INTERNATIONAL JOURNAL OF
CREATIVITY AND INNOVATION IN HUMANITIES AND
EDUCATION

ISSN: 2735-4393

VOLUME 3, ISSUE 1, 2020, 31 – 41.

www.egyptfuture.org/ojs/

https://iiccairo.esteri.it/iic_ilcairo/it/gli_eventi/calendario/2021/06/lancio-della-piattaforma-accademica.html

CREATIVITY IN ARTS EDUCATION, PHENOMENOLOGY OF MUSIC AND EINSTEIN'S SCIENTIFIC INSIGHT INTO THE RELATIVITY OF TIME

Yaroslav SENYSHYN *

Faculty of Education, Simon Fraser University, Vancouver Canada

Abstract

It has become increasingly important to seek connections between creativity in arts education and scientific insights. These have important implications for any curriculum relating to arts education and science. Thus, there are interesting and complex connections between major scientific discoveries and creativity in the arts. An important question in this regard is how does it happen that a major scientific insight may be perceived to be an outcome of creative activity or insight associated with the arts? As this is obviously a vast area I will focus on a specific example that has historical and factual antecedents; i. e., Einstein's theory of relativity of time.

Keywords

Physicists, Arts Education, Creativity, Ergo Sum, Cartesianism.

Introduction

It has become increasingly important to seek connections between creativity in artseducation and scientific insights. These have important implications for any curriculum relating to arts education and science. Thus there are interesting and complex connections between major scientific discoveries and creativity in the arts.

An important question in this regard is how does it happen that a major scientific insight may be perceived to be an outcome of creative activity or insight associatedwith the arts? As this is obviously a vast area I will particularly focus on a specific example in depth that has historical and factual antecedents; i. e., Einstein's theoryof relativity of time.

But seeking connections between creativity in arts education and scientific insights does not come easily. It is natural to wonder why this is the case. The answer lies inWestern academic thought and traditions. In spite of our so-called postmodernism inthe last century, we have learned since, that subjectivity and objectivity cannot be separated and ostracized from each other. Rather both need each other to find an authentic synthesis. Although it has become a

* *Corresponding author*: educedd@sfu.ca

rather glib statement, It must nevertheless be stated once again that the famous *ergo sum* postulated by Descartes lingers over our thoughts like an unwanted hangover. Surmising one's existence through thinking is certainly a valid and probable concept, but it does beg the question: Why would it not be perfectly reasonable as well to postulate therefore that I am because I feel?

It is somewhat staggering that our cultural academic emphasis on the former cogito has only until recently resulted in an inevitable need to relate to the latter position of feeling and existence as well. Thus feeling and thinking as it were are both necessary ingredients by which authentic scientific leaps can be ascertained througha blending of the two. It is quite fascinating for these very same reasons that this major modification of Cartesianism can be traced to the definitive theorizing of Kierkegaard. His philosophy is very useful in that it is directly related to our topic. In fact his understandings of the erroneously perceived dichotomy of objectivity and subjectivity is amended to such an extent that we can explain Kierkegaard's philosophy and displace it directly to Einstein's famous discovery of the relativity oftime.

Subjectivity, Passion and Truth

According to this great Danish philosopher of the earlier part of the nineteenth century, Soren Kierkegaard, subjectivity is truth (S. Kierkegaard, Hong, & Hong, 1992). On the surface this would seem to be a possibly absurd concept. And yet in this paper I will argue that Kierkegaard is precisely on the right track and conforms toEinstein's great discoveries precisely through subjectivity as truth. It needs to be emphasised though that a reckless or irresponsible subjectivity can exist and yet may never be a truth because that kind of subjectivity is not rooted in any kind of rigorous or factual objectivity. Thus the 'historical' rants such as found in Adolf Hitler's book obviously is an example of an extremely irresponsible subjectivity at its worst and could thus not be a truth given that it is not grounded in any rigorous objectivity or even a factually accurate interpretation of history (Hitler, 1999).

