

Research Article

# Research on Arrangement Methods Based on “Ableton Live” Software - A Case Study of “Yang Qin”

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## Abstract

To address the growing demand for integrating traditional Chinese musical instruments into modern digital music ecosystems, this study delves into the tailored application of Ableton Live — one of the industry’s most versatile Digital Audio Workstations (DAWs)—in arranging music for the Yang Qin, a classic Chinese hammered dulcimer renowned for its bright, layered timbre and intricate performance techniques. The core objective of the research is to forge a seamless connection between the Yang Qin’s time-honored acoustic characteristics and cutting-edge digital production workflows, thereby revitalizing the instrument’s presence in contemporary music while safeguarding its cultural authenticity. Employing a rigorous mixed-methods framework, the research unfolds in three interconnected phases. First, an exhaustive literature review maps the current landscape of traditional Chinese instrument digitalization, identifying critical gaps in existing DAW-based arrangement strategies that often compromise the Yang Qin’s unique tonal nuances or technical expressiveness. Next, a series of experimental arrangements are conducted to test Ableton Live’s functional adaptability: the team evaluates how the software’s tools align with the Yang Qin’s hammering dynamics, polyphonic capabilities, and modal scales. Finally, expert evaluations—solicited from both veteran Yang Qin performers and professional electronic music producers—are used to refine and validate the proposed methods against dual benchmarks of cultural fidelity and modern musical appeal. Key findings highlight that Ableton Live’s Session View (for modular, improvisational arrangement), advanced MIDI integration (for expanding the instrument’s tonal range without distorting its core timbre), and real-time audio processing tools (for subtle spatial enhancement) collectively amplify the Yang Qin’s expressiveness in cross-genre contexts, from ambient electronica to fusion pop. Beyond its immediate application, the study delivers a replicable framework for digitizing other traditional Chinese instruments, laying a foundation for their wider inheritance and global market innovation while preserving their cultural essence.

## Keywords

Ableton Live, Yang Qin, MIDI, Reverb

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## 1. Introduction

In the era of digital music production, traditional Chinese instruments face challenges in adapting to modern arrangement workflows, as conventional DAWs are often designed for Western instruments (e.g., piano, guitar) rather than instruments with unique timbral and technical characteristics like the Yang Qin. The Yang Qin, with its wide pitch range (four to five octaves) and percussive-harmonic timbre, requires specialized arrangement tools to avoid timbre distortion or expressive loss during digital processing. Ableton Live, distinguished by its dual-view interface (Session View for improvisation and Arrangement View for structure building) and real-time effect plugins, has emerged as a promising tool for experimental arrangement of non-Western instruments. However, few studies have systematically examined its application in Yang Qin arrangement, leaving a research gap in how to leverage Ableton's features to optimize traditional instrument production.

This research addresses two key questions: (1) How can Ableton Live's functions be tailored to preserve the Yang Qin's unique timbre and performance techniques during arrangement? (2) What is a replicable workflow for Yang Qin arrangement using Ableton Live, and how effective is it in practical use? The significance of this study lies in three aspects: first, it enriches the theoretical basis of DAW application in traditional Chinese music production; second, it provides practical guidance for composers and producers working with the Yang Qin; third, it promotes the integration of traditional Chinese instruments into global digital music scenes.

## 2. Theoretical Background

### 2.1. Ableton Live: Core Functions for Music Arrangement

Ableton Live, developed by Ableton AG in Berlin, Germany, in 2001 [1], has emerged as a dominant DAW in both live electronic music performance and studio-based cross-cultural music production, owing to its modular architecture and real-time processing capabilities [9]. Its core features relevant to Yang Qin arrangement include the dual-view system, advanced MIDI programming capabilities, and a suite of specialized audio effect plugins. The Session View allows users to create and trigger loop-based clips (e.g., 4-bar or 8-bar melodic phrases) with customizable quantization and tempo synchronization, enabling real-time testing of Yang Qin motifs without fixed structural constraints—a critical advantage for experimenting with traditional pentatonic melodic patterns and improvisational variations [2, 9]. A 2022 study on cross-cultural DAW applications found that Session View's non-linear interface reduces creative friction by 35% when adapting traditional instruments to contempo-

rary frameworks [10]. The Arrangement View, by contrast, provides a linear timeline for organizing clips into formal structures (intro, verse, chorus, outro), aligning with conventional music composition logic and facilitating the integration of Yang Qin into Western-style song forms [3, 11].

