

Cultivating Pathways to Nature Connection Through Collaborative Music Creation: A Workshop Model

Qinthar Qibran Kurniawan¹, Denis Setiaji²

^{1,2}Departement of Ethnomusicology, Indonesian Institute of the Arts Surakarta
Email: kurniawanqinthar@gmail.com

This research explores the emergence and transformation of nature connection pathways into collaborative music by designing and implementing a nature-based collaborative music creation workshop model. Employing a practice-based approach, the study integrates four theoretical frameworks, including the Five Pathways to Nature Connection (FPNC), the Soundtalking method, Collaboration Principles, and the Music Paradigm of Creativity. The resulting three-stage model (pre-creation, collaborative creation, and post-creation) was implemented over five weeks with ten participants (aged 15-22 years) at the Sekolah Seni Tubaba. Data from field notes, focus group discussions, and multimodal documentation were analyzed abductively and iteratively. Findings indicate that pathways to nature connection (FPNC) can be cultivated and strengthened through nature's sound exploration, collaborative music-making, and reflective dialogue. The analysis also produced a collaborative information-processing model that elucidates how shared understanding of nature is transformed into artistic work. The creation of two musical compositions, "Mulai Bernapas" and "Rahim Alam," proves that collaborative artistic practice can serve as an epistemological site for forming, deepening, and expanding nature connection pathways.

Keywords: Collaborative Music, Nature Connection, Non-formal Education, Workshop Model.

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Corresponding Author:

Qinthar Qibran Kurniawan
Indonesian Institute of the Arts Surakarta
19 Ki Hajar Dewantara Street, Jebres, Jebres District, Surakarta City, Central Java
57126, Indonesia
kurniawanqinthar@gmail.com

1. Introduction

The ecological crisis has manifested into various phenomena around us, ranging from extreme climate change to the decline of biodiversity [1]. Impacts of the ecological crisis can be seen in the spread of infectious diseases such as malaria and the Zika virus, which directly threaten human survival [2]. Instability in agricultural yields due to extreme weather changes is a form of ecological crisis that affects the increase in hunger and malnutrition rates [3]. The anthropocentric worldview is strongly suspected to be the cause of humans' exploitative behavior towards nature [4], [5]. This exploitative behavior is evidenced by the alteration of 95% of the Earth's land due to human activities [6], [7]. From this point, it can be understood that the ecological crisis not only encompasses environmental damage but also reveals the separation of humans from their nature [8], [9].

In contrast to exploitative human behavior, a study shows that throughout its evolutionary process, humanity has demonstrated a tendency to remain connected with nature [10]. This suggests that in addressing the ecological crisis, restoring the connection between humans and nature first is an important starting point [11]. A study conducted by Geng [12] explains that the level of nature connection significantly influences human behavior to value and protect nature. In one of her articles, Lumber [13] describes five experiential pathways that an individual can take to connect with nature, one of which highlights sensory involvement and the formation of emotional bonds with nature. Restall and Conrad [14] supported by Raatikainen et al. [15], also emphasize emotional and sensory experiences in enhancing the human-nature

connection. Musical artistic activities, particularly the creation of music about nature, offer significant potential in accommodating the development of sensory experiences, emotional expression, and appreciation for the beauty of nature [16]. Furthermore, collaborative musical creative activities, such as music creation workshops, can accommodate the transmission of ecological knowledge and expand collective understanding of nature [17], [18].

Building on this potential, this research focuses on designing and implementing a model for a collaborative music creation workshop aimed at fostering nature connection. In designing and examining the workshop model, this study integrates four theoretical frameworks, including the Five Pathways to Nature Connection (FPNC), the Soundtalking method, Collaboration Principles, and the Music Paradigm of Creativity. Thus, this research has specific objectives, which include (1) Designing and implementing a workshop model by integrating the four theoretical frameworks; (2) examining how the designed implementation model can accommodate the formation and strengthening of pathways to nature connection (FPNC) in participants; and (3) Analyzing the transformation of participants' experiences of nature connection into a collaborative music composition. Thus, this research does not test the effectiveness of the theory integration, but rather explore how the transformation of nature connection from the individual can be transformed into a collaborative music composition

2. Literature Review and Problem Statement

The participants' nature connection can be identified and understood through the theoretical framework of the Five Pathways to Nature Connection. These pathways encompass emotion or emotional bond, meaning or the ascribing of meaning to nature, compassion or empathy and motivation to act because of it, and beauty, which signifies an appreciative response to the beauty of nature [13]. In line with this, the Soundtalking method offers a series of natural sound explorations that encourage the engagement of sensory experience and reflective discussion as a space for sharing experiences and deepening understanding of nature among participants [19].

