

Report on Whole Child Outcomes of Lead Guitar Programs

*by Dr. J. David Betts, Professor Emeritus, UA College of Education;
Past-president of the Arts and Learning SIG of the American Educational
Research Association*



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INTRODUCTION

In order to evaluate the effectiveness of Lead Guitar programs, we counted on the cooperation of the schools and school districts involved to allow us to have access to participating students and educators for their observations and reactions to the music learning they undertook.

In order to execute the evaluation, we reached out to several participating school districts of various sizes. Through data-sharing agreements with the districts, we arranged to have data from the schools about students' grade point average, attendance, and disciplinary actions. We asked for data from the year before beginning the program and for two years as participants. We also asked participating educators to fill out reflective evaluations on the programs' perceived effectiveness with their students.

Parents were asked to sign a Parental Consent form for giving us access to the anonymized student data. We received approval for this work from the University of Arizona Institutional Review Board through the College of Fine Arts. The anonymized forms and data sheets were analyzed to determine the students' average GPA's, number of days absent, and number of disciplinary actions recorded by the school.

What follows is an overview of the program evaluations that were undertaken to learn what works and how to improve Lead Guitar programs.

SECTION 1. GPA, ABSENCE AND DISCIPLINE DATA FOR LEAD GUITAR PARTICIPANTS

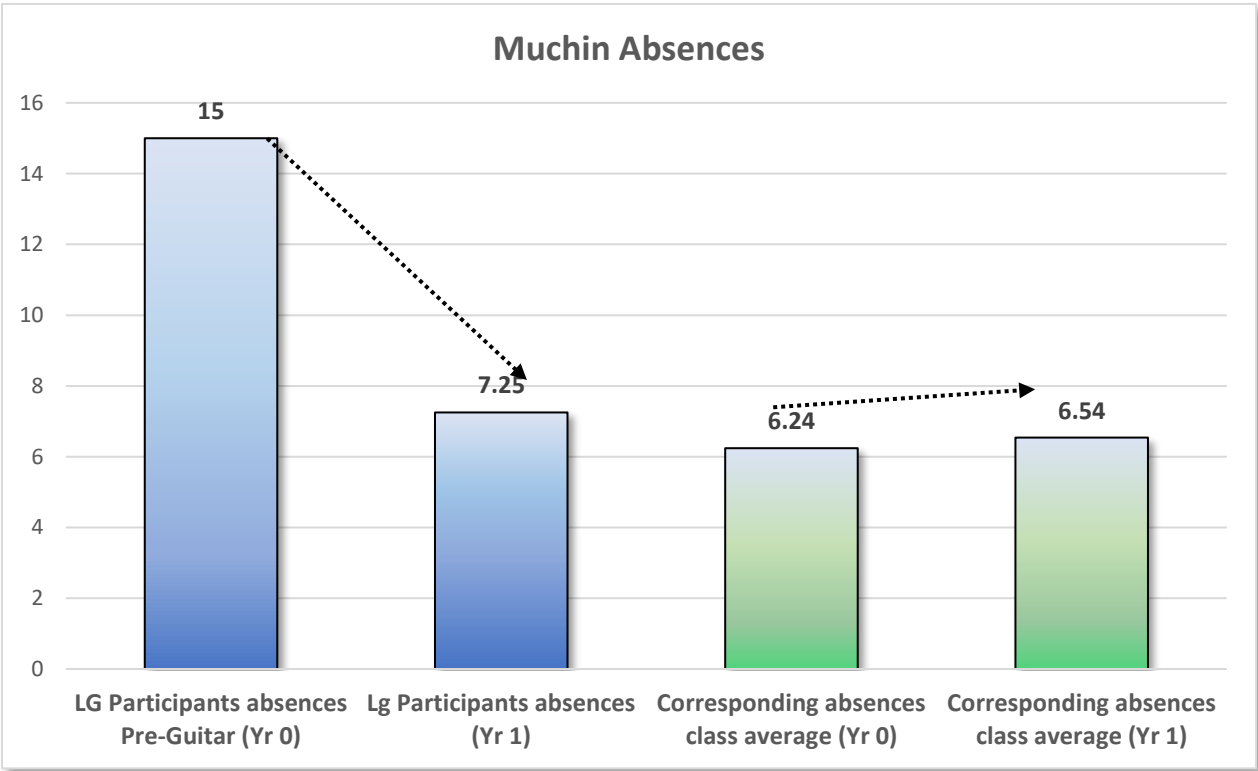
A recently published study titled, "A Population-Level Analysis of Associations Between School Music Participation and Academic Achievement" (Guhn, Emerson, and Gouzouasis), identified evidence of positive relationships between school music participation and high school exam scores in English, mathematics, and science using population-level educational records for over 110,000 students in British Columbia, Canada. The group differences observed were greater than average annual gains in academic achievement during high school. In other words, students highly engaged in music were, on average, academically ahead by one year of their peers not engaged in school music. (Guhn, et al.)