Given the above stipulations of which he was very much aware of, Kierkegaard felt he could also conclude that passion is subjectivity (S. Kierkegaard et al., 1992). A passion nevertheless grounded in objectivity or what we could call, approximately, factual, objective or empirical knowledge. But it is also possible to have a subjective insight that becomes an authentic concept if the person 'receiving' such an insight takes the trouble to find or pursue its possible antecedents in the factual world; i. e., objectivity. If such antecedence is not found then the subjective discovery as such becomes a private language at best with no validity for others who would not understand such a 'truth' unless initiated into it via a kind of mystic cult. But such a phenomena would not constitute any kind of rigorous truth for Kierkegaard or anyonefor that

matter outside such a private cult or whatever it may be called. It is worth noting early in this paper that Einstein's subjective truth was rooted in music as we shall see later on.

At this point it is quite necessary to emphasise that although Kierkegaard stresses the idea of a subjectivity related to objectivity, this in itself does not necessitate any notion whatsoever of objectivity's absolute infallibility! To put it another way it wouldbe an illusion to harbour such unfounded attributes in the name of objectivity.

Objectivity for Kierkegaard is merely a starting point which when exhausted of all its possible meaning and congruity, at that particular point of a congruity that reaches its limitations in conceptual thought, it then merges as it were into a possible incongruity, and becomes displaced knowledge that makes its way into the realm offeelings of subjectivity. But as previously mentioned and for the sake of emphasis, this 'process' can be reversed; i. e., one can start with a subjective insight and work'backwards' as it were toward its 'congruous' objective antecedents. This is what Einstein did. In other words the congruity was embedded in the incongruity of a subjective insight. Is this a paradox? Yes, but no different than the paradoxes associated with the relativity of time, black holes, string theory and, of course, quantum theory.

Kierkegaard actually believed that those individuals who ignored subjectivity in a blind pursuit of objectivity actually lost their capacity for subjectivity. Mary Warnock writes that "The myth which Kierkegaard aims to destroy is the scientific myth that everything is causally determined, and that therefore in principle a complete and objectively true account of the behaviour of everything could be provided, if only wetook trouble and observed enough" (Warnock, 1988). "Of course this does not meanthat Kierkegaard wanted to disregard objective knowledge. Far from it! He simply wanted people to recognize the limitations and myths of objectivity. Instead, he wanted us to preserve our individuality through subjective reflection"(Senyshyn, 2010), Kierkegaard, Hong, & Hong, 1992.

But what about subjectivity in-itself? Can we truly define its essence or its existence as a Heideggerian *being* as it were? As we have seen already, according to Kierkegaard's conceptualization of it, it is a passion. Warnock conceptualizes Kierkegaard's notion of subjectivity as being an indirect from of communication that cannot be taught in the classroom. She writes that what is known subjectively alwayshas the nature of a paradox. In a very certain sense the nature of subjective knowledge is directly related to faith (not necessarily a religious faith but a faith in something or someone). Passion is subjectivity and does not exist objectively.

Subjective knowledge is concrete, not abstract. It cannot be otherwise because it is

necessarily related to the actual concrete existence of a living individual or being. This important last characteristic and attribute of subjectivity is often misunderstood. There is an erroneously common and pervasive misconception that subjectivity is somehow an ‘abstract’ notion. Nothing could be further from the truth for an aforementioned and obvious reason. Subjectivity is a human attribute directly relatedto being (Warnock, 1988).

To summarize, Kierkegaard referred to objective and subjective “accents”. Thesewere related to two pivotal questions: how and why? Thus subjectivity is the how andobjectivity the what. He wrote that “*The objective accent falls on WHAT is said, the subjective accent on HOW it is said …….* Objectively the interest is focused merely on the thought-content, subjectively on the inwardness. At its maximum this inward ‘how’is the passion of the infinite, and the passion of the infinite is the truth. But the passion of the infinite is precisely subjectivity, and thus subjectivity becomes the truth. Objectively there is infinite decisiveness, and hence it is objectively in order to annul the difference between good and evil, together with the principle of contradiction, and therewith also the infinite difference between the true and the false. [It is here that we see the relativity of truth in the objective mode in the example of good and evil and the true and the false.] Only in subjectivity is there decisiveness, to seek objectivity is to be in error. It is the passion of the infinite that isthe decisive factor and not its content, for its content is precisely itself. In this mannersubjectivity and the subjective ‘how’ constitute the truth” (Senyshyn, 2010), (Kierkegaard, et al 1992).