In the realm of collaborative music composition creation, the Music Paradigm of Creativity provides a theoretical framework for investigating the transformation of the creative process through several of its elements. These elements include value or the fundamental value held by each individual, belief in the value, the desire to create a work, the model or imaginative depiction of the work, the concept or explanation of the model, the method of creating the work, and the musical composition as the result of application [20]. Meanwhile, the Collaboration Principles by Stout and Keast [21] provide a theoretical framework for forming an ideal collaborative music creation environment. These principles include shared authority/power-with, emergent or the organic emergence of structure and flow, shared goals, good personal relationships, interdependence, an integrative process, and facilitative leadership.

Previous research has demonstrated the potential of the arts in restoring nature connection at the community level. The study conducted by Walshe et al. [22] successfully identified the pedagogical benefits of arts-in-nature or outdoor education, followed by Arbuthnott and Sutter [23] who measured the increase in nature connection through songwriting in nature. The study conducted by Wilson and Black [24] emphasizes the online technology dimension in exploring music collaboration as education for global sustainable development goals (SDGs). Although valuable, previous research is still limited to an external approach and leaves behind the potential of existing collaborative interaction. This research is present to fill that gap by designing, implementing, and analyzing a collaborative music creation workshop model that accommodates the formation of nature connection through the integration of four theoretical frameworks. This research also emphasizes the researcher's internal participation which highlights the collaborative

dynamics that emerge organically. However, there remains a lack of understanding of how the pathways to nature connection (FPNC) that emerge within individuals are collectively processed, negotiated, and transformed through the structured yet emergent dynamics of collaborative music creation into a coherent artistic output.

3. Method

This research constitutes a practice-based research within the conceptual framework of "Making" by Ingold, strengthened by a qualitative case study approach. This paradigm is used to examine collaborative artistic practice as an epistemological site [25]. A single iterative cycle is employed in designing and analyzing the practice of the nature-based collaborative music creation workshop. This single iterative cycle consists of three phases, namely (1) the planning phase, (2) the implementation phase accompanied by preliminary data collection and analysis, up to (3) the evaluation and in-depth analysis phase of the collected data. The designed cycle is an application of the trajectory model by Edmonds and Candy [26], in which the elements of practice, theory, and evaluation interact iteratively to form a cycle.



Fig. 1. Single Iterative Cycle

Integration of Theoretical Frameworks in Workshop Model Design

In designing and analyzing the model of collaborative artistic practice, this research integrates five theoretical frameworks that include: (1) the Soundtalking method by Bruce, (2) Collaboration Principles from Stout and Keast, (3) the Music Paradigm of Creativity by Bambang Sunarto, and (4) the Five Pathways to Nature Connection (FPNC) – Lumber et al. The integration of theoretical frameworks is designed to form a tiered logic, each of which has a role in the implementation and analysis of collaborative artistic practice. The Five Pathways to Nature Connection (FPNC) framework and the Music Paradigm of Creativity serve as both the output target and analytical frameworks for understanding the transformation and formation of nature connection. Alongside theoretical frameworks operating at the philosophical and analytical level, Soundtalking and Collaboration Principles by Stout & Keast are used in developing procedures and interventions to achieve the ideal output target.

Table 1. Function of Theoretical Frameworks in Workshop Implementation

Theoretical Framework	Primary Function
Soundtalking	A methodological practice platform in the implementation phase that facilitates the formation of FPNC.
Five Pathways to Nature Connection (FPNC)	Serves as both the output target and an analytical lens for understanding the emergence of pathways to nature connection within the implementation of the nature-based music creation model.
Collaboration Principles	Serves as intentional interventions to ensure interaction quality in creating an ideal collaborative environment.
Music Paradigm of Creativity	Acts as a map for music creation in observing the transformation of pathways to nature connection within collaborative music creation.

Adaptation and Application as Operational Interventions

Soundtalking is specifically applied to form FPNC. As a method in soundscape studies, Soundtalking itself involves a grounded theory approach, therefore adjustments are required to align it with the objectives of this research. This adaptation has undergone various considerations regarding effectiveness and time efficiency, which influence the depth of the research results. These considerations are outlined in Table 1.2: Adaptation of the Soundtalking Method.

Table 2. Adaptation of the Soundtalking Method

Aspect	Adaptation Rationale	Adapted Implementation
Research approach	Adapted from a Grounded Theory Method to align with the practice-based research study's predefined theoretical framework.	Shifted to an abductive approach, where the study is dialoguing finding with existing frameworks.
Theoretical function.	Adapted from an independent soundscape study tool to be integrated into a project-based design focusing on FPNC emergence	Functions as an integrated framework that triggers creativity and forms collective understanding.
Timeframe	Adapted from a longitudinal soundscape study to suit an intensive, process-oriented creative research focus.	Implemented as a short-term, collaborative intervention to achieve deep, shared understanding [27].