We were most interested in comparing outcomes from students in Lead Guitar programs that had participated for two years or more, since the majority of the innumerable studies that show improvements in academic achievement and brain development among in-school arts participants cited multiple years of involvement in arts learning. For this portion of our program evaluation, we chose three schools or districts that had already participated in Lead Guitar for at least three years. Therefore, we could readily collect GPA, absence, and discipline data that included one-year prior to participating in the program through the end of the second year of participating in the program.

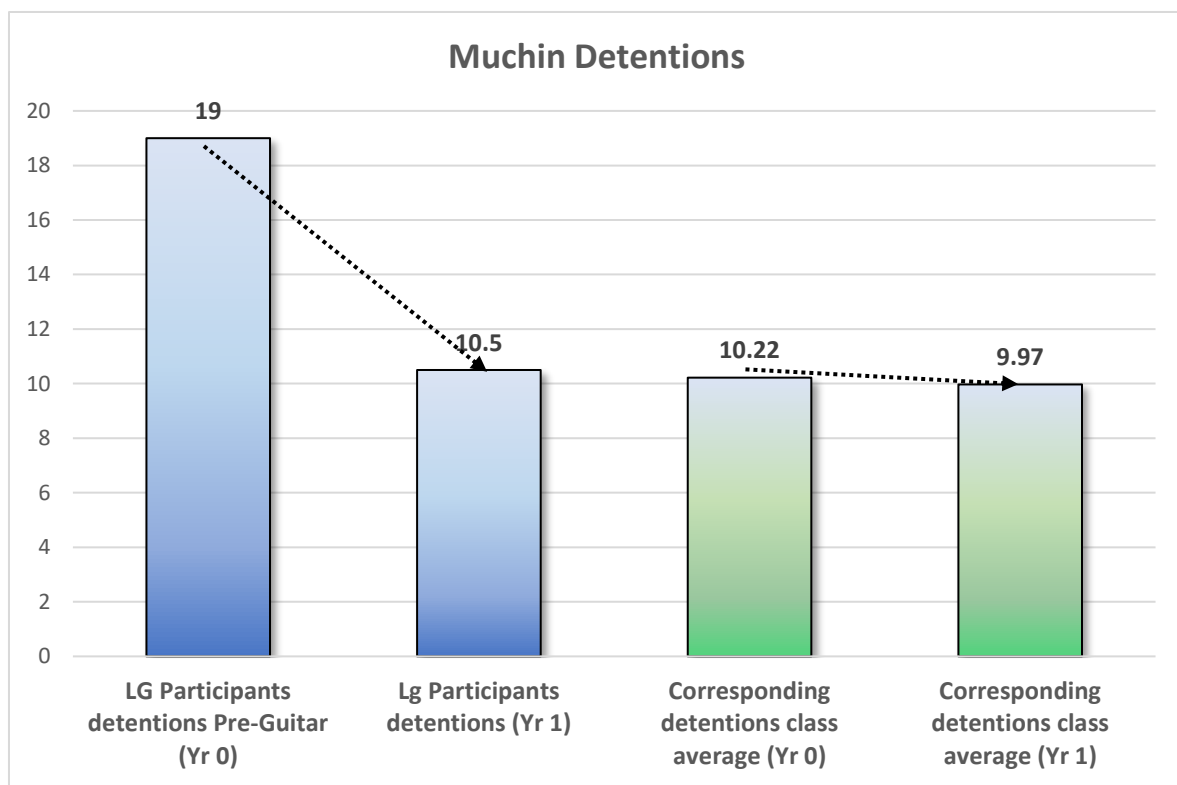
Lead Guitar Students at Risk of Dropping out Show Marked Improvement in GPA, Attendance and Discipline:

Muchin College Prep, located in Chicago’s downtown Loop district, enrolls students from 50 different zip codes throughout the city. While 84% of students qualify for Free and Reduced-Price Lunch (FRPL), the school defies the correlation between poverty and low academic performance boasting a 99% graduation rate. While that is impressive, that statistic is partially reliant on students who aren’t meeting the school’s academic standards or who have a history of absences and discipline issues transferring elsewhere before graduation. For this reason, when Lead Guitar partnered with Muchin College Prep to measure effects of the program on students determined by the school to be at-risk of dropping out, senior staff selected a small cohort of Lead Guitar participants who had unusually high numbers of absences and discipline incidents and tracked them through a special Lead Guitar enrichment class. The students showed marked improvement in all categories measured after only one year of participation, particularly when compared to their graduating class averages.

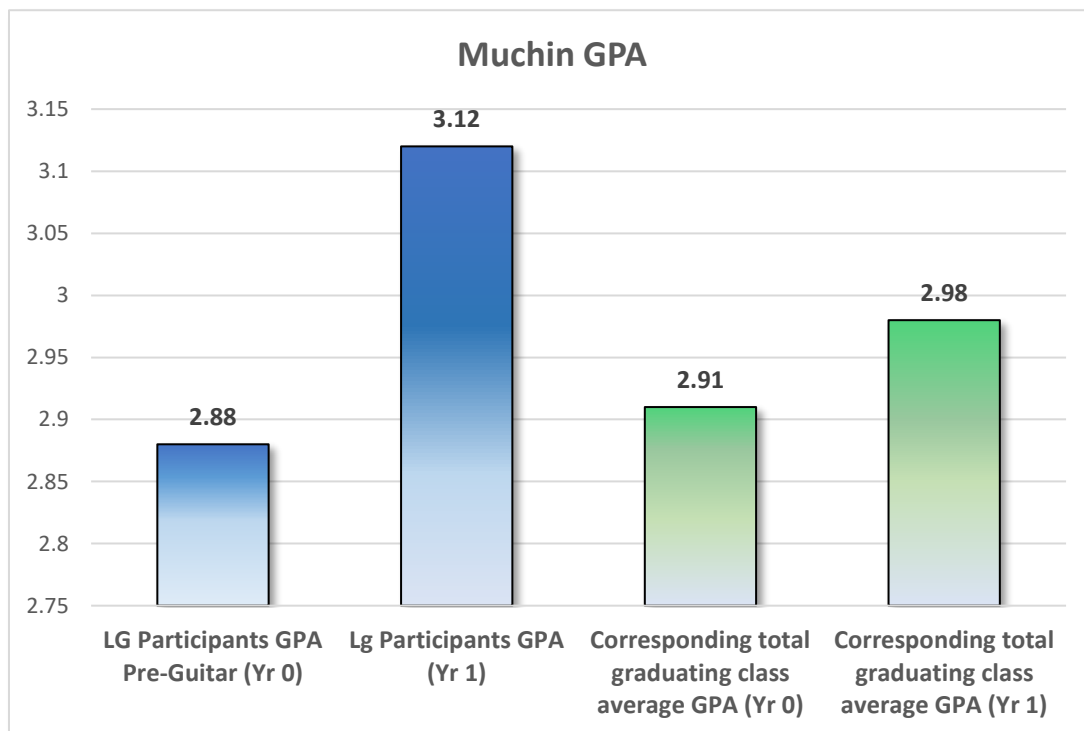
These Lead Guitar participants averaged 15 days absent in the year prior to starting Lead Guitar and reduced that by more than half to 7.25 after one year in the program. By contrast, the graduating class average increased slightly over the same time period from 6.24 days absent to 6.54.