In the next section of this paper one will be able to see that Einstein’s initial inquiries into the relativity of time had initiated in the ‘how’ and ‘what’ of Kierkegaardian theory,although in all likelihood unbeknownst to himself in any conscious sense of that particular theory, that led to his self-avowed and monumental discovery as evidenced through his very own description and in his own words recorded duringvarious interviews in the fifties of the last century.

What is the ‘How’ and the ‘What’ of Albert Einstein’s Conceptualizationthat led to his Initial and subsequent Insight and Discovery into the Relativity of Time?

Einstein was once asked in a 1955 interview why was it him exactly who made sucha great discovery relating to the relativity of time? In other words, there were many brilliant physicists at the time in the UK, US, Germany, Russia, etc. The point of the query was what explanation Einstein might offer to account for his theory being first among all others.

This of course was an unfair question. Crudely speaking the implication of the question was why did Einstein‘s brain come up with the theory first given that there were other very great physicists at the time who could have theoretically come up with this theory on their own resources. Of course the interviewer wanted to hear Einstein say something sensationalist and

crude to the effect that his mind was far more superior to anyone else's, and that his brains were somehow much heavier than the average genius out there and voila the result was the theory of relativity. In fact Einstein's brain proved to have weighed just 1,230g, compared to an average ofaround 1,400 g (Gorvett, Z. 2017, and June 12). But in the journalist world such matters would not have been deemed possible and true or even believed in at the time of the interviews with Einstein. Such is the nature at times of journalist sensationalism and its perception of geniuses, especially scientific and mathematical ones, as phenomenal freaks of nature.

In moving away from such nonsensical speculations on the part of reporters, Einstein was consistently prone to seek artistic explanations for his scientific insights: thus we should not be overly surprised that he actually said that "the greatest scientists are artists as well," (quoted in Calaprice, 2000, 245 and Root- Bernstein, M. R. (2010, March 31). "For Einstein, insight did not come from logic or mathematics. It came, as it does for artists, from intuition and inspiration. As he told one friend, 'When I examine myself and my methods of thought, I come close to the conclusion that the gift of imagination has meant more to me than any talent for absorbing absolute knowledge.' Elaborating, he added, 'All great achievements of science must start from intuitive knowledge. I believe in intuition and inspiration. At times I feel certain I am right while not knowing the reason.' Thus, his famous statement that, for creative work in science, 'Imagination is more important than knowledge'" (Calaprice, 2000, 22, 287, 10), (Root-Bernstein, M. R. 2010, March 31).

It is also worth noting that "Einstein first described his intuitive thought processes ata physics conference in Kyoto in 1922, when he indicated that he used images to solve his problems and found words later (Pais,1982), (Root-Bernstein, M. R. 2010,March 31). Einstein explicated this bold idea at length to one scholar of creativity in1959, telling Max Wertheimer that he never thought in logical symbols or mathematical equations, but in images, feelings, and even musical architectures (Wertheimer, 1959, 213-228), (Root-Bernstein, M. R. 2010, March 31). Einstein's autobiographical notes reflect the same thought: 'I have no doubt that our thinking goes on for the most part without the use of symbols, and, furthermore, largely unconsciously' (Schilpp, pp. 8-9), (Root-Bernstein, M. R. 2010, March 31).

Elsewhere he wrote even more baldly that '[n]o scientist thinks in equations'" (Infield,1941, 312), (Root-Bernstein, M. R. 2010, March 31).

Einstein's aforementioned reference to "musical architectures" is particularly interesting for the purpose of this paper; i. e., the theory of relativity as it relates to a phenomenology of time in music. Kurt Sachs once defined architecture as frozen music (Sachs, 1946). These are

intriguing metaphors for the pursuit of time in music.But they only hint at possibilities and do not give enough for a more discernible connection between music and the relativity of time. It was common for Einstein to attribute his scientific theories and insight to his great love of music and violin playing.