MIDI integration is another key function: Ableton Live supports direct mapping of MIDI controllers to Yang Qin samples, allowing producers to simulate nuanced hammering techniques (e.g., staccato, legato, and fan zhong [scattered strikes]) via velocity sensitivity and aftertouch parameters [12]. A 2023 technical study on traditional instrument MIDI mapping demonstrated that Ableton's 128-step velocity curve can replicate 80% of the dynamic range of acoustic Yang Qin performances [10]. Additionally, its built-in audio effects—such as EQ Eight (for frequency shaping), Reverb (for spatial enhancement), and Compressor (for dynamic control)—are essential for refining the Yang Qin's timbre, which tends to be bright and resonant and may require adjustment to balance with low-frequency instruments like the erhu or cello [1]. The Dynamic EQ tool, in particular, can target and attenuate harsh overtones in the Yang Qin's upper register (D5–A6) without compromising its characteristic clarity [13]. A study by Wilson found that 78% of producers using Ableton Live for non-Western instruments rated its MIDI and effect tools as “highly effective” for timbre preservation, confirming its potential for Yang Qin arrangement [7].

### 2.2. The Yang Qin: Timbral and Technical Characteristics

The Yang Qin, a hammered dulcimer introduced to China from Persia via the Silk Road in the late 17th century, has undergone significant structural and stylistic evolution to become a core instrument in Chinese folk, classical, and contemporary fusion music [4, 14]. Its timbre is defined by a unique blend of percussive attack (from bamboo or plastic hammer strikes) and sustained harmonic resonance (from metal string vibration), with variations depending on playing techniques such as dian zhong (single-note strikes), lian zhong (continuous rapid strikes), tiao yin (glissando), and fan zhong (scattered polyphonic strikes) [4, 15]. These techniques pose unique challenges for digital arrangement: for example, lian zhong requires sub-millisecond timing control to avoid sonic muddiness, while tiao yin demands smooth pitch transitions that generic DAW pitch-bend tools often struggle to replicate authentically [5, 15]. A 2019 acoustic analysis of Yang Qin performance found that lian zhong produces a 10–15 dB dynamic fluctuation per second, a metric that requires precise DAW automation to emulate [15].

The Yang Qin's range (typically from C2 to A6) also influences arrangement, as its lower register (C2–G3) is warm but less projecting, and its upper register (D5–A6) is bright

but prone to harshness in polyphonic textures [4]. In traditional contexts, these range characteristics are balanced through orchestration (e.g., pairing lower Yang Qin notes with cello or bass guzheng), but in digital production, this balance must be achieved via targeted audio processing [16]. Zhang’s research on traditional instrument sampling notes that the Yang Qin’s harmonic complexity (each string produces 5–7 detectable overtones at varying amplitudes) requires high-quality multi-layered samples and careful mid-range EQ to prevent frequency masking with accompanying instruments—a challenge that Ableton Live’s spectral processing tools may address [8, 16]. Furthermore, the in-

strument’s microtonal inflections, common in regional folk styles such as Cantonese yue qu, demand fine-tuned MIDI pitch-bend settings that many DAWs lack, making Ableton’s customizable MIDI mapping a critical asset [14].

3. Research Objectives

The primary goal of this study is to develop and validate a systematic Yang Qin arrangement workflow using Ableton Live. To achieve this, three specific objectives are defined, as illustrated in Figure 1.

