

# Reflections on the Role of Music in Higher Education and the “Learned” Mind

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*Abstract: Historical cultures and education systems as well as noted intellectuals have recognized the relationship between music study and the development of intellectual perspective, regardless of whether the music experience is applied or academic. The education systems that include music are in agreement with today's quantitative scientific findings that demonstrate music interaction can enhance brain development and thus have an impact on cerebral or analytical abilities. Although US higher education is shifting away from traditional liberal arts and towards vocational and professional fields, history informs us that marginalizing arts like music within the curriculum is not conducive to a solid education.*

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## Introduction

**I**N RECENT DECADES in US higher institutions undergraduate education has moved toward a dominant focus on vocationalization and professional fields and away from a traditional liberal arts curriculum. A 1996 study indicates that 60 percent of US undergraduates are choosing majors in vocational fields,<sup>1</sup> and according to more recent research by the US Department of Education (2007-08), the most popular college major for both men and women is business, with business degrees comprising 21 percent of the bachelor's degrees awarded, at least doubling the number of all degrees in other majors.<sup>2</sup> Other non-liberal arts fields, such as health care, engineering, and public administration have also been on the rise in the past decade, and like business studies, their specialized curriculum leaves little time, or appreciation, for the arts.<sup>3</sup> But as history and science both demonstrate, regardless of one's college major, marginalizing or eliminating music from higher academe programs may not be in the best interest of students.

## Music and the Brain

Historically there has long been a philosophical belief in the powers of music to enhance erudition, and today, the connection between music study and an increase in intelligence can be quantified. For instance, in the field of neurology, we see research findings like those of Gottfried Schlaug who for over a decade has been using MRI technology to scan the

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<sup>1</sup> S. Brint, *Schools and Society* (Thousand Oaks, CA: Pine Forge Press, 1998); C. Kerr, *The Great Transformation in Higher Education 1960-1980* (Albany, NY: State University of New York Press, 1991).

<sup>2</sup> “The American Freshman: National Norms Fall 2009,” Higher Education Research Institute at UCLA Research Brief, Jan. 2010.

<sup>3</sup> “The Condition of Education, 1999,” *National Center for Education Statistics*, U.S. Department of Education Office of Educational Research and Improvement, NCES 1999-022, 122.

“musical” brain. He has found that, among musicians, the corpus callosum, which is the largest brain fiber tract that connects the two brain hemispheres, is enlarged, especially so in those who have absolute pitch or who started music training early. This results in greater intellectual capacity, since the larger the corpus callosum, the more easily one can access information on both sides of the brain.<sup>4</sup> Other neurology research has proposed that listening to music “facilitates the neurogenesis, the regeneration and repair of cerebral nerves by adjusting the secretion of steroid hormones, ultimately leading to cerebral plasticity.”<sup>5</sup> Music has the added advantage of being oftentimes a most pleasurable experience. Indeed “when people listen to music they say they enjoy, their brain activity spikes in regions involved in reward and motivation.”<sup>6</sup> The great scientist Albert Einstein, a noted violinist, regularly sought such musical inspiration. As his son remembered, “Whenever he had come to the end of the road or into a difficult situation in his work, he would take refuge in music and that would usually resolve all his difficulties.”<sup>7</sup> Music’s benefits are cyclic: music affects brain growth or regeneration, people enjoy it so they continue with musical activities, and doing so in turn further facilitates the brain.

Of course since music is an extraordinarily expansive discipline, its study, especially that in colleges and universities, can involve much more than just listening or even performing. A music curriculum can incorporate an examination of notation systems, texts, libretti, philosophies, histories, or engage a variety of outside disciplines including astronomy, religion, the social sciences, and a myriad of other complex subjects. Music by its very systematic nature and use of sounds/vibrations is understandably tied to mathematics or physics. Consequently, it has long been believed that music, although a creative art, is especially conducive to the development of the scientific or analytic psyche.<sup>8</sup> Throughout the world the disproportionate amount of distinguished scientists and physicians who are also highly advanced

<sup>4</sup> Amanda Hutchinson, D. and J. L. Mathias, B. L. Jacobson, L. Ruzic, A. N. Bond, Marie T. Banich, “Relationship between intelligence and the size and composition of the corpus callosum,” *Experimental Brain Research* (24 Oct. 2008). N. Gaab and C. Gaser, G. Schlaug, “Improvement-related functional plasticity following pitch memory training,” *Neuroimage* 31/1 (May 15 2006): 255-63. The size of a person’s corpus callosum is linked to intelligence, since the more easily one can access information on both sides of the brain the greater one’s intellectual capacity. “Positive associations between intelligence and posterior callosal thickness may reflect a more efficient inter-hemispheric information transfer, positively affecting information processing and integration, and thus intellectual performance.” E. Luders, and K. L. Narr, R. M. Bilder, P. M. Thompson, P. R. Szeszko, L. Hamilton, A. W. Toga, “Positive correlations between corpus callosum thickness and intelligence,” *Neuroimage* 37/4 (Oct 1 2007): 1457-64.