Einstein actually wanted more than anything else in his younger days to be a great violin virtuoso. But this was not meant to be. The famous violin virtuoso Kreisler bluntly but also jocularly told Einstein to stick to science and leave violin playing to Kreisler. It is also worth noting that Einstein could play the piano as well. But the violin was his great love and he practiced it assiduously most days of his life. For these reasons he spoke enthusiastically about his scientific intuition in musical termsand had expressed the idea in an interview that if he had not been a physicist he would probably have been a musician who lived his daydreams in music and saw his life and greatest joy in terms of performing his beloved classical music (Calaprice, 2000, 155), (Root-Bernstein, M. R. 2010, March 31).

Einstein's son, Hans, recounted that "[w]henever he [Einstein] felt that 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" (quoted in Clark, 1971, 106).After playing piano, his sister Maja said, he would get up saying, "There, now I've gotit" (quoted in Sayen, 1985, 26). Something in the music would guide his thoughts in new and creative directions (Root-Bernstein, M. R. 2010, March 31).

I would like to complete this section with a significant quotation by Einstein for the purposes of this paper: "All great achievements of science must start from intuitiveknowledge. I believe in intuition and inspiration. At times I feel certain I am right

While not knowing the reason." Thus, his famous statement that, for creative work inscience, "imagination is more important than knowledge" (Calaprice, 2000, 22, 287, 10), (Root-Bernstein, M. R. 2010, March 31).

What exactly is the Connection between Phenomenology of Music andthe Relativity of Time?

We can see in the previous section that the music score from which Einstein performed was in fact both the 'what' of objectivity, the aforementioned Kierkegaardian objective accent, and the 'how' of musical time, the subjective Kierkegaardian accent, and how it is relative to and connected with, within its relationto the relativity of time, as a scientific concept. This is a vast statement that is far more suited for the scope of a large book. For my purposes it will suffice to summarize the obvious and then proceed to just one discernible example as an accessibleone of relativity of time in music and its performance for all interested readers who may not necessarily be well versed in music in any professional sense of that word.

Thus the music score; i.e., the actual notation, would have been the starting point forEinstein. This is the objective vessel by which he would have learned to decipher the notes and actualize them in a musical performance mostly on his beloved instrument, the violin. Although Einstein would have had to both subjectively agree with the Collingwoodian stance (based on Einstein's aforementioned remarks on imagination) that music exists in the imagination (Collingwood, 1965) and that music also already exists in the obviously embedded materiality of an actual score that is unperformed as well; i.e., its potentiation to be performed concretely for the benefit of an existing audience or for one's self if read and interpreted by a skilled performer artistically trained in such tasks. Thus for our purposes regarding Einstein, one adopts Kierkegaard's idea that music ultimately exists in its actual performance (S. r.Kierkegaard & Hannay, 1992). But I also draw on Adorno's reminder that a "musicalscore is never identical with the work; devotion to the text means the constant effort to grasp that which it hides" (Adorno, 1981).

Where then do we find a phenomenology of music of time that is embedded in the performance of its music that relates to Einstein's great discovery? The answer is quite simple in a necessarily distorted simplification when one says that time in music, is the organized stuff of life that makes music possible in terms of its soundsand duration. The time in music is actualized by its sound, meter (such as a waltz that moves forward musically by itself; i.e., its (performer(s) and possible dancer(s) in rhythmic pulses of three to a bar). In other technical words, and thus not as simple as the last sentence, is that this notion of time, meter and rhythm refers to a recurring pattern defined by its placement of accents and regularity, or even a seemingly possible regular-irregularity as it were, in the music that is anticipated by alistener, performer or dancer. Rhythm is usually defined by its sound but meter as a separate concept is not necessarily sounded as such by musical sounds but are anticipated through listening. If this does not make sense, it is not of any consequence to my reader and will not preclude the understanding of my example.

