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The Application of Aleatoric Technique through Graphic Notation in the Choral Composition "Acumalaka"

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Abstract

This article examines the use of aleatoric techniques through graphic notation in the choral music composition *Acumalaka*. It aims to demonstrate how aleatoric techniques and graphic notation can enhance artistic quality and musical expression. The composition process applied the practice-led research method, with the researcher serving as both composer and conductor. This approach involved the direct creation of the piece, alongside observing the choir's rehearsal and performance. Additionally, interviews with 14 singers were conducted to explore their experiences interpreting graphic notation and adapting to the creative freedom that aleatoric techniques allow. The collected data was analyzed thematically, combining critical reflections on the creative process with the singers' insights. Findings indicate that using aleatoric techniques through graphic notation enriched the musical dynamics, fostered creativity, and strengthened interactions among choir members. Moreover, aleatoric techniques and graphic notation can support innovative and collaborative musical experiences.

Keywords: *Aleatoric technique, graphic notation, music composition, choir, musical creativity.*

Abstrak

Artikel ini mengeksplorasi penerapan teknik aleatorik melalui notasi grafis dalam komposisi musik "Acumalaka" dengan menggunakan paduan suara sebagai media ungkap utama. Tulisan ini bertujuan untuk memahami bagaimana teknik aleatorik dan notasi grafis dapat meningkatkan kualitas artistik dan ekspresi musikal. Metode penyusunan komposisi musik yang digunakan, yaitu *practice-led research*. Metode yang digunakan melibatkan penciptaan karya secara langsung oleh peneliti yang juga berperan sebagai komposer dan dirigen, diikuti oleh observasi proses latihan dan penampilan paduan suara. Selain itu, wawancara dengan 14 penyanyi dilakukan untuk menggali pengalaman mereka dalam menginterpretasikan notasi grafis

dan beradaptasi dengan elemen kebebasan yang diberikan oleh teknik aleatorik. Data yang dikumpulkan dianalisis secara tematik, menggabungkan refleksi kritis dari proses kreatif dengan respons para penyanyi. Hasil penelitian menunjukkan bahwa teknik aleatorik melalui notasi grafis memperkaya dinamika musikal, mendorong kreativitas, dan meningkatkan interaksi antar anggota paduan suara. Selain itu, teknik aleatorik dan notasi grafis dapat digunakan untuk menciptakan pengalaman musikal yang inovatif dan kolaboratif.

Kata kunci: *Teknik aleatorik, notasi grafis, komposisi musik, paduan suara, kreativitas musik*

Introduction

The aleatoric technique in music is a compositional method that introduces freedom and unpredictability into the performers' interpretation process (Mack, 2004). With this technique, the composer provides general guidelines through musical notation but allows certain musical elements, such as rhythm, dynamics, or pitch order, to be determined by the musicians during the performance. This approach first emerged in the mid-20th century, with composers like John Cage and Pierre Boulez recognized as pioneers of aleatoric techniques (Amazonas et al., 2020). They were drawn to the concept of creating music that wasn't entirely fixed, allowing each performance to produce unique interpretations (Campbell & O'Hagan, 2016).

The main motivation for composers to employ aleatoric techniques is to more deeply engage musicians in the creative process and to produce works that are dynamic and constantly evolving. This technique grants performers interpretive freedom, which can enhance the musical experience and foster interaction among musicians during performances (Bishop, 2024). Furthermore, aleatoric techniques enable music to mirror the uncertainty and complexity of the modern world, where unpredictability and variation are seen as essential aspects of daily life (Palombini, 1993).

The aleatoric technique has been used by many composers in iconic works that showcase the flexibility and innovation of modern music. One well-known example is *Music of Changes* (1951) by John Cage. In this piece, Cage used the *I Ching*, an ancient Chinese divination system, to determine elements such as duration, dynamics, and notation. The result is a composition that is not only random but also unique with each performance, capturing the essence of uncertainty promoted by aleatoric techniques (Bernstein, 1996).

Pierre Boulez also employed aleatoric techniques in compositions like *Troisième Sonate pour Piano* (1955-1957), where the pianist was allowed to choose the order of specific sections. This freedom enables performers to create different versions of the piece, offering varied interpretations of the same composition (Campbell, 2016; Boulez et al., 1991). Another example is *Klavierstück XI* (1956) by Karlheinz Stockhausen. In this work, eleven musical

fragments are printed on a large sheet, and the pianist selects the sequence in which they will be played during the performance (Pamungkas, 2020). The composition integrates elements of freedom and improvisation, which are central to the aleatoric technique (Vickery, 2010; Parsons, 2021).

In music interpretation, there are two main parameters: syntactic parameters and statistical parameters (Meeùs, 2019). These parameters offer different perspectives on how musicians can understand and interpret a piece of music. Syntactic parameters relate to the formal structure and underlying rules of composition, covering elements like melody, harmony, rhythm, and overall form. In music that adheres to a strict syntactic structure, musicians are expected to closely follow the composer's notation and instructions, interpreting the piece according to established rules and patterns. Here, interpretation primarily focuses on fidelity to the musical text and the management of predefined formal elements.

On the other hand, statistical parameters include aspects that are more qualitative and not as precisely measurable as syntactic parameters. These elements encompass dynamics (volume), tempo, timbre, and other characteristics that influence how the music sounds in performance (Brun & Exbrayat, 2022). Music notation often cannot capture all the nuances of these statistical parameters in detail. For instance, although notation may indicate dynamics (like "piano" or "forte"), the expression of these dynamics is largely dependent on the performer and the context of the performance (Battogtokh & Baynjargal, 2024). Therefore, statistical parameters relate more to how the music is expressed and perceived by the listener, often requiring verbal instructions or additional notes (*didascalies*) to clarify how these elements should be conveyed.

In aleatoric music, statistical parameters focus on the more random or probabilistic aspects of a composition. These include elements like intensity, density, and time distribution, which are not strictly bound by formal rules. This approach creates space for variation and interpretative freedom, enabling musicians to explore diverse possibilities and generate a unique musical experience with each performance.

For instance, in piano works such as John Cage's *Music of Changes*, musicians receive notation that allows flexible interpretation of certain aspects, such as duration and dynamics. In this context, statistical parameters enable substantial variation in each rendition of the piece. Meanwhile, syntactical parameters remain as a foundational framework, establishing the basic structure of the music, as illustrated in Figure 1 below.