Days in detention among this cohort decreased from an average of 19 in the year before taking Lead Guitar to 10.5 in their first year of participation, while the average detention days of the graduating class decreased only marginally from 10.22 to 9.97.



These Lead Guitar participants also improved their cumulative GPA, though less dramatically, which rose from an average of 2.88 before Lead Guitar to 3.12 after one year, while their graduating class average changed less – moving from 2.91 to 2.98.

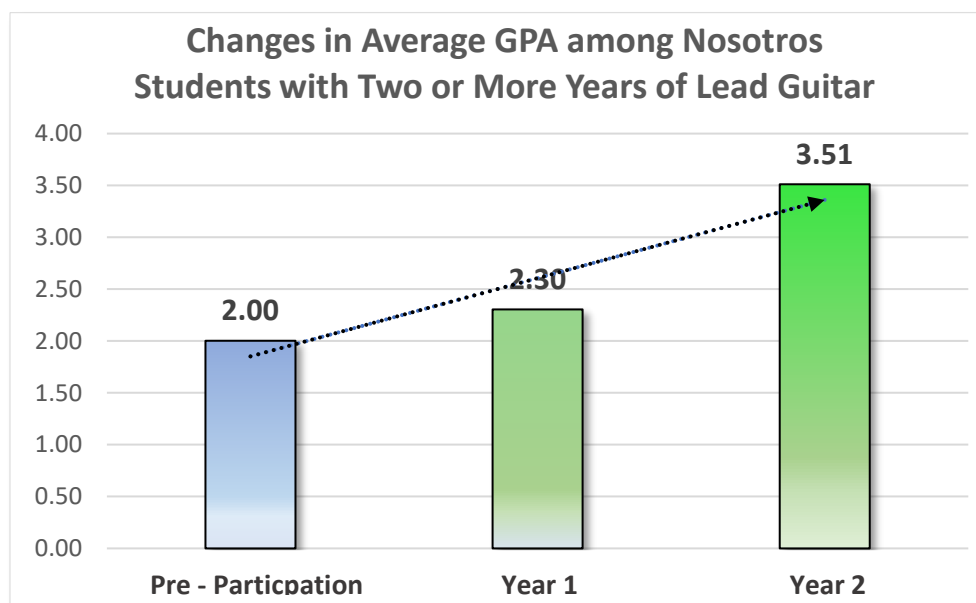


Large Cohort of Phoenix Union High School Students Show Improved GPA:

In the four Phoenix Union High School District schools participating in Lead Guitar in 2018-19, there were 59 students who began with Guitar 1 and took at least two years (or four semesters) of guitar. In asking the question: What is the effect of a Lead Guitar class after two years of exposure on those with no prior exposure? We found that 47 of 59 or **80% of students improved their GPAs** between Year 1 and Year 2 of participation.

Increased Average GPA among Nosotros Academy Participants:

The last study in this section entailed analyzing data from 30 students at Nosotros Academy in Tucson. Participants who completed two years of Lead Guitar classes ending in spring 2019 showed marked improvement in the overall class average GPA from the year before starting Lead Guitar until the end of the second year with the program.



SECTION 2. LEAD GUITAR ADAPTIVE PROGRAM (LEAD GUITAR WITH CHORD BUDDY)

Program description

Chord Buddy is a device originally designed to help adults easily learn to play chords on the guitar. It has been adapted by Lead Guitar to allow children with a range of abilities to participate fully in guitar classes. The Chord Buddy device attaches to the neck of the guitar and, by pushing color-coded buttons, allows the user to play complete six-string chords. A curriculum has been devised by the Lead Guitar team to utilize Chord Buddy's color-coded system to teach rhythmic patterns and song accompaniments that are in lock step with the learning goals in the standard Lead Guitar curriculum and can be tailored to a range of physical and cognitive skills. This curriculum is being refined based on lessons learned in five Tucson pilot schools.

