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Musiah Case Study

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A case study to compare the effectivess of Musiah, the world's first Artificially Intelligent virtual piano teacher with traditional teachers

The following case study compares the effectiveness of Musiah, the world's first Artificially Intelligent virtual piano teacher with traditional piano teachers. The case study was conducted over a ten week period commencing mid October 2011.

Definitions:

"Piano": The lessons referred to in this case study are piano lessons delivered for practical reasons using electronic MIDI keyboards. I do not refer to keyboard lessons because "keyboard lessons" often refers to lessons or courses that do not teach students to read and play the notes properly with both hands but merely teach the right hand notes while using chord symbols (often 1-finger chords) in the left hand. So, to be clear, these lessons are piano lessons insofar as they teach all the skills that have been associated with traditional piano lessons for hundreds of years.

"Piece": A "piece" as the term is used in this document can refer to a solo song or a part in an ensemble song. Many of the songs in the Musiah syllabus are ensemble arrangements containing multiple parts. For example, "Mary Had Leg Of Lamb" has two parts, Part 1 and Part 2. Each part is considered a separate piece. So if a student has learnt both parts, they are deemed to have learnt two pieces.

Applicants and the selection process:

In September 2011, applications to participate in the case study were sought through a number of avenues.

Applicants were required to have a PC with at least 2GB of RAM. From our initial pool of applicants some did not have a PC that met the necessary specifications, and a few had mac computers, so those families were unable to participate.

Then there was our second requirement — regular practice. Normally when parents are paying for their children to attend traditional lessons they make a point of ensuring that their children practice regularly (because no normal parent would pay for lessons if their child is not doing any practice) so it seemed reasonable to ask applicants up front if they were willing to practice for 30 minutes a day 5 days a week. We felt it was important to obtain an indication of willingness from participants to use Musiah on a regular basis for ten weeks. Some families were unable or unwilling to make this commitment, so that whittled the numbers down further.

Additionally, a small number of families who started the case study but did not complete it have not been included in this document. For example, some families took holidays in the middle of the ten weeks, while others were unable to continue for various personal reasons unrelated to Musiah.

So we ended up with six suitable applicants who for ten weeks did a reasonable amount of practice, that is, an amount that would be comparable to the norm for beginner students attending paid traditional piano lessons.

Methodology:

Before starting the case study, my intended methodology was simple — take a group of beginners, students that had never previously received piano or keyboard tuition, and let them study exclusively with Musiah, with no assistance from a traditional teacher, for ten weeks. The results can be easily compared to those of traditional lessons because the Musiah syllabus is a piano course that I wrote more than 17 years ago that has been taught to approximately 80,000 students in primary schools all around Australia through an in-school piano program I started in 1995. So this is a syllabus I know inside out, one that has been delivered by more than 800 traditional teachers whom I have trained. Because the syllabus is so well established, we know what to expect in terms of average rates of progress through the syllabus from traditional students.

When it came to applying the intended methodology to the case study participants, an interesting opportunity arose that was too good to pass up. One of the families that applied to participate in the study had not one, but two sets of twins. So that got me thinking… What if, to make things a little more interesting, from the older pair of twins (age 12) we had Twin A learn exclusively with Musiah while Twin B learnt with both Musiah AND a traditional teacher for ten weeks — just to see if the involvement of a traditional teacher would make a difference to the outcome. And for the younger set of twins (age 9), we had Twin C learn exclusively with Musiah while Twin D was denied access to Musiah, instead attending lessons with a traditional teacher for the ten weeks. Plus we had two other students, each from different families, who learnt exclusively with Musiah for ten weeks. This was going to be fun.

The Results In Summary

To start with, let us look at the benchmark, that is, the rate of progress would one would expect from students learning the same syllabus in a traditional lesson scenario. While there are a myriad of factors that can influence a student's progress, (for example, the effectiveness of the teacher, the amount of practice done by the student, the age of the student, whether the student has any learning disabilities, student attendance rates throughout the term, teacher attendance rates throughout the term, whether there were school events such as school camps that disrupted the lessons, etc.), on average, experience over the last 17 years with approximately 80,000 students has shown that beginners aged between 7–12, over the course of a ten week school term, will usually learn 4–6 pieces.