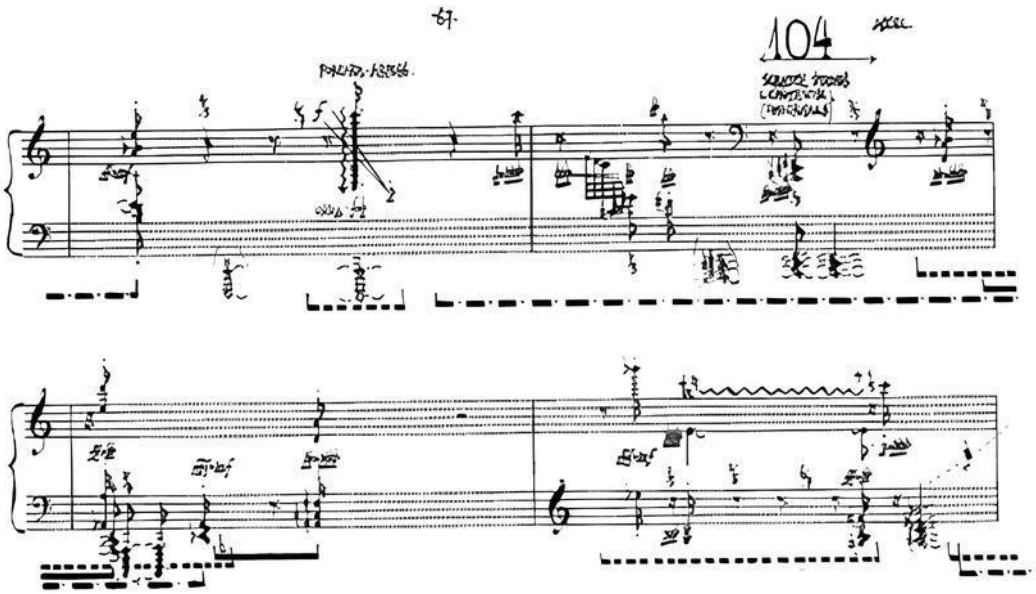


Figure 1 John Cage's "Music of Changes" notation excerpt
Source: https://en.wikipedia.org/wiki/Music_of_Changes

The number "104" in the notation excerpt above designates the tempo for that section. Unlike conventional bar lines, the vertical lines in this notation serve only to mark the center of the staves. The cross symbol indicates the moment when the sound ceases, while the diamond-shaped notes are meant to be depressed without producing sound (Iddon, 2009).

Playing aleatoric music on instruments often requires musicians to have exceptional technical skills. They must be proficient in complex techniques while preserving the interpretive freedom that aleatoric music demands. This includes navigating abstract graphic notation, balancing structured elements with improvisation, and responding spontaneously to unexpected developments during a performance (Pritchett, 1993). On the other hand, aleatoric techniques in vocal music are generally more accessible, as singers are not bound by the same technical challenges. The inherent flexibility of the human voice and the ability to improvise naturally allows vocalists to interpret aleatoric elements with greater freedom, creating a dynamic and expressive experience without needing advanced technical skills (Sauer, 2009).

Vocal flexibility enables singers to adapt readily to the aleatoric instructions set forth by the composer, particularly when working with graphic notation. Graphic notation, which is often abstract and symbolic, offers a broad range of interpretative freedom. Singers can approach these symbols with creative expression, unhindered by the technical complexities that instrumentalists might face.

A notable example of graphic notation in vocal music is Cathy Berberian's *Stripsody* (1966) (Swed, 2013), where singers interpret various lines and shapes to produce sounds that are diverse and unpredictable (Buj Corral, 2018), as

illustrated in Figure 2 below. This freedom allows for each performance to be unique, with the singer's interpretation of the graphic symbols adding to the variability and spontaneity of the work.

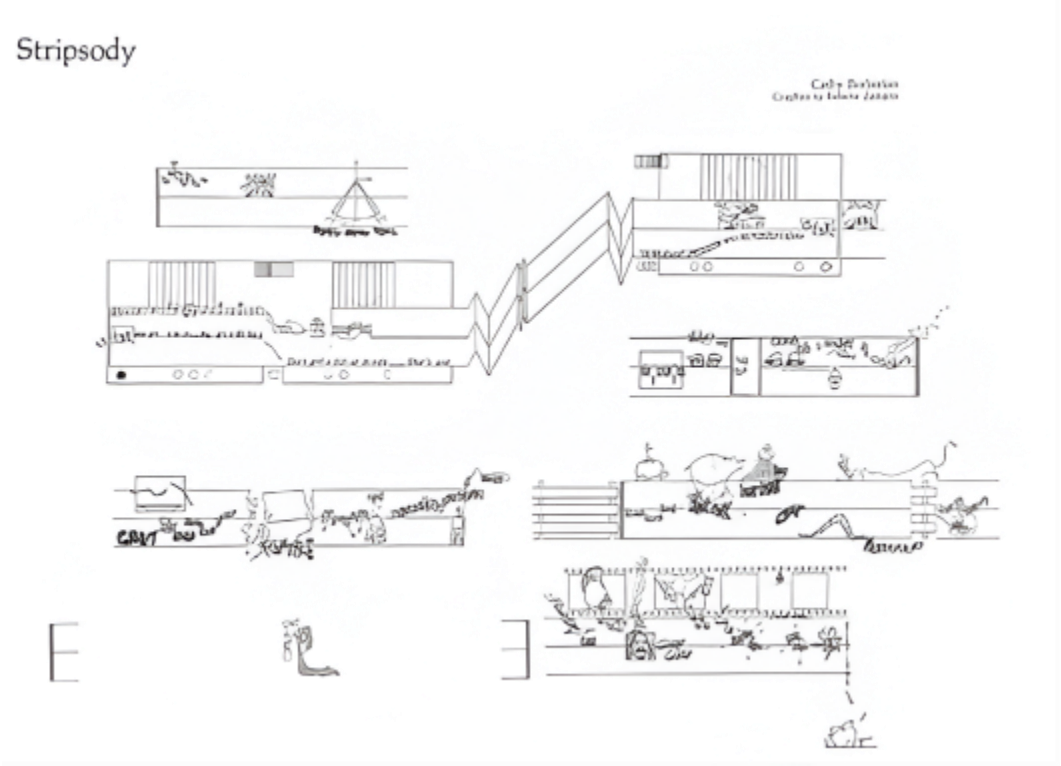


Figure 2 Graphic notation of Cathy Berberian's "Stripsody"
Source: (Buj Corral, 2018, p. 50)

