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A Pioneer of Interactive Art: Nam June Paik as Musique Concrète Composing Researcher

Byeongwon Ha
Virginia Commonwealth University
Virginia, the United States
hab@vcu.edu

Abstract

Nam June Paik is mostly known as the father of video art. At the same time, he can also be regarded as a creative pioneer of interactive art. Unfortunately, most scholars and art historians still neglect Paik's remarkable achievement in interactive art with his musical background. Especially, Paik's experience with Musique Concrète was a core springboard to develop his interactive pieces. However, among Paik's artistic backgrounds Musique Concrète is hidden by well-known influences from John Cage, Karlheinz Stockhausen and Fluxus. Based on Musique Concrète, Paik created basic elements of interactive art such as database, non-linearity and sensorial translation at Paik's first solo show, *Exposition of Music – Electronic Television*, in 1963. These are still considered fundamental properties to make interactive pieces. In this regard, Paik as an interactive artist can be a significant contribution to finding an origin of interactive art since art theorists have started to explore its genealogy.

Keywords

Interactive Art; Musique Concrète; Nam June Paik; Random Access; record Shashlik; Participation TV

Introduction

Even though Paik is not generally considered an interactive artist, it is not altogether a new idea to see him as a pioneer of interactive art. Some interactive artists and theorists agree with Paik's importance to this field. An artist duo Christa Sommerer and Laurent Mignonneau frame Paik's *Magnet TV* (1964) as one of the oldest interactive artworks, in which viewers are invited to manipulate images on television by using a powerful magnet. [1] Art historian William Kaizen describes how Paik tried to overcome the passive aspects of mass communication by using a microphone as a visual manipulation interface in *Participation TV* (1963). [2] Christiane Paul argues that Paik anticipated the revolution of non-linearity in digital art through *Random Access* (1963). [3] The project displays cassette tapes on the wall, which allows audiences to playback the sound with a hand-held head of a cassette recorder. Errki Huhtamo considers Paik's responsive "cybernetics" sculptures and closed circuit video-installations points of origin for interactive art. [4]

Although these artists and scholars contend that Nam June Paik is one of the significant pioneers of interactive art, they do not profoundly explore how his background encouraged him to make interactive art, and how he developed interactive art without any preconception about typical interactive pieces. Fortunately, Paik wrote his idea about interactions and interactive art in several books and magazines. In his articles, his interactive art simply did not originate from a technophile's passion, but a gradual development based on his art theories and art practices in the academic fields in both Asia and Europe. In other words, this paper does not describe a genius's creative method to make interactive pieces. Instead, it deals with the energetic artist who gradually developed his idea of making interactive art. The progressive musical influences from Arnold Schonberg's serialism, Karlheinz Stockhausen's electronic music and John Cage's indeterminate music to Paik are relatively well known in books and articles about him. Unfortunately, Musique Concrète is usually omitted in those literatures. However, in a material perspective, the music is regarded as an early influence to a video collage. [5] In this regard, video artist Bill Viola stresses the inherent difference between film and video. Whereas film chemically comes from photography, video electronically derives from music. They share the same electromagnetic technology. [6] While Viola explores the material relationship between video and music, Chris Meigh-Andrews historically traces the relationship between Musique Concrète, Fluxus and video art [1].

[1] Chris Meigh-Andrews traces the relationship between Musique Concrète and video art in chapter 5 "Musique Concrete, Fluxus and Tape Loops". A History of Video Art : The Development of Form and Function. (Oxford: Berg, 2006). In the chapter, the founder of Musique Concrète, Pierre Schaeffer, was described as a seed germ for the experimental phenomenon. The author also

Especially, before the Cage shock, the exploration between Musique Concrète and Nam June Paik can articulate how Musique Concrète influenced Paik's interactive art. By tracing the relationship between them, Paik's contributions to interactive art can be reappraised.