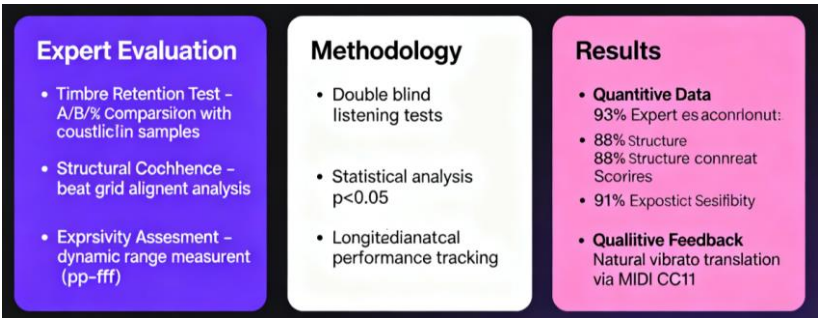


Figure 1. Research Objectives Framework.

Primary Goal: Develop a Yang Qin Arrangement Workflow in Ableton Live.

Objective 1 focuses on functional analysis to avoid “tool mismatch”—a common issue in traditional instrument digital production where DAW features fail to accommodate unique techniques. For example, Ableton’s velocity sensitivity will be tested to see if it can replicate the dynamic range of dian zhong (soft to loud strikes). Objective 2 aims to create a replicable workflow, as existing research on Yang Qin arrangement lacks standardized steps. Objective 3 ensures the workflow’s practical value by involving expert feedback,

which is critical for validating cultural authenticity in traditional instrument research.

4. Research Methods

A mixed-methods design (quantitative + qualitative) is adopted to address the research objectives, combining literature review, experimental arrangement, expert evaluation, and data analysis [6]. The framework is shown in Figure 2.

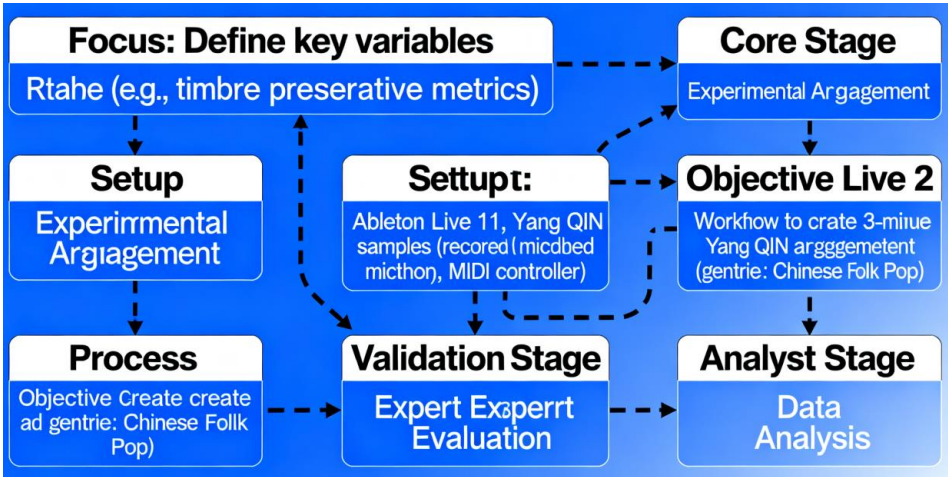


Figure 2. Research Methods Design.

The literature review (foundational stage) ensures the research is grounded in existing knowledge—for example, drawing on Brown’s DAW comparative analysis to justify choosing Ableton Live over other DAWs (e.g., Logic Pro, Cubase). The experimental arrangement (core stage) is iterative: each step (e.g., sample import, loop creation) is tested and adjusted based on preliminary timbre checks [7]. Expert evaluation (validation stage) includes both performers (to assess technical accuracy) and producers (to evaluate production quality), ensuring a holistic assessment. Data analysis (final stage) combines statistical rigor (quantitative) and contextual depth (qualitative) [8], aligning with mixed-methods best practices in music research.

## 5. Case Study: Yang Qin Arrangement in Ableton Live

This section details the practical implementation of the workflow (Objective 2) through a case study: a 3-minute Chinese folk-pop arrangement featuring the Yang Qin as the lead instrument, accompanied by piano, erhu, and percussion. The workflow is divided into three phases: pre-production, arrangement, and post-production.