In choral applications, aleatoric techniques make spontaneous interaction easier to achieve. A recent example is Katarina Gimon's *Elements*, a choral work known for its use of graphic notation and aleatoric techniques that explore the human voice in diverse ways, including overtone singing, percussive vocals, and variations in vocal timbre. Each section of the piece symbolizes one of the natural elements—earth, air, fire, and water—requiring singers to actively participate in spontaneous and unique interpretations in each performance. This freedom allows for a continuously evolving musical experience. The aleatoric nature of *Elements* makes it accessible for younger or less experienced choirs, contrasting with instrumental aleatoric works that often demand high technical proficiency. For instance, the "Fire" section highlights how vocal exploration and interpretive liberty can yield dynamic, energetic outcomes (Gimon, 2024).

Aleatoric techniques in choral music have also been enhanced by virtual instrument technology, like TUTTI VOX by Sonokinetic and MYSTERIA by Native Instruments. These tools not only provide high-quality choral sounds but also feature advanced capabilities like dynamic control, sound effect processing, and aleatoric algorithms for rich and complex vocal simulations. TUTTI VOX, for example, includes a range of randomized vocal phrases that can be blended to

create unique textures, allowing users to experiment with aleatoric vocal elements in an audio environment. This feature is especially valuable for composers interested in exploring vocal aleatorics without needing a live choir for recording (Sonokinetic, 2024; Native Instruments, 2024).

Furthermore, these virtual instrument products offer visual and audio control through an intuitive interface, enabling users to generate diverse sound patterns that can aid in composing graphic notations. The visual elements provided by these tools can inspire the development of innovative graphic notations that are responsive to aleatoric techniques.

Although initially designed for efficient film music production, these virtual instruments also serve as valuable learning tools. They allow musicians and composers to explore and understand a wide range of vocal possibilities that can be incorporated into new works, opening up creative avenues previously unexplored. Through research and creative practice, these technologies offer insights that can lead to more dynamic and innovative approaches to music-making. For example, as shown in Figure 3, the visual interface of Sonokinetic's TUTTI VOX virtual instrument offers a visual component that supports the preparation of graphic notation, encouraging further creativity and experimentation.

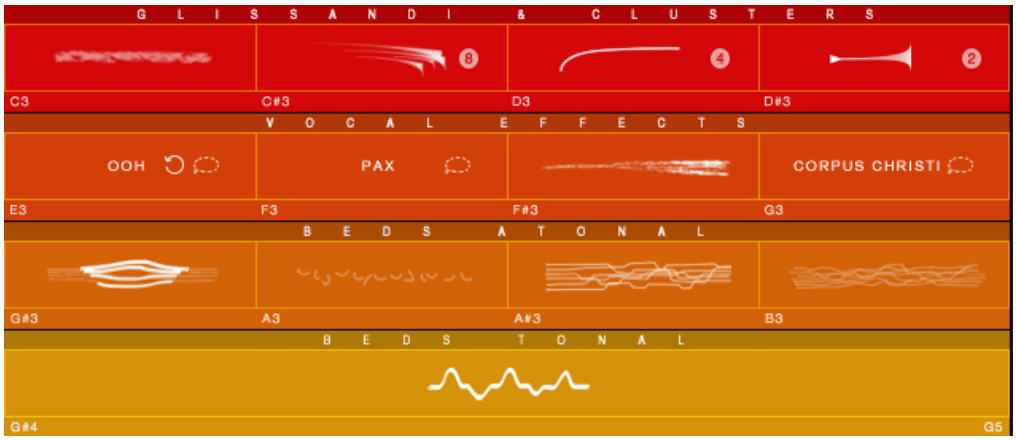


Figure 3 Graphic visualization of the aleatoric concept on TUTTI VOX products
Source: https://www.sonokinetic.net/products/classical/tuttivox/

The exploration of aleatoric techniques in choral music, particularly as applied by Katarina Gimon in her composition “Elements” and through various virtual instrument products, has inspired the researcher to create a new work titled “Acumalaka.” This technique provides singers with the freedom to interpret music through graphic notation, motivating the researcher to investigate the dynamic potential that can be achieved in choral compositions (Galbreath, 2018). “Acumalaka” aims to continue this spirit of exploration by allowing singers to develop unique interpretations in each performance.

Several studies are relevant to this topic. Research conducted by Hope (2020) indicates that traditional music notation often fails to capture the complexity of modern compositions, which are increasingly collaborative, polystylistic, and incorporate elements of improvisation, found sound, and multimedia. Graphic notation and animation enable the representation of aspects such as microtonality, non-linear structures, and improvisation—features that are challenging to express using conventional notation.

Meanwhile, the research conducted by Delius et al. (2023) aims to understand the neural and physiological mechanisms involved in the activity of singing together in a choir and describes the choir as a superorganism system. The study reveals that singing in a choir requires complex coordination among various physiological subsystems, such as breathing and vocalization, which are interconnected to create a harmonious musical experience. Although research on collective brain activity in singing is still limited, further studies are necessary to address the knowledge gap in this area.

These two studies provide a foundational basis and inspiration for exploring the effectiveness of choral music using graphic notation. Based on this context, the research focus leads to three primary questions: 1) What steps were taken in creating the work “Acumalaka” using the aleatoric technique? 2) What obstacles arose during the rehearsal and performance of the work? 3) How did the singers respond to and interpret the graphic notation during the performance?

Methods

In researching the creation of a musical composition titled “Acumalaka,” the Practice-Led Research method was used as the primary approach. This method enables researchers to generate new knowledge through the process of creating artworks, where the artwork itself serves as the focal point of the research (Mäkelä, 2007; Nelson, 2022; Hannula et al., 2014). Data collection techniques for this study included documenting the creative process, which involved recording the steps in composition, rehearsal, and performance. The collected data also encompassed audio-visual recordings and feedback from the singers involved in the choir.