The Collaboration Principles by Stout and Keast are focused on conditioning the environment in collaborative music creation. In their article, Stout and Keast [21] also emphasize that collaboration should not be "procedural" or a structure that is regulated and planned by one party. This means that the structure and flow of collaborative music creation must be "emergent," where the process flow structure emerges within the process itself. Therefore, in applying the collaboration principles to the workshop model, the stages of collaborative music creation are not determined during the planning phase.

Table 3. Implementation of Collaboration Principles

Collaboration Principle	Form of Implementation
Power-with	Manifests as shared authority, where all decisions are made based on mutual agreement.
Emergent	The flow, structure, task division, and even the results of the creative process emerge within the creative process itself, without being pre-planned by any single individual or specific authority.
Shared Goals	Manifests as a shared goal in producing a shared output, namely the collaborative music work.
Good Personal Relationships	Manifests as the establishment of collaboration rules that emphasize appreciative dialogue to role equality.
Interdependence	Ensures all participants have equal roles in the creative process.
Integrative Process	Ensures all participants actively contribute to the work's creation so that not a single contribution can be removed without changing the essence of the work.
Facilitative Leadership	Manifests in the form of an entity that plays an active role in ensuring all principles function well, through guiding participants, synthesizing ideas/proposals, to mediating negotiations in the work creation process.

Research Context and the Three-Stage Workshop Implementation Design

This research was conducted over ten weeks through a collaboration between the MBKM Program of ISI Surakarta and a number of students at the Tubaba Art School, a non-formal educational institution in Lampung. The selection of the research location for natural sound exploration was based on the relevance of the natural landscape with the local socio-ecological context [28]. The study involved 10 local participants aged 15-22 years who were selected through purposive sampling, emphasizing basic artistic creation competency proficiency, which prioritizes practical skills and communication of musical artistic ideas [29]. The independence in transmitting knowledge possessed by the Tubaba Art School as an environment-based non-formal educational institution provided this research with fertile ground for its application. The first five weeks were focused on observation and identification of environmental issues through the preparation of the conceptual framework integration; subsequently, the second five weeks were dedicated to the implementation phase based on the established conceptual framework.

Based on the division of roles and functions of the integrated theoretical frameworks, the implementation model is divided into three stages. The first stage (pre-creation) specifically adapts the Soundtalking method to facilitate the formation of FPNC. This stage was conducted in the first week of the implementation phase, consisting of sound exploration and concluding with a reflective circular discussion session. This stage aimed for the growth of personal values, beliefs, and desires about nature from the participants' correspondence in the exploration, which were then guided to transform into collective keywords as a manifestation of shared understanding. The formed keywords and collective understanding then underpinned the collaborative music creation.

The second stage (collaborative creation) was conducted from the second to the fifth week. Through collaborative creation, where alignment between intellectual and emotional aspects occurs, this stage targets the transformation of the elements of value, belief, and personal desire into an imaginative model, concept, method, and its application in music [20]. All of Stout and Keast's Collaboration Principles are intensively present in this stage. The principles of power-with and shared goals are realized in collective artistic decision-making and the selection of creation methods. This creation stage focuses on the integrative realization of the work, emphasizing complementary role division and fostering an awareness of interdependence. Simultaneously, the researcher plays a role in synthesizing the jointly agreed artistic decisions, which is a form of facilitative leadership. This collaborative process aims to deepen the meaning and emotional bonds with nature in each participant [13].

Still in the fifth week, the third stage (post-creation) contains a work presentation and reflective discussion which becomes the peak of integration and validation in this artistic process. A reflective discussion session in the format of a focus group discussion (FGD) is also presented to provide a space for articulating participants' experiences and to validate the interim analysis conducted by the researcher. The interim analysis includes tracking the emergence of FPNC to its transformation into a collaborative music work through the elements of the Music Paradigm of Creativity. Thus, it can be concluded that these three implementation stages form an epistemic continuum supported by the internal logic of mutually reinforcing theoretical framework integration.