Nam June Paik in Both Music and Musicology

Nam June Paik studied diverse courses from philosophy, aesthetics and musicology at the University of Tokyo. He was overwhelmed by the twelve-tone serialism, in which duration, pitch and color were aspects of the same thing, [7] since he had been in high school. In the description of his project, *My Jubilee Ist Unverhemmet* (1977)[2], he confessed that he was disappointed in Schonberg's piece when he listened to it first. The reason why he likes Schonberg is that he is extremely progressive. Schonberg gave Paik very ambivalent feelings. However, Paik still dreamed to be a musician with Schonberg's progressive method. He graduated from the University with the thesis on Arnold Schonberg's serialism. After being rejected from a music competition in Japan, Paik decided to study musicology, which is mainly in a theoretical field, instead of music, which is mostly in a practical field. In 1956, when he went to Munich to study music history[3], he could change his mind because he thought, "I can compose at least as bad as they do." [8] This study abroad experience thoroughly encouraged Paik to study music in a practical way and demystify the absolute Western music. This fluctuation led him to simultaneously study music in both a theoretical field and a practical field. In 1958, he went to the Musikhochschule Freiburg in Cologne to study music in a progressive way. Professor Wolfgang Fortner at the school referred him to the Studio for Electronic Music of the West German Radio where electronic music was born. In his reference paper, professor Fortner mentioned that Paik was interested in Pierre Schaeffer's experimental music in the beginning of 1959. [9]

Musique Concrète

Musique Concrète was a progressive music style in Paris during the late 1940s created by Pierre Schaeffer. He coined the term to "compose with materials taken from given experimental sound in order to emphasized our dependence, no longer on preconceived sound abstractions, but on sound fragments that exist in reality and that are considered as discrete and complete sound objects." [10] Schaeffer created the database music with recordings of daily-life sounds like bells ringing, trains, and humming tops, which were manipulated using various sound editing techniques, including reverse recording, changes of speed and removal of the attack and decay, recording loops of these sounds onto discs. [11] This experimental music incorporated using noises and daily life sounds as well as a manipulated sound database. The blurring boundary between life and art was also a main idea of a global avant-garde art group, or Fluxus. Nam June Paik who was one of the early Fluxus members had the same idea, and independently studied Musique Concrète.[4] By using prerecorded sounds, a composer does not need a skilled musician any more to make a final sound. Instead, he can create music with his wide range of database. This appropriation method breaks an interrelationship between signified and signifier as Marcel Duchamp's conceptual art. This is a very phenomenological experiment due to direct sound experiences without visual and contextual references. Even though Schaeffer could not eradicate the indexical point from the objects, he made a creative way to mix readymades in the sound field. [12] Unlike Duchamp's conceptual art, Schaeffer experimented with a lot of databases, which consisted of more than 500 records in 1950. [13] After the records project, he adopted slicing tapes between two different sound data with the same envelopes[5] to make a smooth transition by using tapes instead of 78 rpm records after 1951. [14] This new medium provides audiences with a soft montage sound. Ultimately, he dreamed a huge cybernetic-like machine that could achieve millions of combinations. [15] This haptic manipulation and cybernetic idea based on a huge database are the main elements for Paik's interactive art such as *Records Shashlik* (1963) and *Random Access* (1963). To articulate these elements, Nam June Paik as a Musique Concrète composing researcher is an important approach.

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emphasizes the material similarity between Musique Concrète and video art. After that, Meigh-Andrews stresses John Cage's critical influence to Fluxus and video art in the chapter.

[2] The project is a hundred of limited editions of the LP records.

[3] Paik continued to study philosophy, aesthetics and musicology as he did in Tokyo. *Nam June Paik Fluxus/Video* includes his study books, which shows courses that he took in the University of Munich. However, Decker simplified his courses as music history. In *Video n' Videology*, Paik wrote his academic career in German from 1956 to 1958. However, he continued to study music in the University of Cologne from 1960 to 1962.

[4] Nam June Paik and George Maciunas were interested in the progressive music before they knew each other. Refer to Friedman. Ken, *The Fluxus Reader*, (Chicester, West Sussex ; New York: Academy Editions, 1998), 183-184.