Over the course of the ten weeks of the Musiah case study, here is how the study participants fared:

Table 1 Number Of Pieces Learned According To Teaching Method		
Student	**Teaching Method**	**Number Of Pieces Learned**
Twin A (age 12)	learnt exclusively with Musiah for 10 weeks	26
Twin B (age 12)	learnt with both Musiah AND a traditional teacher for 10 weeks	19
Twin C (age 9)	learnt exclusively with Musiah for 10 weeks	19
Twin D (age 9)	learnt with a traditional teacher for 10 weeks with no access to Musiah	4
Student E (age 11)	learnt exclusively with Musiah for 10 weeks	19
Student F (age 7)	learnt exclusively with Musiah for 10 weeks	17

All students who learnt with Musiah progressed well above the average progress rate of traditional students learning the same syllabus. To better understand how much more they progressed than their traditional counterparts, we need to look at the results in more detail.

The Results In Detail

First, let us look more closely at the results achieved by the two sets of twins.

Twin A and Twin B (age 12) learnt 26 pieces and 19 pieces respectively. Yet Twin B, in addition to lessons with Musiah attended lessons with a traditional teacher. While both students progressed very well (more than an average traditional student learning the same syllabus), why did Twin B not progress faster than twin A? It would seem that the presence or absence of a traditional teacher is not the main factor in this equation, but rather the presence or absence of Musiah. If the student has access to Musiah, whether or not they are also learning from a traditional teacher, they will progress faster than an average student learning with a traditional teacher alone.

Twin C and Twin D learnt 19 pieces and 4 pieces respectively. Interestingly, Twin D was denied access to Musiah for the entire ten weeks of the case study and progressed at a rate that is comparable with the average rate of traditional students learning this syllabus. By contrast, Twin C

learnt several times faster. Again it seems that the main factor influencing the progress of the student is not the presence or absence of a traditional teacher, but rather the presence or absence of Musiah.

Students E (age 11) and F (age 7) also progressed very well with Musiah learning 19 pieces and 17 pieces respectively. As with all the other participants, if the student has access to Musiah, whether or not they are also learning with a traditional teacher, the results show that they will progress faster than an average student learning with a traditional teacher alone (assuming a reasonable amount of regular practice).

To better understand how much faster Musiah students progressed compared to their traditional counterparts, it is necessary to consider the following:.

As an example, if a Musiah student learns 20 pieces, while a traditional student learns 5 pieces in the same timeframe, one cannot simply say that the Musiah student learnt 4 times faster (5 pieces X 4 = 20 pieces) because as one progresses through the syllabus, the pieces become increasingly more advanced and therefore present a greater challenge. For example, it would take far less time to learn Piece 1 than Piece 20. So it becomes necessary to assign a weighting to each piece to represent the learning value it contains (see below).

Table 2
Value Of Pieces Learned

Piece	Title	Weighting
1	Jack In The Box — RH Only	1
2	Jack In The Box — BH	1
3	First Of All — Part 1	1.5
4	Now For Seconds — Part 1	1.5
5	Hot Cross Buns — Part 1	2.5
6	Hot Cross Buns — Part 2	2.5
7	First Of All — Part 2	2
8	Now For Seconds — Part 2	2.5
9	Mary Had A Leg Of Lamb — Part 1	2
10	Mary Had A Leg Of Lamb — Part 2	2
11	Third Tune Lucky — Part 1	4
12	Third Tune Lucky — Part 2	4
13	Big Ben — Part 3	2.5
14	Big Ben — Part 1	2.5
15	Big Ben — Part 2	2.5
16	4X4 — Part 1	4.5
17	4X4 — Part 2	4.5

18	Playful Fingers	3.5
19	Let's Mimic	4
20	Indian Dance	4
21	PopGoes The Weasel	4
22	Go Tell Aunt Rhody	4
23	This Is The Way — Part 2	3.5
24	This Is The Way — Part 1	4
25	Row, Row, Row — Part 2	3.5
26	Row, Row, Row — Part 1	4

While all other information presented thus far is objective and factual, these weightings assigned to each piece contain an element of subjectivity. They are assessments based on my opinion of a combination of the level of difficulty of each piece, the amount of time usually required to learn each piece properly and the amount of material in each piece (the pieces vary in length), and are given to help provide an indicative picture of how much progress is really being made as students advance through the course. Also, there are more than 100 pieces in the course, but we do not need to list the entire course here for the purpose of this document.