<sup>5</sup> “Music affects levels of such steroids as cortisol (C), testosterone (T) and estrogen (E), and ... also affects the receptor genes related to these substances, and related proteins,” H. Fukui, and Kumiko Toyoshima, “Music facilitates the neurogenesis, regeneration and repair of neurons,” *Medical Hypotheses* 71/5 (Aug. 2008): 765-69. “Brain scans taken during musical performances show that virtually the entire cerebral cortex [central processing area of the brain] is active while musicians are performing. Almost every system of the brain is at work simultaneously during a music performance, and brain cells are rapidly sending messages. Such strengthens the connections between brain cells, allowing the brain to function more efficiently.” N.M. Weinberger, “The Music in Our Minds,” *Educational Leadership* 56/3 (1998): 36-40.

<sup>6</sup> Anne J. Blood and Robert J. Zatorre, “Intensely pleasurable responses to music correlate with activity in brain regions implicated in reward and emotion,” *Proceedings of the national academy of sciences of the United States of America (PNAS)*, 2001.

<sup>7</sup> R. W. Clark, *Einstein: The Life and Times* (New York: World Publishing, 1971), 106.

<sup>8</sup> Isabelle Peretz and Robert J. Zatorre, “Brain organization for music processing,” *Annual Review of Psychology* 56: 2005: 89-114.

musicians manifest this connection.<sup>9</sup> Through the years music no doubt had some impact on their brain enhancement, but also consciously or not, it may have affected the actual approach they take to their scientific work. Einstein, among the most intense scientist-musicians, stated that he never would have realized the theory of relativity if it were not for his musical studies. “[It] occurred to me by intuition. And music is the driving force behind this intuition...”<sup>10</sup> Einstein found that the laws of nature, such as those of relativity theory, were just waiting to be recognized by someone with a musical discernment. He felt that the existing theories lacked “architecture” and “inner unity,” which his musical mind revealed.<sup>11</sup>

## Music in the Early Western Academy: Classic and Medieval

Long before we had Einstein’s testimony or quantitative neurological evidence, we had historical philosophical justification for music as a tool to enhance human intellect in education systems. The history of higher education is replete with attestations on the importance of music. The Ancient Greeks, who laid the foundation for European academe, believed music played a crucial role in developing a productive citizen. To Plato, “music,” a term that had a much broader meaning, was one of two basic aspects of an idealized education system: there were gymnastics to discipline the body and music to discipline the mind, the pair serving as “outlines of one’s education and breeding...” In addition, Plato believed that the significance of music went beyond the academy. He, like many great sages throughout history, felt music possessed moral qualities that could affect the character and behavior of an individual. Indeed, he reasoned that music could help shape society, as he noted, “a change to a new type of music is something to beware of as a hazard of all our fortunes. For the modes of music are never disturbed without unsettling of the most fundamental political and social conventions....”<sup>12</sup>

In teachings of other Greeks such as Pythagoras and his disciples, music was inseparable from numbers. The Pythagorean school is credited with the discovery of the numerical rela-

<sup>9</sup> Historically, some of the greatest composers were professionals in scientific careers. Aleksandr Borodin (1833-1887) was a noted professor of chemistry; Hector Berlioz (1803-1869), a practicing physician; Iannis Xenakis (1922-2001), a civil engineer and architect; and Sir William Herschel (1738-1822) was one of the greatest astronomers of the nineteenth century. The connection can also be seen at leading scientific institutes where extraordinary orchestras and other ensembles have emerged. The National Institute of Health (NIH) in Bethesda Maryland, USA, which is the primary agency of the United States government responsible for biomedical and health-related research, houses a superb orchestra comprised of sterling scientists, researchers, and physicians. One violinist directs the federal government’s research on the human immune system. Another violinist is a world-famous scientist, with both a Ph.D. and MD, considered one of the country’s top immunologists and a tenured faculty member at NIH. Another violinist is a fellow in the National Institute of Allergy and Infectious Diseases where he does research on tumor immunology. The clarinetist specializes in Physics and Astronomy and is employed by NASA Goddard Space Flight Center where he develops and tests satellite instruments, such as the Hubble Space Telescope, to determine their ability to maintain quality measurements during their lifetime in Earth’s orbit. The French horn player is a foremost neuro-ophthalmologist, a physician who treats brain diseases affecting nerves in the eye. P. Rucker, “High-Achieving MDs and PhDs Find Harmony in Orchestra: Science, Music Intersect in NIH Philharmonia,” *Washington Post*, May 10, 2008: A01.