Additionally, interviews were conducted to gain insights into the singers' experiences during the exploration, rehearsal, and performance of “Acumalaka.” The interview questions aimed to explore how the singers felt when creating musical material intuitively and what challenges they faced. Furthermore, the interviews sought to determine how rehearsing without sheet music affected their understanding of the aleatoric concept and how communication with the conductor and fellow group members influenced their performance. Another area of focus was the singers' comfort in executing musical passages, particularly when transitioning between sections or interacting with the audience to create surround sound effects. Singers were also encouraged to reflect on what went

well and what could be improved and to offer suggestions for enhancing the interpretation of the music. Through these interviews, the author hopes to gain new insights that will deepen the understanding of the creative and performative processes involved in this work.

Data analysis was conducted by evaluating the compositional and interpretive outcomes of the choral singers. This process enabled the researcher to assess the effectiveness of the graphic notation used to guide the aleatoric technique and to understand how singers responded to the interpretative freedom offered by the notation. This approach provided valuable insights into the dynamics of the interaction between notation and vocal expression, facilitating the revision and further development of musical ideas.

The process of music creation in this research can be illustrated in chart form, as shown in Figure 4 below.

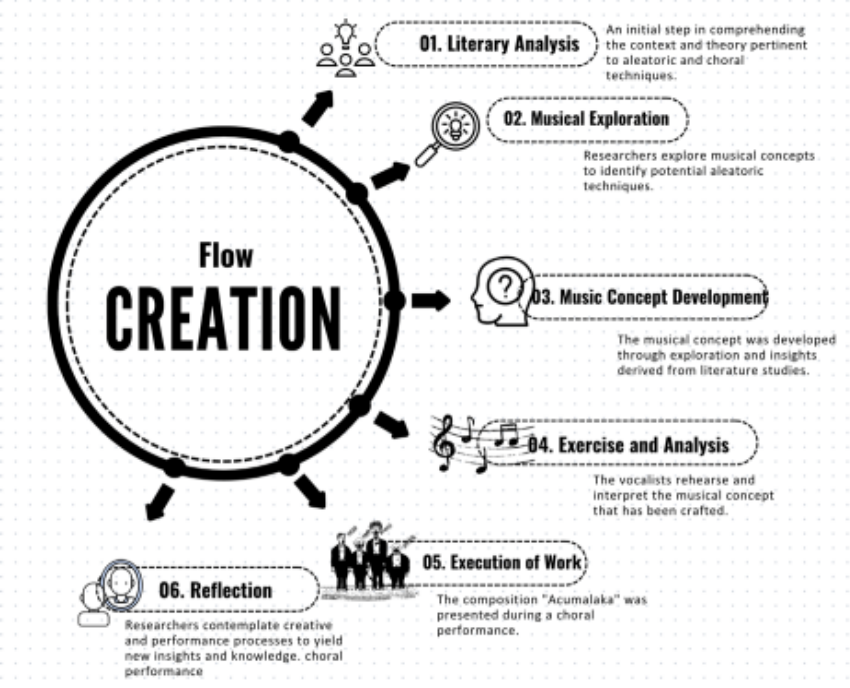


Figure 4 Music creation flow

Results

Based on the method used, the author will describe various findings by the steps undertaken, beginning with the literature study phase, followed by music exploration, music concept design, rehearsal and interpretation, the performance of the work, and reflection.

Literature Study

The literature study was conducted at the initial stage to review the meanings and technical aspects of how the aleatoric concept is applied in music creation. The literature reviewed included not only scientific articles, as discussed in the introduction, but also books that explore aleatoric music, such as “Sejarah Musik Jilid IV” by Dieter Mack. This book examines the aleatoric technique from a

philosophical perspective and provides examples of works and composers who have developed this concept (Mack, 2004).

To deepen the understanding of the musical aspects, the author investigated various audio-visual documents related to the works discussed in the book. This included video examples from YouTube channels, several audio recording collections, and notations obtained from various sources. These materials were studied and compared to ensure a clear understanding of the aleatoric technique. The findings from this literature study served as inspiration for the author, leading to the next phase: the musical exploration stage.

Musical Exploration

At this stage, musical ideas were explored collectively, incorporating both intuitive contributions from the singers and conceptual ideas developed by the author. The author guided the exploration by directly involving the singers in creating images that could intuitively visualize sounds. This process was based on four main concepts designed by the author: long drone-like sounds, short sounds using phonemes, rhythmic patterns, and sound effects.

This collaborative approach enabled all participants to actively contribute to shaping the sound and its color. Each singer was assigned specific tasks, such as designing rhythmic phrases, depicting long sounds, illustrating short sounds, and describing sound effects that mimic natural sounds, such as waterfalls and water reflections. This method not only stimulated the singers' creativity but also enriched the texture and dynamics of the composition by incorporating organic and experimental elements.

The outcomes of this exploration were then formulated into sketches that can be used as graphic notation material in the composition process. The following sketch, created as a result of the exploration, is presented in Figure 5 below.

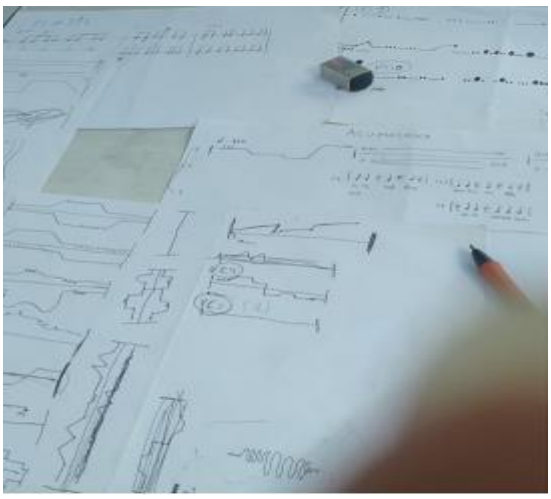


Figure 5 Sketches from music exploration with singers

Figure 5 presents the various materials collected by the author from several sources, which were then used as the foundation for composing the complete work. The author analyzes, interprets, and tests these materials by involving several singers. Based on the results of these trials, the author can evaluate and determine which materials to incorporate into the composition. This process helps clarify the most effective and relevant elements to include, ensuring that each part contributes optimally to the overall structure of the piece. The author curates the collected materials by marking them with codes such as "VC 1," "VC 2," and so on, as illustrated in Figure 6 below.