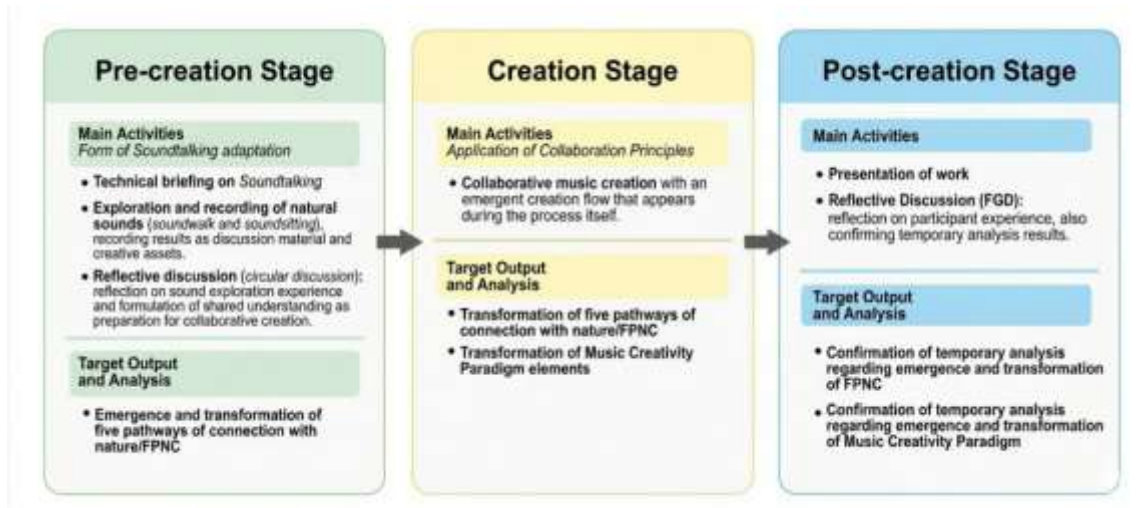


Fig. 2. Implementation Model of Nature-Based Collaborative Music Creation Workshop

Collecting and Analyzing Datas

Based The collected data is divided into primary and secondary sources. Primary data was obtained through immersive participant observation, with the researcher fully involved as an artist-researcher. Key sources include field notes from the workshop and transcripts of the final focus group discussion (FGD), which captured participants' experiences. This primary data was supported by multimodal documentation, such as audio recordings of sound explorations and reflective discussions, music demos, video of the final performance, photos of the collaborative process, and sketches of musical constructions. Secondary data from the literature review deepened the interpretation of primary data.

The analysis followed an abductive, iterative process, with data collection and analysis conducted in parallel through ongoing dialogue between empirical findings and the four theoretical frameworks. Initial interim analysis of early primary data (sound exploration recordings, Soundtalking discussions, and field notes) produced a working narrative of the artistic process. This narrative was then developed through iterative thematic coding guided by the five theoretical frameworks. The iterative cycle culminated when reflective data from the FGD was incorporated, after which all data were interpreted and synthesized through triangulation to arrive at the final findings.

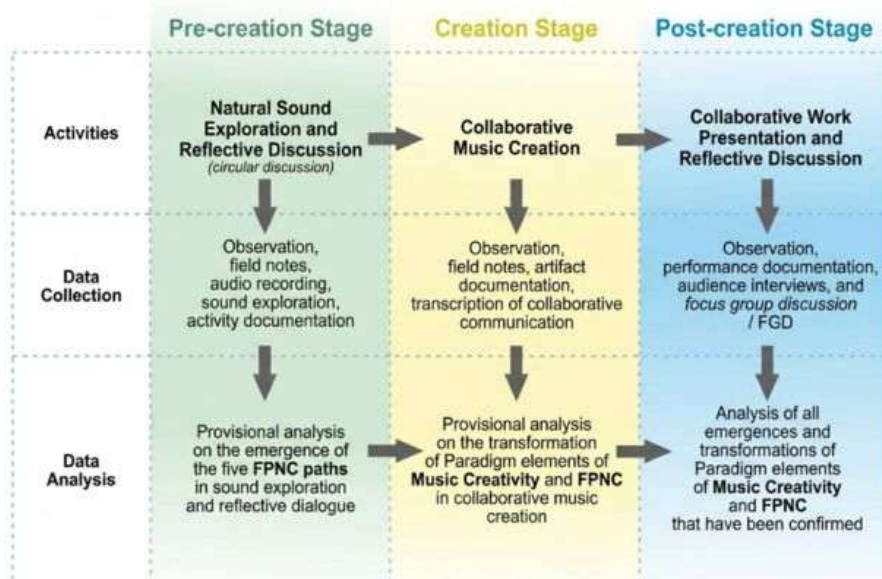


Fig. 3. Data Collection and Analysis System Flow at Each Stage

4. Results and Discussion

Through the five-week implementation phase, this artistic practice produced two musical works that represent the collective outcome, titled “Mulai Bernapas” which is a dance accompaniment instrumental music, and “Rahim Alam”. These works are not only viewed as the final results of the collaborative process, but also as a form of crystallization of the collaborative artistic process holistically. Sensory involvement, artistic negotiation, and reflective dialogue by the participant creators also became the foundation supporting the realization of these works. Therefore, the formation of nature connection cannot only be understood through reading the structure of the musical text, but must also be understood through in-depth analysis of the collaborative artistic process. Thus, the implementation phase is understood as an epistemological site that has continuity of stages and theoretical frameworks within it.

