; the non-musically trained but results-driven school leader will feel comfortable with the cognitive connections and will appreciate the musical development as they see it enrich their school; the concerned parent will see and understand the dual benefits of musical and cognitive development they are providing their child, even when they have to nudge them to practice and drop them at early morning rehearsal.

It is a way of thinking and advocating that has the potential to appeal to everyone in a way that allays their concerns and supports their efforts. Let’s see how we can use this study to educate to advocate.