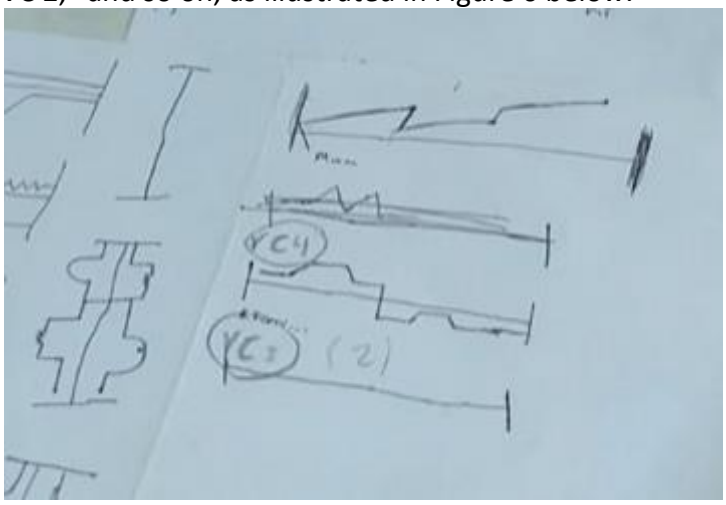


Figure 6 Material curation code in the exploration process

This process enables the author to organize and identify materials more easily during the composition process. Each material selected through this curation becomes an essential and integral part of constructing the overall composition, contributing to the formation of a complete compositional structure.

Long notations or images are used to identify extended sounds, creating a deep and contemplative atmosphere, while short sounds introduce a dynamic rhythm. Phonemes are also incorporated as sound elements, with singers exploring vowel sounds devoid of linguistic meaning, thereby adding an abstract and textural dimension. The use of phonemes significantly influences the articulation of sounds and timbres in this piece, including effects such as hissing and lip-smacking, which enrich the character of the voice.

In creating the material, patterns are developed using various rhythms and phrases that either repeat or vary, providing a flexible foundational structure for the composition. Dynamics are thoroughly explored, with volume variations ranging from very soft to loud, creating different emotional contrasts and energy levels in various sections of the piece. As the exploration process progressed, the author had the opportunity to collaborate with several singers by performing the musical material that had been created, allowing for the curation of this material into a cohesive composition.

Music Concept Development

After all the musical materials have been created, the next step is to design these materials into a complete composition. The author curates and compiles the musical elements, taking into account the expression of dynamics, duration, and signs or symbols that will facilitate the singers' performance in the form of notation. A representation of the notation results as a conceptual music composition is shown in Figure 7 below.

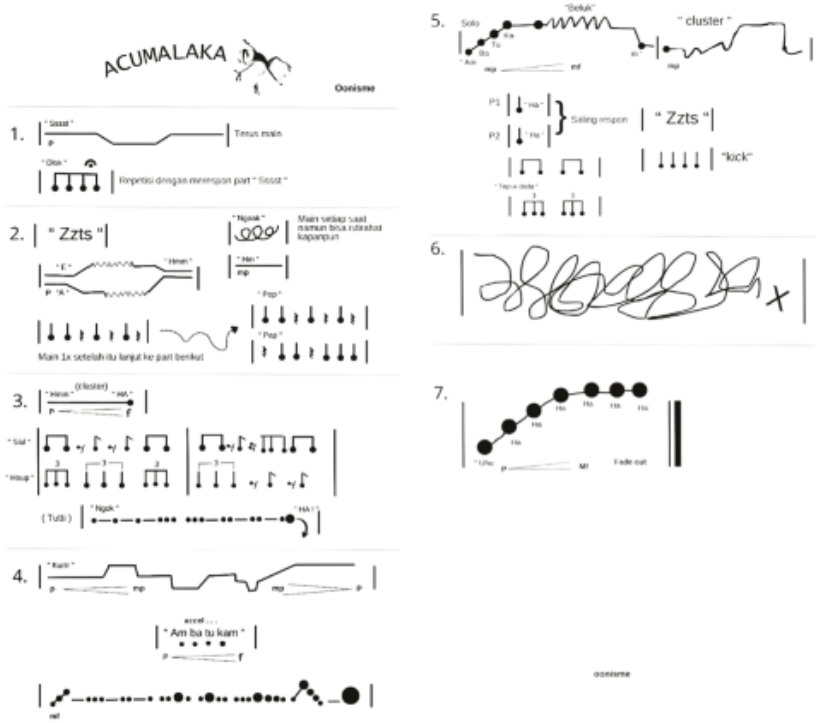


Figure 7 "Acumalaka" notation

In the composition notation of *Acumalaka*, the author divides the entire work into seven major sections, each characterized by distinct sound colors. This division is irregular in terms of the number of bars, allowing both the conductor and singers the freedom to transition between sections without adhering to a rigid count. This structure enables the singers to read the score more freely and interpret when it is appropriate to move to the next section, thereby adding flexibility to the performance.

During the rehearsal process, the singers did not study the score in advance but practiced directly with the composer in the rehearsal space. During the first rehearsal, the author recognized the need for a conductor to guide the singers, as there was no precise count for when to start and stop. Although this piece employs aleatoric techniques, the researcher emphasizes that this composition is not entirely based on free improvisation. The aleatoric elements in *Acumalaka* are constrained by specific artistic goals, which remain aligned with the author's musical vision.

The author acknowledges that directing the musical flow in this composition is quite challenging. Therefore, the author adopts the concept of hierarchical ensemble collaboration. In the context of *Acumalaka*, this concept refers to the close collaboration and synergy among singers in producing an interpretation of the composition that prioritizes not only individual abilities but also cooperation and musical unity. The ensemble collaboration in this work highlights the importance of coordination, communication, and active listening among the singers. To clarify, the hierarchy of ensemble collaboration is illustrated in a chart, as shown in Figure 8 below.