Fostering Five Pathways to Nature Connection through Soundtalking Adaptation

The pre-creation stage specifically adapted the Soundtalking method, which consists of sound exploration and reflective discussion. Over the first week, participants developed listening skills and new understandings of natural sounds, with the growth of the five pathways to nature connection (FPNC) becoming evident within these activities. The sensory experiences and new understanding cultivated through sound exploration were then articulated and expanded through reflective discussions among participants, forming the essential foundation for the subsequent creative work process. The process began with a technical briefing on recording techniques and active listening methods, after which participants dispersed on self-determined routes into the natural landscape, though initial field notes revealed some early challenges in engagement.

To address initial difficulties in deep listening, a mentoring intervention was conducted. At the riverbank, participants were guided to close their eyes and identify the layers of their sonic environment, such as the trickling water (soundmark), chorusing crickets (sound signal), and rustling leaves (keynote), learning how these elements consistently structure a place's soundscape [30]. This intervention led to observable changes. Participant Agil (18), for instance, listened silently to the river for twenty minutes, later describing natural sounds as layered "orchestral music," a description confirming the emergence of the FPNC beauty pathway and illustrating Lumber's [13] concept of "meaning beauty" where aesthetic appreciation intertwines with meaning. Another participant, Dika (17), demonstrated deep engagement by trying to record the soil's presence through insect sounds, explaining his understanding that non-sounding elements support life. This case illustrates the growth of the FPNC meaning pathway through deep sensory contact and the internalization of understanding, aligning with findings that the contact pathway requires such engagement to build meaning [13], [31].



Fig. 4. Documentation of Activities in the Pre-Creation Stage

Following the exploration, a structured reflective discussion session was held. Here, each participant shared experiences and proposed a keyword representing their interpretation of natural sounds. This forum facilitated a meaningful exchange where individual perspectives were broadened through dialogue, exemplified when Gita's (18) view of sounds as "soft and slow" was contrasted with Dika's perception of them as noisy and "chaotic." The discussion also fostered communal emotional resonance, expanding the FPNC emotion pathway. When Angel (19) shared that birdsong made her feel safe, facilitator prompting helped her connect this to specific childhood memories, thereby articulating and enriching the collective affective understanding. From twelve initial proposals, a thematic synthesis through negotiation yielded three unified collective keywords: peace, connection, and tenderness.

The negotiation process was crucial for shaping collective belief and activating deeper pathways. For example, Agil and Gita negotiated their overlapping terms "melancholic" and "soft," coming to see them as complementary facets of a shared experience. This process of expanding meaning together helped unify collective beliefs and enriched personal values about nature, fostering a desire to act through artistic creation [20]. The emergence of this desire signals the activation of the FPNC compassion pathway, a motivation to act [13]. The focused reflective discussion (FGD) at the phase's end reinforced this, with eight of ten participants acknowledging heightened care for nature and motivated involvement. Participant Zakwan's shift from passive following to an active desire to contribute and educate through music reflects this moral regard for nature, aligning clearly with the compassion pathway.

In summary, the first implementation stage illustrates a coherent epistemic transformation. It begins with physical and sensory contact with nature, facilitated by adapted Soundtalking activities and mentor guidance, which successfully fostered the FPNC contact and beauty pathways. This engagement enabled participants to perceive natural beauty and construct personal and shared meanings. Through reflective dialogue, personal values were articulated, negotiated, and synthesized into collective keywords and understanding, simultaneously catalyzing individual belief and activating the compassion pathway. Consequently, this pre-creation stage functioned as a vital epistemological site, equipping the group with the essential collaborative resources of shared keywords, collective understanding, unified belief, and common motivation for the creative work to follow.

Emergent Collaboration and Creative Transformation in Music Making

This second stage applied all Collaboration Principles as purposeful interventions to translate the collective keywords into a technical orientation for music creation. The process began emergently through dialogue, where each participant formed an imaginative musical model based on prior reasoning about natural sounds [31]. These individual models were articulated as personal proposals and then negotiated into a collective musical concept. For example, Gita proposed a "flowing" and "serene" character, while Dika suggested added percussive interplay to better represent the keyword "connection." Another participant, Janu, proposed an opening with a static drone harmony inspired by Indian classical music. During this design phase, Dika strategically proposed creating two distinct musical works to accommodate conceptual complexity and enhance communication, a proposal approved by all participants. The evolving shared concept was documented and detailed into an operational design framework, ultimately formulating two concepts: an instrumental piece embodying "peace" and "connection," and a lyric-based song centered on "tenderness" as ecological concern.

To realize these concepts, a jamming based exploration method was collectively chosen. Participants then divided instrumental roles strategically, utilizing instruments from acoustic guitars to local Tubaba instruments. This shift from a planned practical session to a participatory conceptual forum demonstrated the emergent collaboration principle in action, granting participants autonomy. Other principles like power

with and facilitative leadership fostered an open, negotiatory ecosystem, contributing to the transformation of elements within the Music Paradigm of Creativity by converting individual models into a collectively agreed upon concept and method.