Teacher evaluations

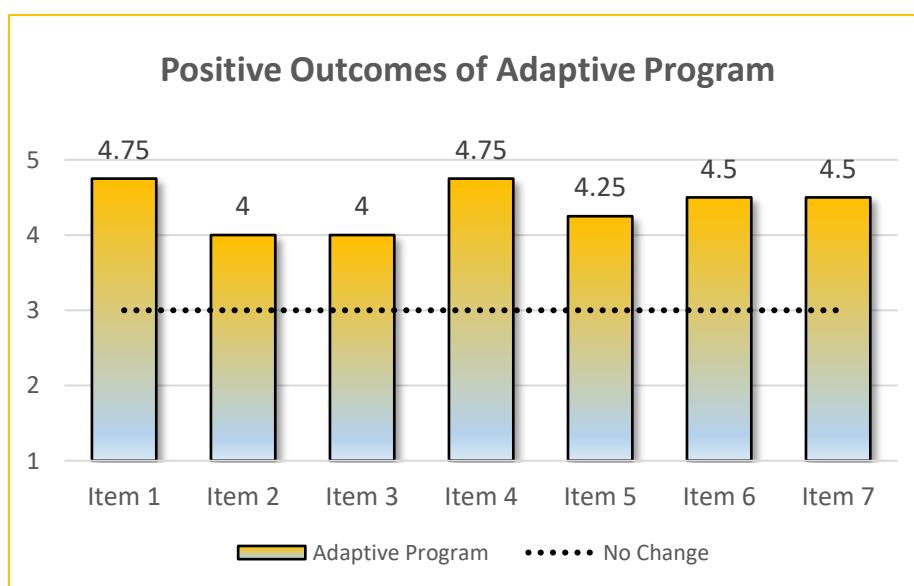
At three elementary schools, one junior high and one high school where the **LEAD GUITAR ADAPTIVE PROGRAM** was piloted, the teachers and classroom aides who worked with the students were asked to respond to a questionnaire using a five-point Likert scale and were asked for comments. The Principal at one of the five schools (that which only had a classroom aide participating) was also asked for comments. The new Lead Guitar Adaptive Curriculum itself is called “Lead Guitar with Chord Buddy” and is variably referred to in comments below as Chord Buddy or CB as well.

On the first section of the questionnaire, teachers and classroom aides responded on a five-point Likert scale; from Much Worse (1) to Greatly Improved (5).

Example:

Much Worse	Somewhat Worse	No Change	Somewhat Improved	Greatly Improved
1	2	3	4	5

Responses were very favorable - with the exception of the technical problems (fitting the $\frac{3}{4}$ guitars and breakable devices). The high scores on the responses and the comments showed that the Chord Buddy is a valuable tool for inclusion. Responses are listed from most to least impactful.



Question 1, Students' ability to focus and listen with the group? (avg. 4.75)

Comments:

"A CB student announced as he was leaving, 'That was fun.'"

"Students fear not being able to hold down strings. The CB alleviates that"

Question 4, Behavior in the classroom? (avg. 4.75)

"Less frustration = less behavior issues."

"Students gain a sense of pride."

Question 6, *Class teamwork or group cohesion?* (avg.4.5)

Comments:

"In our integrated classroom, we sometimes separate Chord Buddies for extra practice, so they often get less interaction with the others, but the cohesion does happen when they are brought back together."

"There is less fear of not being able to follow with other classmates."

Question 7, *Have you seen any change in classroom inclusion of students with differentiated needs outside of music class?* (avg. 4.5)

Comments:

"I notice a big difference from last year with no chord buddies to this year with them."

"The students have been given a confidence and sense of accomplishment with this "key" tool. A willingness to continue to harder patterns."

Question 5, *Participation* (avg. 4.25)

Comments:

"At times, some of them need more of a challenge (Chord Buddy was too easy) but overall, participation with all of them improved with little and moderate frustration."