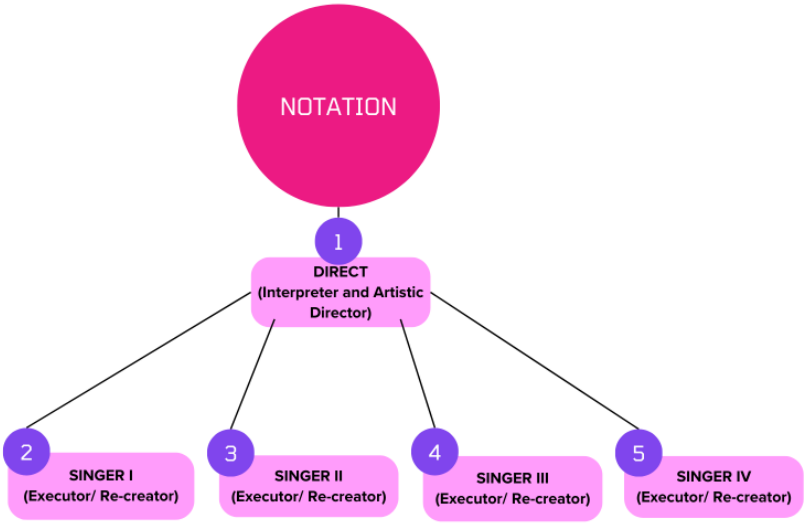


Figure 8 The concept of hierarchical ensemble ship

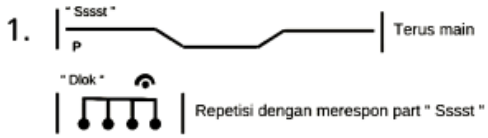
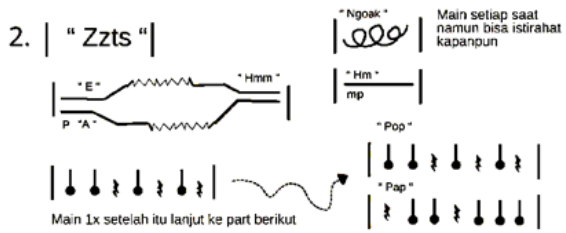
The chart above illustrates how each element in the interpretation and execution process of *Acumalaka* is interconnected. The musical notation serves as the starting point, which is then translated by the conductor and executed and reinterpreted by the singers in the spirit of ensemble collaboration.

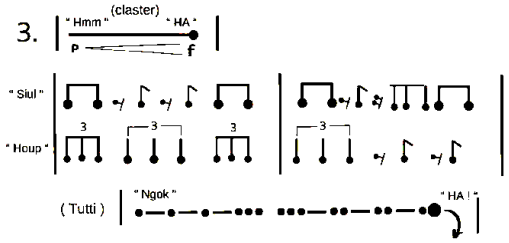
In *Acumalaka*, the concept of ensemble collaboration is central to both the creative process and the performance. The conductor not only serves as the primary leader but also employs a structured hierarchical system to ensure smooth communication and interpretation within the ensemble. To achieve flexibility and efficiency, the conductor divides the singers into four groups, each led by a designated leader responsible for guiding their group members according to the given instructions. These group leaders help manage their group's dynamics, reducing the operational burden on the conductor. They also play a crucial role in interpreting the conductor's directions at a more localized level, particularly concerning sound coordination, dynamics, and the execution of notation.

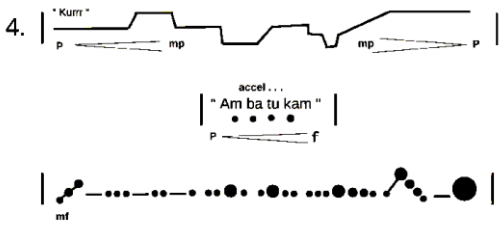
This system allows the conductor to focus on the broader musical aspects, while the group leaders manage the technical execution and

synchronization within their respective groups. The musical journey in *Acumalaka* can be divided into seven major sections, based on specific instructions from the conductor and the execution by the singers, as detailed in Table 1 below.

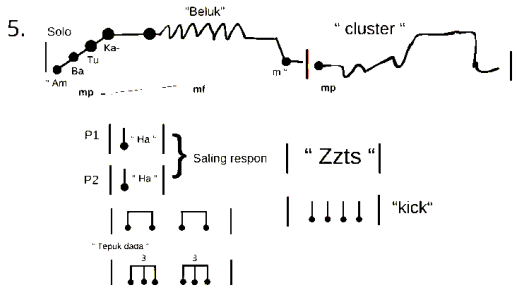
Table 1 The musical journey in “Acumalaka”

<table>
<tr><th colspan="2">SECTION 1</th></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><th>CONDUCTOR'S INSTRUCTIONS</th><th>SINGER'S EXECUTION</th></tr>
<tr><td>• The director orchestrates the first and second groups of singers to enter simultaneously, beginning with very slow dynamics.
• The conductor regulates the fluctuations in the dynamics of the "sst" sound.
• The instruction for Group IV singers to enter with the sound "dlok" serves solely as an entry signal, after which the execution is handed over to the leader of Group IV to respond to the "sst" sound.</td><td>• Singer Groups I and II begin with the "sst" sound, evoking the sound of a distant waterfall, which gradually becomes louder as the dynamics are directed by the conductor.
• Singer Group IV produces the "dlok" sound in response to the fluctuations of the "sst" sound, interpreting the sound of water reflections based on prior agreement with the conductor before starting this section.</td></tr>
<tr><th colspan="2">SECTION 2</th></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><th>CONDUCTOR'S INSTRUCTIONS</th><th>SINGER'S EXECUTION</th></tr>
<tr><td>• The conductor signals Singer Group II to begin the drone, marking the entrance to the second major section for all singers.
• The conductor signals Singer Group III to enter, allowing them freedom in their interpretation.</td><td>• Group II singers perform a drone using the syllables "Eee" and "Aaa," following the conductor’s movements and directions.
• Singer Group I transitions from "sst" to "zzts" as agreed with the conductor when Group II begins the</td></tr>
</table>

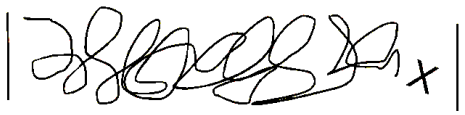
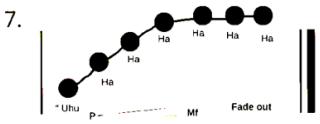
• Two singers from Group II are instructed to move freely.	drone, then proceeds to the next material. • Group IV singers perform a rhythmic pattern using the syllable "dlok," then transition to "pop" and "pap," interpreting these sounds as gentle water reflections. One singer from this group is designated by the director to lead the others. • Group III singers vocalize "ngoak," representing a conversation between frogs. • Two singers from Group II move freely according to their own interpretations.
SECTION 3	
	