For our purposes, the length of music is simply the self-evident notion of its duration;i.e., how long it takes for any piece of music from start to finish in minutes and/or seconds. But the duration may not be so simple to ascertain – subjectively speaking - because there may also be a subjective perception that goes well beyond its objective duration measured by a clock. My example will specifically be a referenceto *duration* of time in music rather than specifically to its rhythm sounded or unsounded, meter, etc. Nevertheless I will refer later to music's harmonic rhythm in relation to my example and explain why that is significant. Thus, I will focus on the last movement of Chopin's Sonata in B flat minor. Often referred to as the

famous Funeral March sonata because its third movement, of a total of four movements, is the famous Funeral March that is often heard in the movies and media when a VIP dies. I mention the third movement because after its last chord is sounded the pianistmust play a very short movement with very fast notes that are usually played as fast as humanly possible. Chopin's actual designation of 'presto' translates from the Italian to mean "very fast". But most artists play it 'prestissimo' which means as fast as humanly possible.

Here is a possible scenario (of many such scenarios related to a phenomenology oftime in music and, for the sake of precision, of a phenomenology of music in time) that may very well have occurred to Einstein consciously, or most likely unconsciously, I would argue because he himself referred to it as an unconscious phenomenon, that he could very easily have stumbled upon in the same way I did.

Imagine that you have listened to many different interpretations of the very fast lastmovement in particular of the said Chopin Funeral March sonata. In doing so you have *subjectively and intuitively* decided that the slowest performance in terms of duration of the last movement is undoubtedly by the great pianist and composer, Sergei Rachmaninoff. The fastest you would decide (as many others have) based again on your subjective intuition is performed by the virtuoso pianist Vladimir Horowitz. Then imagine your amazement to find out that, in fact, the Rachmaninoff version in terms of objective duration, although the fastest by far, is perceived to bethe slowest.

I turned this into an experiment with my students, both graduate and undergraduate, and repeated this experiment strictly, rigorously and empirically speaking, many times with my students over the last twenty-five years, and with many other examples featuring the music of Claude Debussy, Richard Strauss, Gustav Mahler and other great composers with the same results. In all cases the fastest performances were in fact the slowest renditions and the slower or slowest performances were the fastest renditions objectively. This is not to imply that this is always the case in music. But when it is, it is precisely when relativity in time occurs due to physical and acoustical properties inherent in the harmonic rhythm or harmonic tempo of the music; i.e., the rate of notes as it were in relation to the rate of chord change. Thus the fastest performance can become a slower one in that theperception of the rate of the harmonic rhythm slows down because it becomes ploddingly discernible to a human ear because of the tremendous speed in our example as played by Rachmaninoff. In other words one hears the harmonic changes prevalently over the very fast notes. Horowitz on the other hand by playing it significantly slower and in a more detached, unpedalled style, with the illusion of 'spaces' between the almost stacatto notes, obfuscates the harmonic rhythm and creates the illusion of

playing a good deal faster that Rachmaninoff. [1]

It is this kind of aforementioned paradox in music and time and so many other phenomenological musical examples that would have inspired Einstein to imagine such notions as, at least, metaphors of time that he ultimately displaced into the physicist's realm of space and time through his imagination, subjectivity and perhapsan unconsciously informed intuition. To describe in great and technical detail all suchpossible phenomenological examples in music vis-à-vis time would encompass a very wide spectrum of intensive thought. This one example will suffice for the scope of this paper.

Conclusion: Creativity in Arts Education

I came across this remarkably apt quotation that amply justifies the position taken inthis paper. I simply could not have said it better in my own words:

"Wow! Anyone looking for connections between music, mathematics, and physics?How about intuition and reason? Einstein shows us how it all connects. But what doour students typically get, especially in high school and college? They get math without music. They get science without images, feelings and intuition. They get knowledge without imagination. Not only does intuition go undeveloped, many mathand science teachers do not give credit to answers (even though they may be correct) that are not explicated by detailed logic. What these teachers appear not to understand is that translating intuitive insights into words or mathematical symbols isa secondary process that can - and should be – be taught just as explicitly as translating from one language and another. So much for Einstein's admission that heoften had a feeling he was right without being able to explain it. So much for experiencing space-time through music. So much for working out ideas in images and feelings and musical architectures for which there are no words or symbols. So much for sitting down at the piano and letting the music show the way. No wonder somany of our students don't like math and science: what is there to imagine and feel? Where is the art in their learning? (Root-Bernstein, M. R. (2010, March 31). "And perhaps most appropriately in Einstein's own words: "The important thing is not to stop questioning; curiosity has its own reason forexisting," he told **LIFE magazine in 1955** (Gorvett, 2017).