<sup>10</sup> S. Suzuki, *Nurtured by Love. A New Approach to Education*, trans. Waltraud Suzuki, (New York: Exposition Press, 1969).

<sup>11</sup> G. J Whitrow, *Einstein: The Man and His Achievement* (New York: Dover, 1973). A. I. Miller, “A Genius Finds Inspiration in the Music of Another,” *New York Times*: Jan. 31, 2006.

<sup>12</sup> Plato, *Republic*, Book III and Book IV 424c, in Michael L. Mark, *Source Readings in Music Education History* (New York: Schirmer, 1982), 15.

tionships governing the basic intervals of music—the octave, the fifth, and so forth. To many ancient thinkers sounds and rhythms, ordered by numbers, exemplified the harmony of the cosmos and corresponded to it. Thus, some like the leading astronomer Claudius Ptolemy (2nd cent CE) cited the close connection of music and astronomy, as mathematical laws were perceived as underlying the systems of both musical intervals and of heavenly bodies. Others like Aristotle in *The Politics* viewed music as more holistic and encompassing, important in education as well as in ritual and relaxation.<sup>13</sup>



Fig. 1: Boethius' music treatise *De institutione musica*, written in the early sixth century, Cambridge University Library, MS Ii.3.12, ff. 73v-74

<sup>13</sup> P. Weiss and R. Taruskin, *Music in the Western World: A History in Documents* (New York: Schirmer, 1984), 10.

Transferring the Classical legacy to the Middle Ages and into the Renaissance and beyond, Boethius the Roman Medieval philosopher (c. 480-524) assessed music as one of the seven liberal arts of education, that is, the *studia humanitatis*. In his presentation, similar to that of the Pythagorean Greeks, the focus is on music as harmonics or the science of musical sounds. Boethius lists music as part of the *quadrivium*, that is, the higher curriculum that included the four disciplines of measurement: i.e., geometry, arithmetic, astronomy and music. The lower curriculum held the remaining three disciplines, the *trivium*: grammar, logic, and rhetoric. Interestingly, in this system, as part of the *quadrivium*, music is clearly tied with the sciences (fig. 1).<sup>14</sup>

### **Early Universities**

With the establishment of universities in the Middle Ages, Boethius' teachings maintained a leading role. But along with his mathematical study of music, music as a living art was also held in esteem. Indeed, academic study was supplemented by musical activities of many different kinds under university auspices. As medieval universities were basically scholastic guilds of the Roman Catholic Church, such is understandable: music and performance had been an integral part of the Mass and Offices from their inceptions. So as the universities emerged, maintaining music study as part of higher education was an organic process. Religious observances accompanied by music formed a never-ending part of university life. The students were enshrouded in music making and were no doubt themselves trained. A sound music education at an early age was deemed excellent preparation for learning in advanced academic areas. In Paris, Notre Dame's choir school served as a preparatory institution that fed into the university, constantly sending students to the Sorbonne for higher studies that had nothing to do with music. Moreover, many of these choristers were so advanced they were on academic scholarship.<sup>15</sup>

Premiere English universities, Cambridge and Oxford, likewise maintained a solid core of musico-religious activities. Here we can see that that along with applied activities, academic study of music was highly regarded; indeed, music was singled out from among the other disciplines of the *quadrivium* for special distinction. Degrees in music were awarded from at least the fifteenth century in England, and during the Renaissance a graduate in music was granted permission "to lecture in any of the books of Boethius"—that is, any of the seven major disciplines of education. This was likely true in the Middle Ages as well, as Boethius' treatise *De institutione musica* was a regular part of the mathematical study requirement. In Central Europe we also see in the universities both an applied and academic-Boethian music education. In Prague and Cologne music along with mathematics was part of daily lectures.<sup>16</sup>

The connection between music study and the advanced, well-rounded mind continued throughout western history. For instance, William Tans'ur in 1746 described a "Master of Musick" in *A New Musical Grammar* as a person who:

<sup>14</sup> Weiss, 33. Today we know that music is both a left and right brain function, left brain in that it is sequential and time oriented, and right brain, in that it is intuitive and creative.

<sup>15</sup> N. C. Carpenter, "Music in the Medieval Universities," *Journal of Research in Music Education* 3/2 (Autumn 1955): 138. (Carpenter, 1955), 138.

<sup>16</sup> Carpenter, 139; C. B. Rootham, "Music in the Universities," *Proceedings of the Musical Association* 48 (1921-22): 99-116.