Question 2, *Students' attitude towards learning?* (avg. 4.0)

Comments:

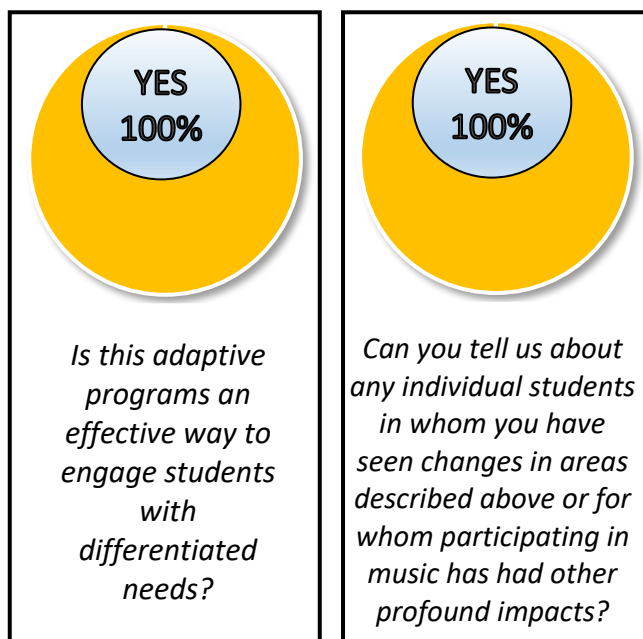
"Students are able to improve pattern memorization."

Question 3, *Interactions with classmates?* (avg. 4.0)

Comments:

"Students feel that they are able to be part of the music lesson."

On the second section of the questionnaire, the **LEAD GUITAR ADAPTIVE PROGRAM** teachers and classroom aides were asked to respond to three items with a "Yes" or "No" response, listed from most to least impactful. They left additional comments on this section.



Question 8, Is this an effective way to engage students with differentiated needs? Can you tell us about any individual students in whom you have seen changes in areas described above or for whom participating in music has had other profound impacts? (100-% Yes)

Comments:

Principal – “Yes – there were several instances I observed growth in small groups of students.”

Aide – “One student would not even have the urge to try, with the “chord buddy” they can learn a pattern of multi-tasking using vision, hearing, and eye-hand coordination.”

Aide – “Individualized strategies to support students’ needs resulted in increased confidence and a willingness to try new things.”

Question 9, What changes and improvements would you like to see in the delivery or materials of this program?

Comments:

Teacher – “It would be very helpful to have [both] curricula combined to project for all students to see at the same time. It was hard on the teachers to constantly have to write in the colors on the regular music [when projected]. Also, my school had the $\frac{3}{4}$ guitars, so unfortunately the chord buddies do not fit them.” [Lead Guitar provided full size guitars as a work around.]

Teacher – “Chord Buddies that fit the $\frac{3}{4}$ size guitars.”

Principal – “The inherent nature needed to work with ensembles helped. I saw marked improvement after rehearsals on many occasions, esp. regards to in-class behavior and peer to peer interaction.”

Question 10. Can you tell us about any individual students in whom you have seen changes in areas described above or for whom participating in music has had other profound impacts? (100-% Yes)

Comments:

Teacher – “Yes, one student in particular complained all the time at the beginning that everything was too hard. By the last class, he was playing along with all songs, and exclaiming that he was having fun.”

Teacher – “Yes, It has made a difference in many of the younger hearing-impaired students – it’s a quick, easy way to get them involved and engaged. One of my students this year – new to our school – was completely overwhelmed by the guitar and sat sullenly through a great many classes. After he started using the Chord Buddy, he has made up his own chord progressions, offered to be a mentor to other students – giant improvement in confidence and feeling a part of the class. (We had two CB’s break, I’m going to try to repair them with super glue.)”

SECTION 5. QUALITATIVE EVIDENCE OF WHOLE-CHILD BENEFITS

In this initial phase of our program evaluation, we did not include qualitative data other than the comments attached to the specific questions above. In other words, we did not conduct individual interviews with students, teachers, or administrators directly involved in Lead Guitar programming. However, it was years of qualitative data that originally led us to the supposition that this in-school music education program does have positive carryover into the rest of the participants’ school day.