CONDUCTOR'S INSTRUCTIONS	**SINGER'S EXECUTION**
• The conductor cues all singers to transition to Section 3. • The conductor adjusts dynamics from soft to intense for Singer Groups I and II. • The initial direction instructs Group IV to perform a rhythmic “houp” along with repeated whistling. • A cue is given to increase the intensity of the “ngoak” sound for Singer Group III. • Accentuation is used as a signal for all singers to shift parts. • The conductor directs the tutti section, maintaining full control over the timing.	• The singers who had been moving freely return to their positions and prepare for further instructions. • Singer Groups I and II perform drone sounds with pitch variations, creating clusters. • Group IV singers produce a rhythmic “houp” sound and repeat a whistling pattern. • Singer Group III increases the intensity of the “ngoak” sound. • Following the accent cue, all singers perform the tutti material using the consonant “ngok.”
SECTION 4	



CONDUCTOR'S INSTRUCTIONS	SINGER'S EXECUTION
• The conductor provides the initial cue for the entry of Singer Groups I and II with the “kurr” sound. • Emphasis is placed on Singer Group IV, focusing on the rhythmic “ngok” sound. • The conductor’s right-hand guides the rhythm for Group IV, while the left hand directs the dynamics and tempo for Group III, which performs with the lyrics “Am ba tuk kam.”	• Singer Groups I and II perform the prolonged “kurr” sound, each interpreting it individually. • Group IV singers perform the rhythmic “ngok” sound according to the conductor's instructions. • Singer Group III performs short sounds with the lyrics “am ba tu kam,” building in a crescendo.
SECTION 5	



CONDUCTOR'S INSTRUCTIONS	SINGER'S EXECUTION
• The conductor gives a sudden silence cue to initiate Section 5. • Tempo instructions are provided for Singer Group IV, with mutual response instructions for the female singers (P1 and P2). • Cluster instructions are directed to Singer Groups I and II, using the lyrics “Mmm.”	• The first soloist immediately sings the material "ambatukam" followed by the lyric "Aaa" upon the conductor's silent cue for the other singers. • The second soloist enters after the syllable "am," as previously agreed with the conductor. • The female singers respond to each other using the P1 and P2 patterns. • Singer Groups I and II sing the cluster using the dental sound "Mmm."
SECTION 6	

<table>
<tr><td colspan="2">6.  </td></tr>
<tr><td>CONDUCTOR'S INSTRUCTIONS</td><td>SINGER'S EXECUTION</td></tr>
<tr><td>• The conductor provides an accent cue to initiate section 6.
• The conductor directs all singers to produce a cacophonic sound texture, creating an intentionally "chaotic" effect as per the mutual agreement.</td><td>• Each singer performs various types of music, including imitating drum sounds, singing metal songs, and performing beluk, to create a sound phenomenon characterized as cacophony, which is often described as 'chaotic.'</td></tr>
<tr><td colspan="2">SECTION 7</td></tr>
<tr><td colspan="2">7. 
</td></tr>
<tr><td>CONDUCTOR'S INSTRUCTIONS</td><td>SINGER'S EXECUTION</td></tr>
<tr><td>• The conductor issued a silent signal for section 6 to conclude.
• All singers vocalize "woahahahaha" across different pitch ranges until the performance ends.</td><td>• All singers performed the "woahahahaha" material according to the timing instructions given by the conductor until the conclusion of the composition.</td></tr>
</table>

This table outlines the musical material in each section, the instructions from the conductor, and the execution by the singers. It reflects the purposeful aleatoric approach present in “Acumalaka,” where the conductor provides the singers with flexible control, allowing for improvisation and intuitive responses in certain sections.

Performance of Works

In the performance section of the work, there are significant differences between the two performances held at different venues and events. This variation arises from the aleatoric concept that characterizes the composition of “Acumalaka.” The aleatoric nature of the work permits greater freedom of interpretation for both the conductor and the singers, resulting in each performance producing a unique and distinct musical experience.

The first group's performance of “Acumalaka” was very controlled and structured, largely due to the extensive rehearsal time. This group was the first to work on “Acumalaka,” participating in many intensive rehearsal sessions to agree on key interpretative points of the work. During the rehearsal process, the singers not only understood the musical material but also internalized their roles and instructions.

While performing at the Amphitheater of Universitas Pendidikan Indonesia, the author took the initiative to realize the concept of surround sound. The author agreed and provided instructions to Group III, whose members sang the lyrics “ngoak,” to remain off-stage and instead hide in various corners of the audience area. This arrangement allowed the sound to emanate from multiple directions when they began singing after the conductor's cue. Additionally, two singers from Group II were instructed to move freely, exit the stage, and join Group III to enhance the surround sound effect.

The presence of various sounds from multiple locations surprised the audience. Some audience members were even startled when they heard sounds or voices from singers who appeared unexpectedly near their seats. This phenomenon reinforced the surround sound concept in the performance, creating an evocative and immersive experience in which sound did not come from a single direction but enveloped the audience from all sides. The surround sound concept was realized very effectively. Thanks to intensive rehearsals, the singers knew precisely what to do and were able to deliver a highly controlled performance. This meticulous preparation played a significant role in successfully creating a captivating surrounding experience, in line with the concept designed by the author. With strong control, the singers could respond appropriately to the conductor's instructions while maintaining a sound quality that blended seamlessly with the overall artistic vision of the piece, combining controlled improvisation with structured execution.

In the second performance, conducted at Taman Budaya Surakarta with a different group of singers, various factors contributed to a less controlled performance compared to the previous group. This group only had the opportunity to rehearse three times, resulting in communication and execution among the performers that were not as smooth as anticipated. Their unfamiliarity with performing aleatoric music made the singers hesitant and shy in executing the material according to their interpretations. As a result, they appeared less confident in performing certain sections, particularly those that required a freer interpretation and improvisation.

One of the major drawbacks of this group was the limited number of female singers. With only one female singer, the sound color and pitch range became too narrow and low, which negatively impacted the overall balance of sound in the performance. This limitation affected the dynamics of the group and restricted the tonal variations that could have been explored more richly.