“must not only be a grammarian, but also a Master of Letters and Languages, in order to unfold what is locked up in the Closets of the Learned. He must be an Arithmetitian [sic] and able to explain Numbers, and even the Misteries [sic] of Algebra; and also a Geometrician, to evince a great variety, the Original of Intervals, Consonant and Dissonant...”<sup>17</sup>

Thus, it is not just the general scholar who must know music, but also the musician who must be skilled in grammar, mathematics, and other disciplines, as such are inherently enconced in the complexities of his/her art.

### **Music and Advanced Education: China**

Using music to aid in the development of the learned mind is more than a western concept. Long before Boethius, and about fifty years before Plato, the great Chinese philosopher Confucius (551 BCE-479 CE) founder of the official state ideology of Imperial China, extolled the significance of music. He taught that music should be practiced in conjunction with ritual as a means of governance and self-cultivation. Students of the Confucian school were expected to learn the “Six Arts,” which include rites, archery, chariot-driving, literature, mathematics, and of course, music. Confucius considered the Six Arts as the core subjects of education because “people can learn ideas from poetry, develop human relationships on the basis of propriety, and cultivate the mind with music.” The man who had learned these Six Arts was closer to becoming a “perfect man of virtue,” that is, one who is “wise, brave, honest, courteous, and musical.”<sup>18</sup>

For over two thousand years the Confucius school has formed the foundation of thinking among the Chinese people and influenced Chinese society and other East Asian cultures. Chinese peoples, as well as those of Korea and Japan, have thus maintained a great regard for music education. Today, in the Far East the ability to play a musical instrument is considered necessary for a proper education, and such is largely an outcome of Confucianism. Confucius himself was a highly skilled music performer, composer and singer. He was exceptionally gifted in playing and teaching the *qin* (chin), a Chinese seven-stringed plucked zither, the most esteemed of all Chinese instruments (fig. 2).

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<sup>17</sup> William Tans'ur, *A New Musical Grammar, or, The Harmonical Spectator* (London: J. Robinson, 1746), 9.

<sup>18</sup> M. Wong, “A Comparison between the Philosophies of Confucius and Plato as Applied to Music Education,” *Journal of Aesthetic Education* 32(3) Autumn 1998: 109-110.



Fig. 2: Confucius teaching students with the musical instrument *qin*. Reproduced in *Qinqu Jicheng* [Collection of Qin Music] (Shanghai, 1983), vol 1:11

In 21<sup>st</sup>-century East Asia, there is a similar respect for specific instruments, but rather than focusing on the *qin* of olden times, emphasis is placed on playing the western piano and violin. Today one must often study and play one of these instruments to be considered educated or cultivated. In China, Japan, and Korea, there is substantial prestige attached to classical-music performers and instructors. Art music receives tremendous government support and it is common for prime ministers and dignitaries to be strong music patrons and seasoned dilettantes themselves. In recent decades there has been an explosion of Asian classical musicians, especially string players and pianists. This can be seen even in the United States. According to Nelita True, professor of piano at the Eastman School of Music in Rochester, New York, between 70 and 80 percent of the institute's piano students are of Asian heritage. Many western music schools could not survive without the Asian student body that boosts enrollments, and such attest to the level of importance placed on music by eastern cultures.<sup>19</sup>

## Conclusion

Music education, in one way or another, has had a fundamental role in higher academe in the west even before the inception of the university system. The ancient Greeks were proponents of the art form and medieval scholars expounded upon it, making music study a staple of a learned person. Likewise, we see in the eastern world since at least the age of Confucius, a high regard for music, which is still the case today. Although recent scientific

<sup>19</sup> S. Cantrell, "Far East Makes Inroads into Western Music: Asian Pianists are a 'Growth Industry,'" *The Dallas Morning News*, May 22, 2005.

studies prove that music involvement and increased intelligence can be quantified, since the late 20<sup>th</sup> century, there has been a move away from the humanities and arts in general as undergraduate education has shifted toward vocationalization and professional degrees. As we progress further into a new era of education, remembering music's historical significance and its contribution to the development of young minds within a curriculum will only benefit the students. Otherwise, students may miss a significant opportunity to advance their analytic, critical, and intuitive thinking processes. As Einstein's experiences revealed: sometimes no matter how diligently one seeks the solution, it cannot be seen if one does not have musical perception.

### **About the Author**

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Lisa Urkevich, Ph.D., is an Associate Professor and Director of the Music Program at the American University of Kuwait where she also served as the founding Division Head of the Arts and Humanities. She has worked extensively on curriculum building and the development of major and minor programs. She holds four degrees in music (BA, BS, MM, PhD) and has taught at a variety of higher education institutions in the United States before coming to the Middle East (e.g., liberal arts, regional, and research universities).