The qualitative data that follows was not solicited by Lead Guitar as part of this program evaluation. Rather, many of the comments came from final reports to funders, in which the school reports directly to the funder and results are shared with the arts organization. Some of the comments also come from instructor surveys that

we have implemented for the last few years in order to identify weak areas in our instructor pool so that we can design professional development to improve those areas. The qualitative data has been organized by theme.

Lead Guitar Qualitative Data by Theme

Impact on Academics

One of the challenges in understanding studies that show a link between music study and elevated academic performance is not so much in showing *that* a link exists, but in *how* music study impacts academics. Some qualitative data points to indirect cause and effect as a major factor, and specifically self-confidence:

"One student who has struggled greatly in academics was in the guitar class. He gained a lot of confidence in the class. This year even though he is not playing guitar, he had the confidence and enthusiasm to choose to play a different instrument. He has shown excitement and has spent a lot of extra time practicing."

- Third Grade Teacher

When a struggling student feels like a failure in most academic areas, arts classes can be a space in which students realize success for the first time. In the above example, the student is branching out within the discipline of the arts; we have known many other students who have seen success in the arts and their new self-confidence spilled over into other subject areas:

"Students appeared to be more responsible and were able to be more successful in their academic progress. Students demonstrated...leadership qualities through examples and by helping other students they saw struggling. Students also challenged themselves, working hard to make sure they were able to perform all of the skills provided by the Lead Guitar Program. Students did better throughout the year with their benchmark scores in reading and math. Students developed team building skills and learned to work with an ensemble in order to be more successful."

- Middle School Teacher

Arts study is transformative precisely because students can start the year "not knowing anything about the guitar to being able to play in a concert at the end of the year," explained the Third-Grade teacher cited above. High school students also identified this experience:

"This year our students saw the scope of what was possible with this program. At this age, they have a radar that's sensitive to authenticity. Getting instruction directly from a faculty member and hearing the ring of truth in what she had to say about discipline, focus, and effort changed the seriousness with which they took music and may have positively affected the way they approach learning in general."

- High School Teacher

"Each of the students has had personal and/or academic issues this year; nevertheless, in guitar class, they come together as a team, across grade level, to love and support each other to achieve their best. I truly believe that without this dynamic they would not be mastering the pieces and performing as well as they are. In guitar class, they have to listen to each other and rely on each other and I have seen the trust that they have established with each other extended outside of the 50-minute guitar class period into all of their interactions with each other at

school. They as a group and individuals are more confident in themselves; which for many of them has translated into improved academics.”

-Middle School Teacher

“This opportunity made performance a real-life goal. Student Confidence in their ability to perform or interact with adults. The goal to provide a performance of learning to parents moved the responsibility of the content to the students. [Our school] has been engaged in a project around Student Agency. The [grant] helped us further our goals of academic identity, equity, student agency and academic culture.”

-Elementary School Principal

Impact on Behavior

Teamwork and cooperation are very difficult skills to improve in the traditional classroom setting, especially in schools where standardized testing is prioritized ahead of group projects or collaborative learning. Arts classes can often shake up social cliques as well as encourage cooperation and develop leadership:

“The Lead Guitar program allowed students to solidify their self-confidence. Solos and soli allowed everybody to participate in a collaborative effort to produce a product. Every student was able to perform a piece of music where they understood how to play it and in most cases volunteered to play it. The guitar ensembles, which are separated by experience, understand that a unifying sound can be produced by all if ‘You can believe in yourself and the group.’”

- Middle School Teacher

“Three of our Lead Guitar students found acceptance through belonging to the ensemble. The shared respect was obvious across the group. We believe that this program actually helped several students stay in school.”

-Middle School Principal

Impact on Confidence

We argue that self-esteem and confidence are two areas in which arts study can have a direct impact on success in other academic areas.

“The students who participated in the Lead Guitar program developed stronger self-confidence as indicated in their final performances at the Fred Fox School of Music. Student participants shared that they had overcome personal psychological barriers to get on stage and play for an audience of people they did not know, outside their community.

Inability to formally read music is always a barrier for our students interested in music. This program strengthened students' abilities to read and strengthened their confidence in their ability to continue learning and improving.”