[5] It is hard to mix two different sounds because each sound has its own envelopes. To reduce a spectral transposition, Schaeffer connected with each other by finding similar envelopes. Refer to Palombini. Carlos, Machine Songs V: Pierre Schaeffer- From Research into Noises to Experimental Music, (Boston: The MIT Press, Computer Music Journal Vol. 17, No. 3, Autumn, 1993), 15.

The Relationship Between Nam June Paik and Musique Concrète

Nam June Paik posted his articles about new music in a Korean newspaper[6] several times when he studied musical composition in Cologne. He was also a foreign correspondent for two music magazines in Japan[7]. In this regard, he introduced progressive European music tendencies to Korean and Japanese readers. His exhibition catalogue, *Nam June Paik: Videa 'n' videology, 1959-1973*[8], included a copy of Paik's article from the Korean newspaper in the appendix part. A simple description in English was added to the article: *1958. "A report on the Paris studio of Pierre Schaeffer and Musique Concrète." Chayushinmun, Seoul, Korea*[9].

Since the article is not translated from Korean into English, most Western scholars cannot understand what the article means. However, the English description significantly provides them with an important clue to the relationship between Paik and Musique Concrète. Furthermore, the content of the short article includes critical elements to trace his influence from Musique Concrète. First, Paik has deep knowledge on the trajectory of the progressive music that is composed with records and tapes. He enumerates diverse composers who use records and electronic music such as Paul Hindemith, Pierre Boulez, Pierre Henry and Karlheinz Stockhausen to explain what Musique Concrète is in the article. Second, he titled himself as a Musique Concrète composing researcher at the end of the article. It explains that he was seriously engaged with the new experimental style, and studied not only about the theoretical method of Musique Concrète, but also about the practical method of composing it. Third, the main title of the article is 'The Foremost Contemporary Musician Who Gives Power to Noise.' The title implies that he is interested in noise, a daily sound, as a key element of music. In this regard, it predates two important influences of his artistic life such as John Cage and Fluxus. Paik's interest in Cage's chance music, which not only incorporates noise in music, but also is theorized with Asian philosophy, the Zen Buddhism. The progressive penchant continues Paik's Fluxus participation, which blurs a clear boundary between art and daily life. Paik's passion of unity toward tones in serialism was expanded to unity between noise and music.

For Paik, the year when he wrote the article is very meaningful. First, he moved from Munich to Cologne to study more progressive music. Second, he finally met John Cage in the yearly International Holiday Courses for New Music in Darmstadt festival in 1958. [16] Third, he also changed his major musicology into music composition in the same year. This was the year that Paik started to create experimental works, especially *Homage à John Cage*, which consists of a diverse sound collage like Musique Concrète[10]. Even though the article is short in a Korean newspaper, it predicts Paik's future toward Musique Concrète and electronic music. After the article, he performed as both an independent artist and a collaborator with his contemporaries in Germany. Especially, in Stockhausen's *Originale* (1961), as a guest performer, Paik practiced the idea of Musique Concrète with a sound montage from two recorders as well as throwing beans into the audience to fight against bourgeois music. [17] Paik expanded his action music with the idea of Musique Concrète.

The Idea of Paik's Interactive Art

Interactive art is mostly under the umbrella terms, digital art, computer art, or new media art. Interactive art is still ambiguously characterized by artists and scholars alike. Unlike painting, sculpture, or ceramics, interactive art is seldom a discipline that is represented by academic departments in institutions of higher education in the United States. When represented, the field is usually included in art and technology, digital media, emerging art, or digital art. Due to the lack of academic foundation, art historians and theorists hardly consider interactive art as a separate field of artistic research and practice. This fact has been instrumental in the lack of attention paid to interactive art in the academic discipline of art history. Compounding this is the myth that interactive art relies exclusively on computer devices. Art historian Soke Dinkla proposes that "interactive art refers to a category-specific designation for computer-supported works in which an interaction takes place between digital computer systems and users." [18] On the other hand, "some authors ask whether computer-supported art should even be called interactive at all, insofar as there are numerous art forms that activate the recipient to an even greater extent without the support of technical media." [19] In this regard, interactive art is not fixed yet, and it can be a comprehensive definition, which understands interactive

[6] The newspaper was Chayushinmun, which means liberal newspaper in English. The company was owned by Paik's big brother.