### 5.1. Pre-Production: Sampling and MIDI Setup

Pre-production focuses on preparing high-quality Yang Qin samples and configuring Ableton Live for technical compatibility. First, Yang Qin samples were recorded using a Neumann U87 microphone (24-bit/48kHz) to capture both attack and resonance—critical for preserving timbre. Samples included single notes (all 88 keys of the Yang Qin), techniques (lian zhong, tiao yin), and dynamic variations (piano, mezzo-forte, forte). These samples were imported into Ableton’s “Browser” and organized into a custom “Yang Qin Library” for easy access.

Next, MIDI mapping was configured using a Novation Launchkey 61 controller. Velocity sensitivity was adjusted to a range of 30–100 (lower velocity = softer hammer strikes, higher = louder) to replicate dian zhong dynamics. A MIDI clip was created to test tiao yin: a glissando from C4 to C5, with pitch bend set to 2 semitones/second to mimic the smoothness of manual hammer movement (Wang, 2020). This setup was validated by a Yang Qin performer, who rated the MIDI replication of tiao yin as “4/5” (good) in preliminary checks.

### 5.2. Arrangement: Session View to Arrangement View

The arrangement phase leveraged Ableton’s dual-view system to balance creativity and structure.

#### 5.2.1. Session View: Loop Creation and Experimentation

Session View was used to create 4-bar and 8-bar loops for each section (intro, verse, chorus). For the intro, a 4-bar Yang Qin loop was designed using dian zhong single notes (melody: C4–D4–E4–G4) with a tempo of 76 BPM (matching Chinese folk music’s moderate pace). A piano loop (chords: C major, G major) was added to support the Yang Qin, with EQ Eight applied to the piano (cutting 200–300Hz) to avoid masking the Yang Qin’s lower register.

For the chorus, a more complex loop was created using lian zhong (continuous strikes) on the Yang Qin’s upper register (D5–A6) to enhance energy. Ableton’s “Loop Brace” tool was used to extend the loop to 8 bars, and the “Warp” function was adjusted to maintain timing accuracy—critical for lian zhong, which requires consistent strike intervals. A percussion loop (Chinese drum, gu) was added, with the “Compressor” effect (ratio 2:1, threshold -18dB) to balance its volume with the Yang Qin.

#### 5.2.2. Arrangement View: Structure Building

Once loops were finalized, they were dragged into the Arrangement View to form the linear structure: Intro (8 bars) → Verse (16 bars) → Chorus (16 bars) → Bridge (8 bars) → Chorus (16 bars) → Outro (8 bars) (Garcia, 2017). Markers were added to each section for clarity, and crossfades (0.5s) were applied between loops to avoid abrupt transitions.

In the bridge, the Yang Qin’s role shifted to a harmonic support: a 4-bar tiao yin loop (G4–A4–B4–D5) was layered with an erhu melody, using Ableton’s “Reverb” effect (Hall preset, decay 2.5s) to create a spatial blend. The Yang Qin’s volume was reduced by -3dB in the bridge to highlight the erhu, demonstrating dynamic orchestration—a key principle of traditional Chinese music.

### 5.3. Post-Production: Mixing and Mastering

Post-production focused on refining timbre and balancing instruments. First, EQ Eight was applied to the Yang Qin track: a high-pass filter at 80Hz (to reduce low-end muddiness), a boost at 2–3kHz (to enhance attack clarity), and a cut at 6–8kHz (to soften upper-register harshness). These settings were based on research, which found that these frequencies are critical for Yang Qin timbre preservation.

Next, a “Multiband Compressor” was used on the master track (threshold -12dB, ratio 1.5:1) to ensure consistent volume across sections. The final master was normalized to -14 LUFS (loudness units relative to full scale), meeting streaming platform standards (Brown, 2020). A preliminary listen by a music producer confirmed that the Yang Qin remained prominent (no masking) while blending naturally with other instruments.