Additionally, the section that used the lyrics “ngoak” encountered some technical difficulties. Some singers struggled to perform this material, so only a few were able to execute it well. This section is crucial for highlighting the surround sound concept that the conductor aimed to emphasize. The realization of the surround concept in this group was also less effective because the performance venue was outdoors, in the *pendopo* (pavilion). When Group 3 attempted to produce the “ngoak” sound from various angles, some audience

members jokingly joined in singing along. Although this was beyond the control of the performance, the author sees a positive aspect in the audience's involvement, as it added a participatory dimension to the work, unexpectedly enriching the sound texture.

However, other problems arose due to the lack of rehearsal. Some singers responded slowly to the conductor's instructions or forgot their parts, leading to delays in execution and occasionally playing the wrong material. Despite these challenges, the author was satisfied with the execution of section 6. In this section, the singers, most of whom have a background in karawitan (Sundanese Music), presented the material in a very engaging manner. Some singers performed the *calung* (bamboo instrument) sounds in an interlocking style, creating a dialogue between the singers and building rich sound textures. They also successfully presented a complex yet structured cacophony phenomenon.

Despite the numerous challenges and issues that arose from insufficient rehearsal, this second group was able to complete the performance successfully until the end. Although their execution was not as refined as that of the first group, they still brought forth interesting nuances and interpretations in various sections of the piece.

Discussion

Aleatorics, as a compositional technique that emphasizes chance and freedom of interpretation, has emerged as one of the most intriguing approaches in contemporary music. In this research, the author explores the application of this technique through the work “Acumalaka,” which combines collaborative and innovative elements in music creation.

In the initial stage, the author conducted a literature review to understand the meaning and technical aspects of the aleatoric concept. References from Dieter Mack’s book “Sejarah Musik Jilid IV” provided valuable insights into the technique from a philosophical perspective, as well as examples of works and composers who developed the concept (Mack, 2004). A solid understanding of aleatoric theory and practice formed an essential foundation before the author proceeded to the musical exploration stage.

During the exploration process, the author engaged singers to collaboratively create musical ideas. This approach not only stimulates the singers' creativity but also enriches the texture and dynamics of the composition by combining organic and experimental elements. The author guided the exploration by inviting singers to produce intuitive sounds based on the designed concepts, such as long drone sounds, and short sounds using phonemes, and rhythmic patterns. This process reflects the fundamental principles of aleatorics, where freedom of interpretation and improvisation are crucial for creating a dynamic musical experience.

The aleatoric technique, which introduces an element of freedom and uncertainty in musical interpretation (Amazonas et al., 2020; Campbell & O'Hagan, 2016), is thoughtfully implemented in “Acumalaka.” The author not only allows the singers to determine the rhythm and dynamics but also provides a clear framework through graphic notation (Swed, 2013). This approach creates space for the singers to express their creativity while still adhering to the established musical vision. In this context, freedom is not limitless; rather, it serves as a tool to enrich the musical experience, enabling each singer to offer a unique interpretation without compromising the essence of the composition.

In the rehearsal and performance process, the role of the conductor is critical. The conductor acts not only as a leader but also as a mediator who connects graphic notation with vocal expression. In “Acumalaka,” the conductor assists singers in understanding and interpreting notations that may appear ambiguous. By providing clear directions, the conductor fosters a collaborative atmosphere in which singers feel supported in exploring their interpretative freedom (Battogtokh & Baynjargal, 2024). The concept of “ensemble ship” applied in this work emphasizes the importance of cooperation and communication among singers. Each member of the ensemble is expected to listen to one another and adapt to each other's interpretations.

One of the most intriguing findings of this research is how graphic notation influences the vocal expression of the singers. The notation used in “Acumalaka” serves not only as a guide but also as a source of inspiration (Sonokinetic, 2024). Singers discovered new ways to express themselves through unconventional interpretations of the notation. For instance, the use of phonemes and vocal elements that lack linguistic meaning adds a new dimension to the performance, allowing singers to explore more abstract nuances of sound (Swed, 2013; Gimon, 2024). This approach creates a more immersive experience, making each performance unique and unexpected.

However, despite the numerous advantages of the aleatoric approach, challenges arise during execution. In some rehearsal sessions, groups of singers with limited time faced difficulties executing sections that required free interpretation and improvisation. This indicates that although aleatorics provides freedom, a sufficient understanding of the material and practice is still necessary to achieve a balance between control and freedom in performance.

Audience involvement in the performance is also a noteworthy aspect of aleatoric music. In one performance, the audience participated indirectly as singers emerged from various angles, creating an experience of surround sound. This approach not only impacts the musicians but also introduces a participatory dimension that enriches the listening experience. This aligns with Galbreath’s (2018) view that aleatoric music can reflect the complexity and unpredictability of the modern world, where variety and freedom are integral to everyday life.

Conclusion

The piece “Acumalaka” serves as an intriguing example of the application of aleatoric techniques in contemporary music, where the freedom of interpretation and collaboration between the composer and singers are the primary focus. By utilizing graphic notation, the composer provides singers with the opportunity to explore their vocal potential, creating a dynamic and interactive musical experience. This technique allows each performance to possess unique characteristics, reflecting the singers' interpretations while still adhering to the musical vision set by the composer.

Despite the many advantages of the aleatoric technique, challenges regarding coordination and execution during performances persist. Through the rehearsal experience, the composer recognized the importance of the conductor's role in directing the flow of music and maintaining effective communication among the singers. Limited rehearsal time and differing levels of understanding among singers can impact performance quality, as observed in the second group, which had less rehearsal time than the first group. This illustrates that while freedom of interpretation is central to aleatorics, adequate rehearsal, and good communication are still essential for achieving optimal results.

The concept of “ensemble ship” applied in “Acumalaka” further emphasizes the importance of collaboration and synergy among singers. By dividing the singers into small groups led by group leaders, the composer establishes a hierarchical structure that promotes better coordination and communication. This approach not only alleviates some of the conductor's responsibilities but also fosters a sense of community among the singers, which in turn enhances the quality of interpretation and execution of the piece.

Overall, this research offers valuable insights into how aleatoric techniques can be applied within the context of choral music and their impact on the listening experience. The engagement of the audience and the participatory dimension that emerges during the performance contribute to the aesthetic and emotional value of the piece. Therefore, “Acumalaka” is not only a musical composition but also an artistic experiment that enriches our understanding of the interaction between musicians and audiences in the contemporary music landscape.

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