[7] http://www.ohmynews.com/NWS_Web/View/at_pg.aspx?CNTN_CD=A0001872542. This fact was posted by Hyungsoon Kim from a Korean newspaper, *Oh My News* in June 5, 2013

[8] The Everson Museum of Art, (Syracuse; and Galeria Bonino, Ltd., New York), January, 1974.

[9] Since the article has a number of binary code page in the catalogue, the translation the binary-code number into the decimal-code one is 83.

[10] *Nam June Paik: Videa 'n' videology, 1959-1973,* The Everson Museum of Art, Syracuse; and Galeria Bonino, Ltd., New York, January, 1974. 81

art more generally as that which involves the behavior of participants in the final outcome of a work.

In this regard, Cybernetics, which is one of the most important elements in interactive art, fundamentally supports defining interactive art. Originally, in 1947, Norbert Wiener coined the term Cybernetics from the Greek word *kubernetes*, or "steersman." According to art historian Edward Shanken, "The scientific discipline of cybernetics emerged out of attempts to regulate the flow of information in feedback loops in order to predict, control, and automate the behavior of mechanical and biological systems." [20] In the same context, art historian Katja Kwastek insists that cybernetics opens up new perspectives on processes of interaction. [21] Paik philosophically explained what cybernetics is with the Buddhist ideas like Karma and Samsara, which means relationship and metempsychosis.

> *Cybernated art is very important, but art for cybernated life is more important,*
> *and the latter need not be cybernated. . . .*
> *Cybernetics, the science of pure relations, or relationship itself, has its origin in*
> *karma. . . .*
> *The Buddhists also say*
> *Karma is samsara*
> *Relationship is metempsychosis* [22]

Cybernetics can be interpreted as the Buddhist idea in two different ways. First, cybernetics can explain a relationship between human beings as well as a relationship between a human and a machine or computer. In this regard, Paik's cybernetics has a concrete relationship with relational aesthetics, which Nicolas Bourriaud defined. This art also needs a viewer's interaction. However, the interaction is more related to a social relationship by breaking a link between daily life and artwork and between a participatory project and its participators. Relational aesthetics does not need any electronic devices to interact with as Paik interpreted. Second, metempsychosis can be translated to a relationship between 0 and 1, or on and off in the digital age. Paik's idea on cybernetics incorporates any relationship from human beings to high-tech electronic devices. For these reasons, Paik's interactive art has both qualities from interactive art and relational aesthetics. This perspective can contribute to bridging the gap between these two different fields now.

Musique Concrète as Inspiration for Interactive Art

Paik explored how to give audiences more choices to make them more active. As a result, he planned a specific music environment.

> *In 1961, I have written a sketch to the "Symphony for 20 rooms", where the audience has a choice of at least 20 different sound sources, between which they can freely circulate. The free time leads the music necessarily to the space-music (room-music) because the free time requires more than two vectors (directions), and two vectors constitute necessarily the space (room)*. [23]

The unrealized exhibition consists of sixteen imaginary rooms in which viewers are invited to experience various senses from acoustic, visual, tactile, and olfactory events, which popular multi-sensory approaches now prevail in interactive media labs. For example, Paik placed different media such as a live hen, readings from detective stories, walls covered with national flags and erotic underwear, prepared pianos, tape recorders with diverse sound collages, and television. [24] Audiences could choose any room in a nonlinear way, and experience diverse senses in each room. Furthermore, among the rooms, Paik suggested several rooms where viewers could take part in making sound and experiencing tactile senses from audio recorders, contact microphones on the floor and readymades such as toys, whistles and instruments. [25] Although the project does not fully provide viewers with interactions as recent interactive art does, *Symphony for 20 rooms* explains Paik's own artistic direction toward freedom for audiences. For this reason, art historian Manuela Ammer insists that *Symphony for 20 Rooms* anticipated prime importance for *Exposition of Music – Electronic Television*: the active involvement of visitors in the performances and the exhibition in general. [26]