The translation of the shared concept into musical expression involved participants reasoning about the agreed musical characteristics. This cognitive process aligns with Atkinson and Shiffrin's memory model, where sensory input from natural sounds and the shared concept is processed into memory and then accessed to shape musical expression [32]. This translation deepened the FPNC meaning pathway through elaborative rehearsal, where understanding of nature was linked and re-signified with existing knowledge before musical expression [33]. For instance, participant Angel proposed using the maqam hijaz scale for "Mulai Bernapas" because it reminded her of the calm from Quranic recitation, relating the artistic concept to pre-existing sensory-emotional memory and thereby deepening both meaning and emotional bonds (FPNC emotion). This aligns with mechanisms of cognitive appraisal, where translating understanding into active musical expression strengthens emotional connections to nature [34].



Fig. 5. Vocal Melody Pieces with Hijaz Maqam Scale

A different pattern of deepening occurred in the lyric writing for "Rahim Alam," where the abstract keyword "tenderness" was transformed into concrete, metaphorical lyrics critiquing ecological exploitation. This active symbolic expression deepened meaning through personal reflection. This final creation stage marked the emergence of sound as epistemic reality and the transformation of the musical concept into applied works, further deepening the emotion and meaning pathways. It also confirmed that Collaboration Principles governed both interaction and working methods; the integrative process was realized as guided jamming, and interdependence was ensured through role division, affirming that every participant's contribution was essential to the substance of the final musical works.

Promoting Nature Connection through Artistic Output and Validation

The post creation stage, comprising work presentation and reflective discussion, was conducted in the fifth week. The works "Mulai Bernapas" and "Rahim Alam" were performed in a theatrical music event titled "Nature's Uterus," alongside other works by MBKM research participants from ISI Surakarta. "Mulai Bernapas" served as dance accompaniment to open the event, while "Rahim Alam" was presented as the musical climax and finale. Following the performance, a post-show reflective discussion in a focus group discussion (FGD) format was facilitated to explore the creators' experiences and confirm the interim analysis of the pre-creation and creation stages.

Brief interviews with audience members were conducted to gauge how effectively the works communicated and promoted shared understanding of nature. The results confirmed that the collective understanding embedded in the works was successfully conveyed. A local artist (38 years old) stated that the first piece, "Mulai Bernapas," evoked a serene and delicate atmosphere with a "desert-like" nuance, and the mood shifted to become more spirited and lively in the middle section, possibly due to the Qtik instrument. This response indicates that the audience perceived the essence of the keywords "peace" and "connection" built into the work. Interviews with three other audience members (aged 20-29) also confirmed that listening to and understanding the lyrics of "Rahim Alam" made them recall ongoing environmental issues in Indonesia, demonstrating that the theme of ecological concern was successfully communicated.

This stage successfully achieved its outcomes: audience confirmation of the values conveyed in the works and validation of the interim analysis through reflective discussion with participants. The interview results confirmed that the created works were able to communicate and promote the substance of nature connection to the audience, such as the values of peace, connection, and tenderness manifested in the lyrical themes. The post-performance reflective discussion successfully confirmed the interim analysis regarding the interaction of theoretical frameworks applied in the collaborative creation process. This discussion validated and elaborated on the interim findings concerning the role of Collaboration Principles and the Soundtalking method in eliciting the five pathways to nature connection (FPNC), and their subsequent transformation into musical works through the Music Paradigm of Creativity. The confirmation of the interim analysis comprises the overall research findings.

Analysis of the Collaborative Information Processing Model

Compared to other creation forms, collaborative art making involves a distinct information processing dynamic where each individual plays a vital role in building collective understanding and determining the final work [35]. Therefore, the output of a collaborative process is inseparable from the information processing undertaken by each participant. By examining individual processing, we can understand how information transforms into a work in collaborative activities. A visual model has been presented to explain the processing pattern in the collaborative creation workshop.