- High School Career Counselor

The latter comment on learning to read music is critically significant here. The career counselor teaches at a high school on the Tohono O’odham Nation Reservation, and a teacher the previous year had commented offhand to our instructor that “these students can’t learn to read music.” In this case then, the fact that students

could learn to read and performed among an auditorium of peers could have transformative impact on any academic area the students approach going forward.

"It was about a week ago I walked into the classroom and [the Lead Guitar instructor] was working with the kids. One of boys shared his composition with the class and everyone was learning it for the performance they had last Friday. They asked me to listen and I did. [The student] was so excited and he is not excited about anything regarding school. He has a pretty bad living situation. I was very proud to see him excited about his work."

-Elementary School Principal

"Most often the students who come through this program choose to do 1 maybe 2 years just to get fine arts credit and do not pursue it any further. Due to the increased popularity and success of the program, I had several 2nd year students indicate that guitar was an avenue they wanted to pursue all through high school and into college. They began asking about scholarships and opportunities to further their music professionally which led us to offer advanced guitar beyond the second year to invite them to start guitar ensemble and be treated much like band and orchestra are."

-High School Teacher

Impact on Focus

"Classroom teachers have commented on the way students have learned to focus better as a result of the guitar classes. Students have gained pride in what they have been able to accomplish. Students have gained confidence in their abilities to learn new things."

-Third Grade Teacher

"Students appeared excited to participate in the Lead Guitar Program. They worked hard and were able to be focused in their music. Unexpectedly, many students who weren't very focused also appeared to work harder in the school work and achieved higher academic achievement than they had at beginning of the year."

- Middle School Teacher

"Lead Guitar is our first serious performing arts class (we've had keyboard and art classes in the past) and as such has shown our staff and students the process by which one begins to master an art form. We are learning that self-expression is more meaningful when it has the depth of knowledge, discipline and focus on detail that a program like Lead Guitar provides."

- High School Principal

Impact on Community

"Those that were part of the Showcase concert were especially proud and happy to share what they had learned with their parents and families. Families were able to be on the university campus, take pictures, and take joy in celebrating students' success. Students were able to enjoy their accomplishments in going from not knowing anything about the guitar to being able to play in a concert at the end of the year."

- Third Grade Teacher in Lead Guitar

SUMMARY

Having analyzed data collected over the past year from a large, diverse, and dynamic population of students and teachers participating in Lead Guitar programs, we saw a pervasive positive influence on classroom learning activities and on teaching.

"Students who learned to play a musical instrument in elementary and continued playing in high school not only score significantly higher but were about one academic year ahead of their non-music peers with regard to their English, mathematics and science skills," (Bergland 2019). The authors of this study sum up the educational significance of these findings to suggest that "...multiyear engagement in music, especially instrumental music, may benefit high school academic achievement."

Similar research shows that music study boosts listening skills, and it furthermore has a positive correlation with increased brain function: "Musically trained kids do better in school, with stronger reading skills, increased math abilities, and higher general intelligence scores. Music even seems to improve social development, as people believe music helps them be better team players and have higher self-esteem" (Skoe and Kraus, 2012).

Eisner describes music as crucial to an expanded view of knowledge; a unique and important mode of representation capturing experiences and meanings (1982). Researchers have long argued that the integration of arts in the curriculum offers students and teachers learning experiences that are intellectually and emotionally stimulating (Barrett 1997). Including music instruction across the school experience provides space "to share and listen to others' ideas, visions and commitments, and to build relationships in collaboration across disciplines" (Bresler 2003). More recent experiments in neuroscience have shown that "The way you hear sound today is dictated by the experience with sound you've had up until today, ...musical training is akin to physical exercise...is a resource that tones the brain for auditory fitness" (Nina Kraus, 2012).

Our work with the Lead Guitar over the past year supports and complements these example findings. Results showed that students grades improved, their absences were reduced, disciplinary incidents decreased, and self-esteem increased. Teachers noted increased participation, inclusion and focus, improved behavior, social interactions and attitudes towards learning and saw positive carryover from the arts classroom to core curricula.

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