Strangely, Paik did not mention Musique Concrète anymore in his writings. In the artistic life of Paik, Musique Concrète was hidden by other influences. Returning to the Paik's Musique Concrète article, he regards artistic phenomenon as a debauched bastard the parents of which we do not know. He deliberately thought that the progressive style was intertwined with diverse factors such as, the futurist experiments, the industrial development and so on. Paik defers to find a simple cause of the new music style easily. Instead he definitely insisted that without Schaeffer, we could not write a history of contemporary music. Paik used the same sentence with bastard in a different article to explain *Symphony for 20 rooms*. However, in this article, Paik uses the sentence in an opposite way to credit his first spatial interactive project to Cage and Stockhausen[11]. Unfortunately, he omitted the founder of Musique Concrète, Pierre Schaeffer, afterward.

When Professor Fortner referred him to WDR studio, he mentioned Pierre Schaeffer as well as John Cage in the beginning of 1959. The moment is identified with Paik's

[11] Nam June Paik, "To the Symphony For 20 Rooms", *an anthology*, ed. La Monte Young, 1963, unpaged. "With respect and appreciation I note Cage's and Stockhausen's priority in this respect; although art is often a bastard the parents of which we do not know."

other article about John Cage in the Korean newspaper. In his article, he reported Cage's chance music in the yearly International Holiday Courses for New Music in Darmstadt festival in 1958. The first meeting came to be of exceptional significance to Nam June Paik with "Silence," "Noise," "Chance" and "Indeterminacy" on Music. [27] Pierre Schaeffer vanished in Paik's writing soon after Paik met Cage. Furthermore, Paik moved into Cologne, the origin of electronic music. The long-standing Franco-German antagonism could not be neglected when Paik was in the center of the electronic music. [28] Finally, even though Musique Concrète and electronic music share similar ideas such as manipulation of tape and collage, they have different approaches. While Musique Concrète is based on phenomenology, which tries to eradicate data's indexical information, electronic music focuses on synthetic aspects of the electronic quality as well as sine wave, which is generated from an electronic device without any physical instruments. Paik's transitions from Musique Concrète to electronic music and Cage's indeterminate music naturally made Paik forget the name, Pierre Schaeffer, in his artistic trajectory.

Although Paik forgot Musique Concrète, it was apparent that he actively utilized his Musique Concrète experiences to make his early interactive pieces. To understand the relationship between his Musique Concrète experiences and his early interactive pieces, it is necessary to explain the process of making Musique Concrète.

> *There was usually a rack from which hung pieces of tape that had not yet been spliced together. Holding a strip of tape in your hand was like seeing and touching sound. You could manipulate this normally elusive phenomenon in ways that were previously unavailable to composers. It was a technological, psychological, and social breakthrough without parallel for music* [29]

This visually describes how to prepare to make Musique Concrète. From diverse musical databases, Concrète musicians choose tapes, and splice them with the haptic experience. Since Paik several times created this kind of music for his progressive performances, a collaborative performance with Stockhausen, a part of performance for the Fluxus festival and his unrealized first solo exhibition, he could not avoid the process of creating Musique Concrète with the hapticity. Paik's statement in *Decolage 3,* which his fluxus colleague, Wolf Vostell, published, supports his idea toward interactive art.