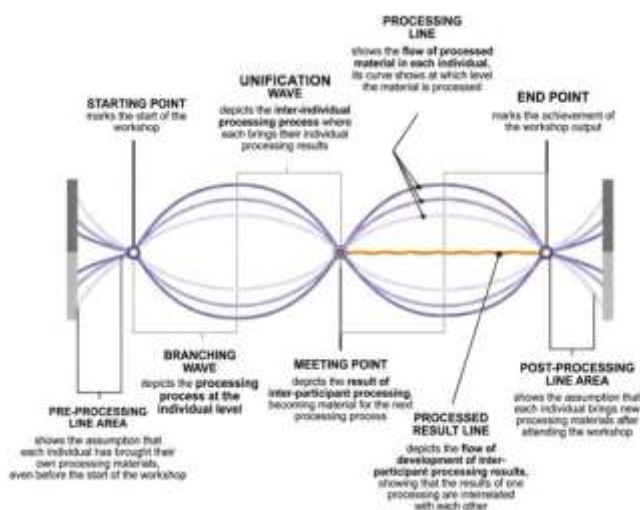


Fig. 6. Collaborative Information Processing Model Anatomical Visualization

The processing in the workshop is depicted as two interacting waves: a branching wave (individual level processing) and a unification wave (group level processing). A meeting point symbol at the end of both waves represents the outcome of group processing, which is then cyclically reprocessed at individual and group levels until the desired artistic output is achieved. Mapping this processing pattern for stimuli like natural sounds or musical concepts reveals how natural sound information can elicit FPNC, transform through elements of musical creativity, and ultimately become a musical work. This sequential and comprehensive pattern across all workshop stages indicates a dynamic interaction between the theoretical frameworks of the Music Paradigm of Creativity, FPNC, and collaboration principles. In each branching wave, individuals actively assimilate and translate processing material (stimulus/information), producing proposals that are then collectively processed in the unification wave. The unification wave signifies a dialectical space where individually processed results are negotiated and developed together. Collaboration Principles play a major role in sustaining this dialectic. Power with, supported by facilitative leadership, drives an integrative process and ensures all participant contributions yield an output at the meeting point.

This repetitive cycle also deepens the FPNC meaning and emotion pathways that emerge from the entire processing sequence.

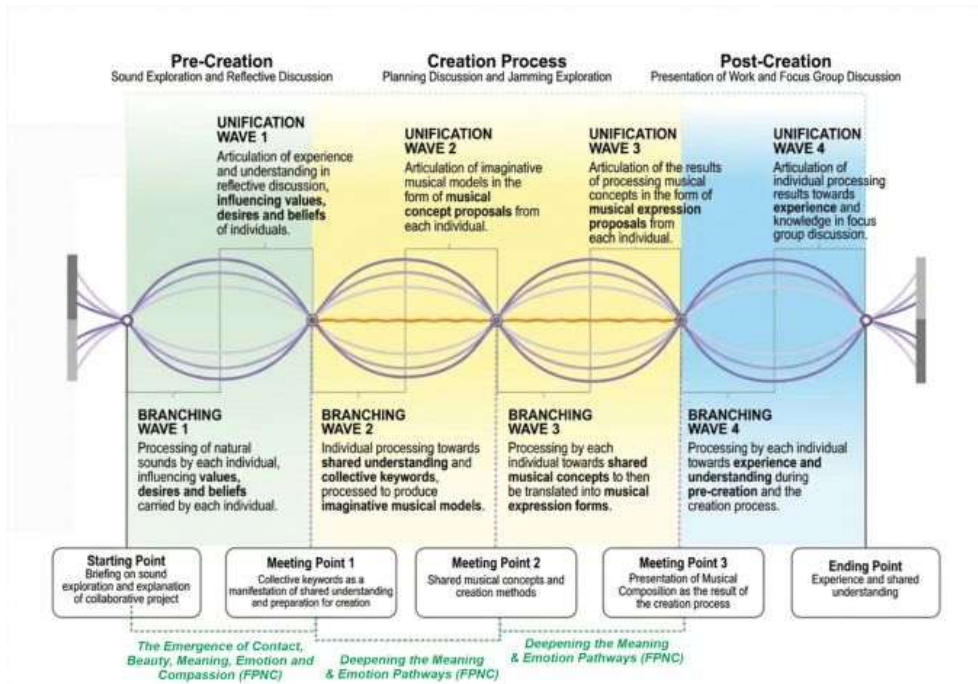


Fig. 7. Visualization of Collaborative Information Processing Model in All Implementation Stages

Through this process mapping, we see how the interaction of theoretical frameworks shapes transformation within the collaborative information processing model. Specifically, this interaction forms a transformation flow from contact with natural sound to an artistic output and new internalized participant experiences. The flow comprises:

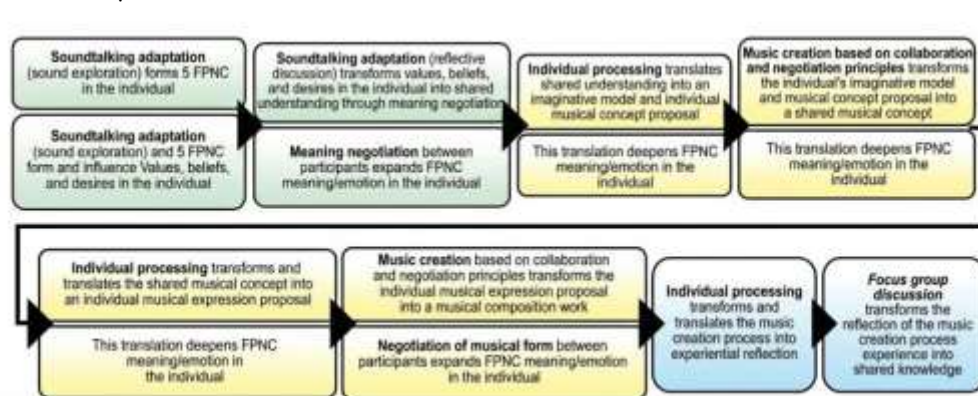


Fig. 8. Nature Connection Transformation Flow in All Implementation Stages

- The process begins with natural sound exploration (adapted Soundtalking), forming the five pathways to nature connection (FPNC) in individuals, indirectly influencing their pre-existing elements of value, belief, and desire.
- Through reflective discussion (adapted Soundtalking), negotiation and meaning expansion occur to form collective keywords as shared understanding. This inter-participant negotiation and meaning expansion also deepens the FPNC meaning and emotion pathways (emotional deepening occurred for some participants).

- c. The emergent Collaboration Principle shapes a discussion process that triggers the processing of shared understanding at the individual level into imaginative models and musical concept proposals. These proposals are then reprocessed at the group level, evolving into a shared musical concept.
- d. The shared musical concept is reprocessed at the individual level into proposals for musical expression, which are then processed at the group level through negotiation and development. This cycle repeats until a complete musical composition is formed.
- e. The entire creation process concludes with individual reflective processing articulated in the FGD. This discussion then forms shared knowledge as an output alongside the musical composition.

Analysis of the resulting compositions further confirms the transformational interaction between the theoretical frameworks. The analysis tracks the manifestation of collective keywords as shared understanding within the works, as summarized in the following table:

Table 4. Empirical Manifestation of Collective Understanding in the Musical Outputs

Collective Keyword	Work	Location in Video	Adapted Implementation
Peace	"Mulai Bernapas" - 02:43	00:07	Static drone harmony from a keyboard accompanying a vocal melody in hijaz maqam scale, confirmed to create an atmosphere of peace.
Connection	"Mulai Bernapas" 04:12 - 06:00		Interlocking patterns between Qtik instruments and guitar melodies accompanying a call-and-response vocal melody, confirmed by participants to depict connection and the interwoven nature of environmental sounds.
Tenderness	"Rahim Alam" lyrics	Entire	Manifested as the central theme in the song lyrics, concerning ecological damage and highlighting exploitative human behavior towards nature as its cause.

Video documentation of the performance can be accessed at:

<https://drive.google.com/drive/folders/1kydpeuey4mCA8Nf5-1yqd7hMIOAY7uXw?usp=sharing>

5. Conclusion

This research successfully formed and implemented a model for a nature based collaborative music creation workshop, proving its capacity to cultivate and strengthen the pathways to nature connection (FPNC). Through the integration of FPNC, Soundtalking, Collaboration Principles, and the Music Paradigm of Creativity, the study provides a theoretical framework for understanding the transformation from emerging nature connection into collaborative musical works. The integrated model, structured across pre-creation, creation, and post creation stages, established a dynamic epistemic continuum. The adapted Soundtalking method in the pre-creation stage, through sound exploration and reflective discussion, fostered FPNC pathways and shaped participants' values, beliefs, and desires, resulting in collective keywords that served as the foundation for collaborative creation.

The collaborative creation stage involved continuous individual and group processing, yielding two musical works, "Mulai Bernapas" and "Rahim Alam," which embodied the collective understanding. This process not only produced artistic outputs but also expanded ecological understanding and deepened the FPNC meaning and emotion pathways. Audience validation confirmed the works successfully communicated and promoted shared values of nature connection, demonstrating the model's practical application and its

theoretical contribution in showing how integrated frameworks can elicit, develop, and transform FPNC into artistic collaboration.

The role of the researcher as both facilitator and artist researcher was acknowledged as significantly influential in shaping the workshop's outcomes, operating within a dual capacity that bridged guidance and creative practice. However, clear boundaries were maintained to prevent the dominance of the researcher's artistic will, ensuring all interventions remained strictly facilitative. This approach empowered participants to retain full authority over artistic decisions and the creative direction, aligning with the core Collaboration Principles of shared power and emergent structure. Consequently, while this study establishes a foundational model, it highlights the necessity for further research to rigorously test the model's effectiveness, reliability, and validity. Specific future efforts should include applying and evaluating the implementation model and the collaborative information processing model across diverse environmental settings and varying durations of engagement. Such research is essential to understand the long term sustainability of the FPNC pathways cultivated in participants and to ascertain the model's adaptability and broader impact.

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