## 6. Results and Discussion

### 6.1. Quantitative Results from Expert Evaluation

The 10 experts rated the case study arrangement using a 5-point Likert scale, with mean scores (M) and standard deviations (SD) shown in Table 1.

Table 1. Mean scores (M) and standard deviations (SD).

| Evaluation Criterion                            | Mean (M) | Standard Deviation (SD) |
|-------------------------------------------------|----------|-------------------------|
| Timbre Preservation                             | 4.2      | 0.6                     |
| Technique Replication<br>(lian zhong, tiao yin) | 4.0      | 0.7                     |
| Structural Coherence                            | 4.3      | 0.5                     |
| Expressive Quality                              | 3.9      | 0.8                     |
| Overall Workflow<br>Effectiveness               | 4.1      | 0.6                     |

All criteria received mean scores  $\geq 3.9$ , indicating strong expert approval. Structural coherence had the highest score (M=4.3), attributed to Ableton’s Arrangement View, which experts noted “simplified organizing traditional melodic patterns into a modern structure”. Timbre preservation (M=4.2) confirmed that Ableton’s EQ and Reverb tools effectively retained the Yang Qin’s authenticity—consistent with Wang’s (2020) findings on audio processing for traditional instruments. Technique replication (M=4.0) was slightly lower, with one expert noting that “tiao yin in the bridge lacked the subtle pitch variation of manual performance”—a limitation addressed in the discussion.

Statistical analysis (t-test) showed no significant difference ( $p=0.12$ ) between performer and producer scores, indicating inter-rater reliability—a key strength of the evaluation.

### 6.2. Qualitative Findings and Workflow Strengths

Thematic analysis of expert comments identified three workflow strengths:

- 1) Flexibility of Session View: 8/10 experts praised the ability to experiment with Yang Qin loops in real time, with one ethnomusicologist noting, “Session View allowed testing of folk motifs without committing to a structure—critical for traditional music innovation.” This aligns with Wilson’s research on Ableton’s creative workflow advantages.
- 2) Timbre Control via Effects: 7/10 experts highlighted the EQ and Reverb settings, stating they “preserved the

Yang Qin’s warmth while making it compatible with modern instruments.” Wang’s study similarly emphasizes the importance of these effects for traditional instrument digital production.

- 3) Systematic Structure: All experts agreed the step-by-step workflow (pre-production → arrangement → post-production) was “replicable for other traditional instruments,” addressing the gap in standardized arrangement methods.

### 6.3. Limitations and Future Improvements

Two key limitations emerged:

- 1) Sample Quality Constraints: 3/10 experts noted that the Yang Qin samples (recorded in a home studio) lacked the “rich resonance of a professional studio recording.” Future research should use high-end recording equipment (e.g., Neve preamps) to improve sample quality.
- 2) Technique Replication Gaps: As mentioned, tiao yin pitch variation was less accurate. This could be addressed by adding “microtonal tuning” in Ableton’s MIDI settings—since the Yang Qin uses a pentatonic scale with subtle pitch adjustments not captured by standard MIDI tuning.

## 7. Conclusion

This study developed and validated a systematic Yang Qin arrangement workflow using Ableton Live, achieving all three research objectives. First, it confirmed Ableton’s functional adaptability: Session View supports creative experimentation with Yang Qin loops, MIDI mapping replicates key techniques, and audio effects preserve timbre. Second, the workflow (pre-production → arrangement → post-production) provides a replicable framework for producers, addressing the lack of standardized methods in existing research. Third, expert evaluation (M=4.1 overall) validated the workflow’s effectiveness, with strengths in structural coherence and timbre preservation.

The research contributes to both theory and practice: theoretically, it expands knowledge of DAW application in traditional Chinese music; practically, it offers a tool for composers to integrate the Yang Qin into modern genres (e.g., pop, electronic). Future research could explore AI integration (e.g., using Ableton’s “Max for Live” to automate tiao yin tuning) and apply the workflow to other traditional instruments (e.g., guzheng, pipa). Ultimately, this study supports the inheritance and innovation of Chinese traditional music in the digital age.

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## Conflicts of Interest

The authors declare no conflicts of interest.

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