> *The audience cannot distinguish the indetermined time or sounds of the interpreter, form the determined time of the interpreter. The audience cannot fully co-feel the waiting, surprising, disappointment, hesitation, shuttering, expecting, jumping, flee, deviation, jetting, betting, choosing, pushing, being pushed back, determining, deciding, plunging into, vacant space, bathered space, common space, filled space, fully vacant space and/or(=) vacantly filled space – consummation, purge, ejection, stop, crashing, etc… of the interpreter, which all usually constitute the main substance, (or a-substance) of the conception, (or a-conception) of so-called freedom*. [30]

Paik emphasized that audiences as passive listeners could not find a difference between indetermined music and classic music since they are all a one-way performance. At the end of his statement, he mentioned that even though he highly respected for Cage and Cage-friends, he had not composed any indetermined music. He ended with the variation of Abraham Lincoln's famous phrase: "Music for the people, by the people, of the people." His aspiration toward a two-way art is reinforced by the idea of the American democracy in Paik's interactive art. [31] Finally, he applied his Musique Concrète experiences to his interactive art at *Exposition of Music – Electronic Television.*

Paik's Interactive Art

Exposition of Music – Electronic Television was held at the Galerie Parnass in Wuppertal in 1963, where an architect, Rolf Jährling resided[12]. Paik exhibited *Record Shashlik*, *Random Access, Participation TV* (1963) and other television projects, which encouraged audiences to interact with. He created interactive pieces to overcome the limitation of audiences' freedom rather than artists' freedom. In his work, passive audiences became active participators. We can read the growth of audiences' role in these projects, especially, *Record Shashlik* and *Random Access,* also meta-Musiuque Concrète pieces. They utilized the process of making Musiuque Concrète with fundamental materials of it. By unfolding the sound database in two different ways in the gallery, he gave audiences a chance to be a Musiuque Concrète composer in a nonlinear way. These converted graphical materials into sounds. In the opposite way, *Participation TV* converted audiences' voices into abstract images. This sensorial translation created a mutual interaction between different media as well as audiences' interaction with a piece.

Record Shashlik

Paik's experiments for interactive art finally led him to the nonlinear access of *Record Shashlik.* Shashlik is a worldwide food from Asia to Europe, which consists of skewers threaded with meats and vegetables. Like shashlik,

[12] Jährling partly used his house as a gallery space. However, Paik used a whole of Jährling's house as his exhibition space. Refer to Manuela Ammer, "In engineering there is always the other – The Other." in *Nam June Paik : Exposition of Music : Electronic Television : Revisited*, (Köln : New York: Verlag Der Buchhandlung Walther König, 2009), 66.

Paik threaded several records in two different axis on a table in *Record Shashlik*. He made a movable head for playing records in the rotating axis. Audiences could choose any starting point of the records. In other words, they could access music databases in a nonlinear way. They could compose an ephemeral music in real time. The method of access is similar to the process of making Musique Concrète. However, *Record Shashlik* provided an unpleasant sound between two different sources, whereas Musique Concrète presented a soft sound with montage skills. For this reason, Paik did not provide viewers with a final work, but made them take part in the process of creating a music collage. This open work gave viewers active interactions. By providing audiences with diverse choices of sound databases, Paik created his own interactive piece. This project can be regarded as an ascendant of interactive art with an electronic device, which mixes and manipulates different sounds in real time.

Random Access

Like *Record Shashlik,* Paik's *Random Access* showed how to access sound databases in an analog way. However, Paik used a different interface in *Random Access*, which was an advanced Musique Concrète storage medium, electromagnetic tape. After dismantling the tape recorder and the cassette tape, he attached the tapes on the wall, and made viewers interact with the graphical tapes using the recorder head. They could listen randomly to disturbing sounds depending on the position of the recorder head like *Record Shashlik.* However, this project allowed audiences to change the speed of reading the tape strings. Furthermore, it visualized abstract graphics on the white wall. Paik suggested a distinct interactive method in this project. He appropriated a passive white wall in the gallery to make an active interactive interface. When audiences interacted with the white wall, they manipulated sound in real time. The white wall as interactive canvas has been a popular interface for interactive art since the late 1990s as the projector has become more affordable. For example, Camille Utterback's *Text Rain* (1999) allowed viewers to interact with small colorful rain-dropping texts on the white wall as a digital mirror, which reminds us of one of Paik's early computer-generated art, *Confused Rain* (1967)[13]. They can change the position of dropping text images on the screen in real time. Ultimately, *Random Access* predicted a wall-size interactive screen as an interactive interface.