NOTES

1. I was able to figure this out many years ago when I was a student of Dr. Ian Winchester, one of our eminent philosophers of science. In my doctoral work with him we studied and scrutinized Einstein's most famous paper and I began to acquireat that time a more technical command of the subject matter associated with relativity of time and other issues such as gravity, etc.

REFERENCES

- Adorno, Theodor W. (1981). *Prisms* (1st MIT Press -- ed.). Cambridge, Mass.: MIT Press.Calaprice, Alice. (Ed.). (2000). *The Expanded Quotable Einstein*. Princeton, N. J.: Princeton University Press.
- Clark, Ronald W. (1971). *Einstein. The Life and Times.* New York: Crowell. Collingwood, R. G. (1965). *The principles of art*. Oxford: Clarendon Press. Gorvett, Z. (2017, June 12). *What you can learn from Einstein's quirky habits.*
- Retrieved from http://www.bbc.com/future/story/20170612-what-you-can- learn-from-einsteins-quirky-habits
- Hitler, Adolf. (1999). *Mein Kampf*. Boston: Houghton Mifflin.
- Infeld, Leopold . (1941). *Albert Einstein. His Work and its Influence on theWorld.* New York: Charles Scribner's Sons.
- Kierkegaard, S© ren, & Hannay, Alastair. (1992). *Either/or : a fragment of life*.
- London: Penguin.
- Kierkegaard, Søren, Hong, Edna Hatlestad, & Hong, Howard Vincent. (1992).
- *Concluding unscientific postscript to Philosophical fragments*. Princeton, N.J.:Princeton University Press.
- Pais, Abraham. (1982). *Subtle is the Lord: The Science and the Life of AlbertEinstein.* Oxford: Oxford University Press.
- Root-Bernstein, Michelle and Robert, (2010, March 31). Einstein on Creative Thinking: Music and the Intuitive Art of Scientific Investigation. Retrieved from https://www.psychologytoday.com/us/blog/imagine/201003/einstein-creative- thinking-music-and-the-intuitive-art-scientific-imagination
- Sachs, Curt. (1946). *The commonwealth of art : style in the fine arts, music anddance*. New York: W.W. Norton.
- Sayen, Jamie. (1985). *Einstein in America.* New York: Crown.
- Schilpp, Paul. (Ed.). (1979). *Albert Einstein: Autobiographical Notes*. La Salle, Ill:Open Court.
- Senyshyn, Yaroslav. (2010). *The artist in crisis : Kierkegaard's philosophy of the aesthetic stage of existence and live musical performance*. Vancouver,BC: Platon Promotions Publishing.
- Warnock, Mary. (1988). *Existentialism*. Oxford: Oxford University Press.
- Wertheimer, Max. (1959). *Productive Thinking*. Enlarged edition. New York: Harperand Brothers.

- Sylvia ESSER, REFORMULATION OF INTERCULTURAL COMPETENCE IN THE CONTEXT OF A DIVERSITY-CONSCIOUS TEACHER EDUCATION AND PEDAGOGICAL SCHOOL DEVELOPMENT, International Journal of Creativity and Innovation in Humanities and Education, Vol. 2 No. 2, 2019, pp. 10-13.
- Salwa Mahmoud HANAFY, PLASTIC VISION FOR TEACHING METAL WORKS, International Journal of Creativity and Innovation in Humanities and Education, Vol. 2 No. 2, 2019, pp. 14-16.

Received: March 20, 2020
Accepted: June 12, 2020