If an average student learning this syllabus through traditional lessons learns 4–6 pieces, let us say 5 pieces in their first 10 weeks of lessons, that is a progress score (based on the above weightings per piece) of 7.5.

By comparison, the results of the case study participants who had access to Musiah are as follows:

Table 3
Progress Scores Of Case Study Participants

Students	Age	Learning Method	Pieces Learnt	Weighted Progress Score
Twin A	12	learnt exclusively with Musiah	26	77.5
Twin B	12	learnt with Musiah AND a traditional teacher	19	50.5
Twin C	9	learnt exclusively with Musiah	19	50.5
Student E	11	learnt exclusively with Musiah	19	50.5
Student F	7	learnt exclusively with Musiah	17	43
Totals			**100**	**272**
Averages			20	54.4

Compared to average traditional students who learn 5 pieces (weighted progress score of 7.5):

Twin A learnt 10.33 times faster.

Twin B, Twin C and Student E learnt 6.73 times faster.

Student E learnt 5.73 times faster.

With an average weighted progress score of 54.4, the group as a whole learnt 7.25 times faster than average students learning the same syllabus through traditional lessons.

But 7–12 is quite a wide age range. To refine this comparison further, let us sort the students by age.

Table 4
Progress of Students (Group by Age)

Student	**Pieces Learnt**	**Weighted Progress Score**
Average traditional students age 7–8	4	5
Student F (age 7)	17	43 (8.6 times faster)
Average traditional students age 9–10	5	7.5
Twin C (age 9)	19	50.5 (6.7 times faster)
Average traditional students age 11–12	6	10
Twin A (age 12)	26	77.5 (7.75 times faster)
Twin B (age 12)	19	50.5 (5.05 times faster)
Student E (age 11)	19	50.5 (5.05 times faster)

The three Musiah students in the 11–12 age group as an average scored 59.5 (that is an average of 5.95 times faster than their traditional counterparts).

By contrast, Twin D (age 9) who did not have access to Musiah learnt 4 pieces (weighted score 5) which is slightly lower than an average traditional student.

However one looks at it, the students who had access to Musiah throughout the ten week case study progressed several times faster than average students learning the same syllabus through traditional lessons. But one important question remains: Why?

What is the main reason for the increased progress of Musiah students compared to traditional students learning the same syllabus?

I do not believe the difference in progress has anything to do with the effectiveness of traditional teachers, per se. In my view, the increased progress of Musiah students is primarily because Musiah is available to support students every step of the way 24/7. By contrast, a traditional teacher, understandably, can only be with their students once a week during their lesson, and for the rest of the time, students are left to their own devices without much support, unless of course they come from a musical family, in which case mum or dad may be able to help them. But for most students, this is not an option.

Because Musiah is there to support students all the time, lesson time and practice become one, as students are not really practicing in the traditional sense so much as having a perpetual lesson.

Additionally, Musiah of course does a very good job of teaching this syllabus and makes it fun and enjoyable for the students by taking them on an adventure that spans the galaxy. As students complete each piece, they have to audition their piece for Musiah with a full backing track and the higher their score, the more gold stars they earn. Gold stars are used to unlock performance challenges at the end of each level. Also, as students complete each piece, clues about the Atonals (the bad guys) are revealed and students progress closer (on the progress map of the galaxy) to the planet where the next performance challenge will be held. Along the way they meet a wide variety of characters, and the ultimate aim of the course is to unlock the Lost Song which is required to save the galaxy from the Atonals. As students complete each level they are awarded a higher rank, and if the student completes the course, they will become the next Musiah. So, in addition to what I believe is very good teaching, all of this helps encourage and motivate students to progress and achieve.

But I honestly believe we may see even greater progress from Musiah students in the future because the students in this case study were using the very first, largely untested proto-type version of Musiah which was extremely rough, full of bugs, and did not have many of the features today's much more polished version has. So if the same students were given access to today's version of Musiah, I believe the enjoyment levels would be a lot higher and this would be reflected in the progress.

In any event, please feel free to try Musiah for yourself. It is now available at www.musiah.com.

Or tell a friend about Musiah. Who knows… In so doing, you may one day take credit for introducing a great musician to their first piano lessons.

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