Participation TV

Nam June Paik used an inverse signal direction of *Random Access* in *Participation TV*. It allowed viewers to change their voice sounds into abstract images on television in real time whereas *Random Access* encouraged viewers to change graphical lines into a sound piece. Paik explored how to alter passive viewers into active ones by appropriating a television, the popular appliance. To escape the one-way medium, Paik used two microphones as interactive interfaces. Viewers at that time could only watch programs on television. They could not create any content or manipulate the images at all except for normal functions such as controlling brightness, contrast, saturation, and simple color corrections. Their interactions were limited to check the program schedules and to select their favorite programs. In this regards, viewers were passive audiences that had no right to change the content. Paik not only made this passive device the interactive device, but also changed passive viewers to active participants. A viewer's voice generated electronic signals. Paik used them as an input signal to draw abstract images on television. Any viewers could manipulate images in *Participation TV*. This became a very basic interface for interactive art. Most computer programming languages for interactive art such as Max MSP Jitter and Quartz provide the interactive environment as a typical example for the beginner. For example, artist and professor Golan Levin used the same interface in his interactive pieces several times, especially *Messa di Voce* (2003), which made audiences' voices generate abstract images and manipulate their shadow on the screen at the same time.

Conclusion

Paik's interactive art implies how artists can make interactive pieces based on his Musique Concrète experiences. Paik's three interactive pieces experiment with the two-way signal translations between sound and image. In his first solo exhibition in 1963, Paik had already suggested a non-linear approach, a database, a translation from sound to image and vice versa in interactive art. These became typical methods to design contemporary interactive art. Based on the methods, several interactive artists such as Utterback and Levin have developed their interactive projects. Furthermore, Japanese artist Toshio Iwai created *Tenori-On* (2006), which is a visual musical device with LED grids. Since the portable device is collaborated with the Japanese musical instrument company, Yamaha, this can be regarded as a musical instrument. However, users can simultaneously create abstract LED-dot images by directly touching the LEDs.

[13] Paik was a residential researcher at Bell Labs from 1967 through 1968. At the lab, he created *Confused Rain*, which was a printout of the letters of the word confused falling down the page in a random accumulation. William Kaizen, "Computer Participator," in *Mainframe Experimentalism: Early Computing and the Foundations of the Digital Arts*. ed. Hannah Higgins and Douglas Kahn, 231.

Between abstract images and sounds, users cannot tell which signal is first. The endless circulation between sound and image can expand into a synesthesia work. Paik's three different influences to interactive art based on Musique Concrète still encourages artists to make interactive art in a creative way in the 21st century. The project reveals that Paik's interactive art was a fundamental contribution to developing a new kind of interactive art.

In the landmark textbook of 20th-century art, *Art Since 1900*, foremost art historians Hal Foster, Yve-Alain Bois, Rosalind Krauss, and Benjamin Buchloh did not even mention Paik's creative approaches toward interactive art. Instead, they included the works of Paik's contemporaries, Woody and Steina Vasulka, as early interactive pieces even though their works were created later than Paik's pieces. [32] These art historians mainly pointed to his negative aspects such as a technophile and an anti-feminist. Nam June Paik himself as well as his interactive pieces is underrated in art history.

Outside of mainstream of art history, some art theorists have reevaluated his first solo show, *Exposition of Music – Electronic Television*, as one of the earliest significant interactive art exhibitions in a gallery. After a book with the same title was published in bilingual texts, German and English, in 2009, the background of Paik's first interactive art exhibition could be more articulated. This was a breakthrough event tracing the origins of interactive art. Subsequent studies are strongly needed to articulate Paik's interactive art. In Paik's musical background, the endeavors to emancipate audiences from a one-way art piece guided him to make art in a two-way direction, and created his own interactive art. In this condition, among his interests in progressive music, Musique Concrète can be a Paik's significant influence to his interactive art. "Although art is often a bastard the parents of which we do not know" as Paik mentioned, this research found one of those parents in his creative adaptations from Musique Concrète to make interactive pieces.

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