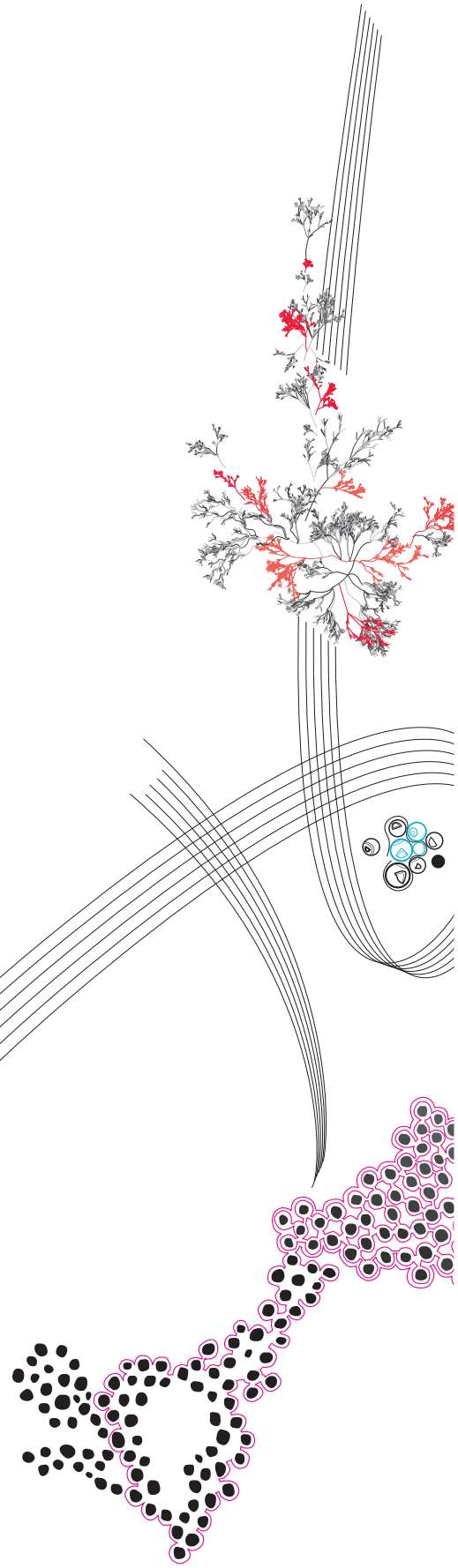

MSc Interaction Technology
Final Project

Interaction Technology Super VJ Pro

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Contents

Abstract

This research presents the development and evaluation of Super VJ Pro, an educational game designed to teach aspiring Visual Jockeys (VJs) the fundamentals of Visual Jockeying (VJing) through a gamified, interactive learning experience. Unlike traditional methods such as YouTube tutorials and software manuals, which often rely on passive learning, Super VJ Pro adopts a performance-first approach, emphasizing hands-on practice and real-time feedback. The game leverages a custom MIDI controller, BitchBoy, to provide an intuitive, tactile interface for users to practice and master essential VJing techniques. By integrating rhythm-based challenges, structured tutorials, and a minimalistic user interface, Super VJ Pro reduces cognitive load while fostering creativity and experimentation.

The research addresses a significant gap in VJ education, as existing tools like Resolume Arena and MIDI controllers are primarily designed for professionals, lacking structured educational features for beginners. Super VJ Pro bridges this gap by offering a step-by-step progression system that guides users through the core tasks of VJing, such as clip launching, effect triggering, and beat synchronization. The game's design is informed by cognitive load theory and gamification principles, ensuring that learning is both accessible and engaging.

Through iterative development and user testing, Super VJ Pro was refined to provide clear, real-time feedback, gradual skill progression, and a seamless transition to professional VJ software. Testing with beginner VJs demonstrated that the game effectively teaches foundational VJing skills, with participants successfully applying their knowledge in Resolume Arena. The findings highlight the potential of gamified learning tools in making complex, creative skills like VJing more accessible to beginners. Future work could explore expanding the game's features, integrating it with professional VJ software, and adapting its design principles to other creative and performative domains.

Keywords: Visual Jockey, gamification, educational tools, cognitive load, creative arts, interactive learning, MIDI controller, performance-first learning.

Chapter 1

Introduction

This research focuses on the development and validation of Super VJ Pro, an educational game designed to teach beginner and aspiring Visual Jockeys (VJs) the fundamentals of VJing using a custom hardware controller, BitchBoy, which was developed alongside Super VJ Pro. Resolume Arena, or Resolume for short, is the current industry standard software in VJing, therefore, the development of BitchBoy and Super VJ Pro, as well as the educational content that the latter entails, are guided by the workflow of the software. Unlike existing methods such as YouTube tutorials and Resolume manuals, which often rely on passive learning, Super VJ Pro adopts a performance-first, gamified approach that emphasizes hands-on practice and real-time feedback. The core claim of this research is that learning to VJ can be made more accessible and effective through a structured, interactive learning environment that bridges the gap between theory and practice. By combining a custom MIDI controller with a game-based learning system, this research aims to lower the entry barrier for beginners while ensuring a seamless transition to real-world VJing scenarios.

1.1 Background Context

VJing involves the real-time manipulation of visuals during live performances, requiring a combination of technical skill and creative improvisation. However, current VJ education largely relies on self-learning through tutorials and trial-and-error, which can be inefficient and demotivating for beginners. Existing tools, such as Resolume Arena and MIDI controllers, are designed primarily for professional use, lacking structured educational features that cater to novices. This creates a significant gap in the market for beginner-friendly solutions that can provide a guided, interactive learning experience.

1.2 BitchBoy

BitchBoy is a custom-designed VJ controller developed as part of a previous research assignment with the University of Twente to provide a dedicated controller for VJs [3]. At the start of the reseach this existed in a non-functional UI mockup state, however throught this research a working prototype was developed in order to provide a physical interface for *Super VJ Pro* and Resolume. Unlike controllers that are used currently, BitchBoy is built to match the specific workflow of VJs, facilitating real-time manipulation of visual elements during live performances. The device includes various inputs, such as sliders, knobs, buttons and a trackpad all mapped to specific visual functions in VJ software like Resolume Arena, which allow VJs to intuitively adjust visuals, synchronize with music, and

apply effects. Its primary role in this research is as the interface through which beginner VJs can learn, practice, and ultimately master essential VJing techniques.

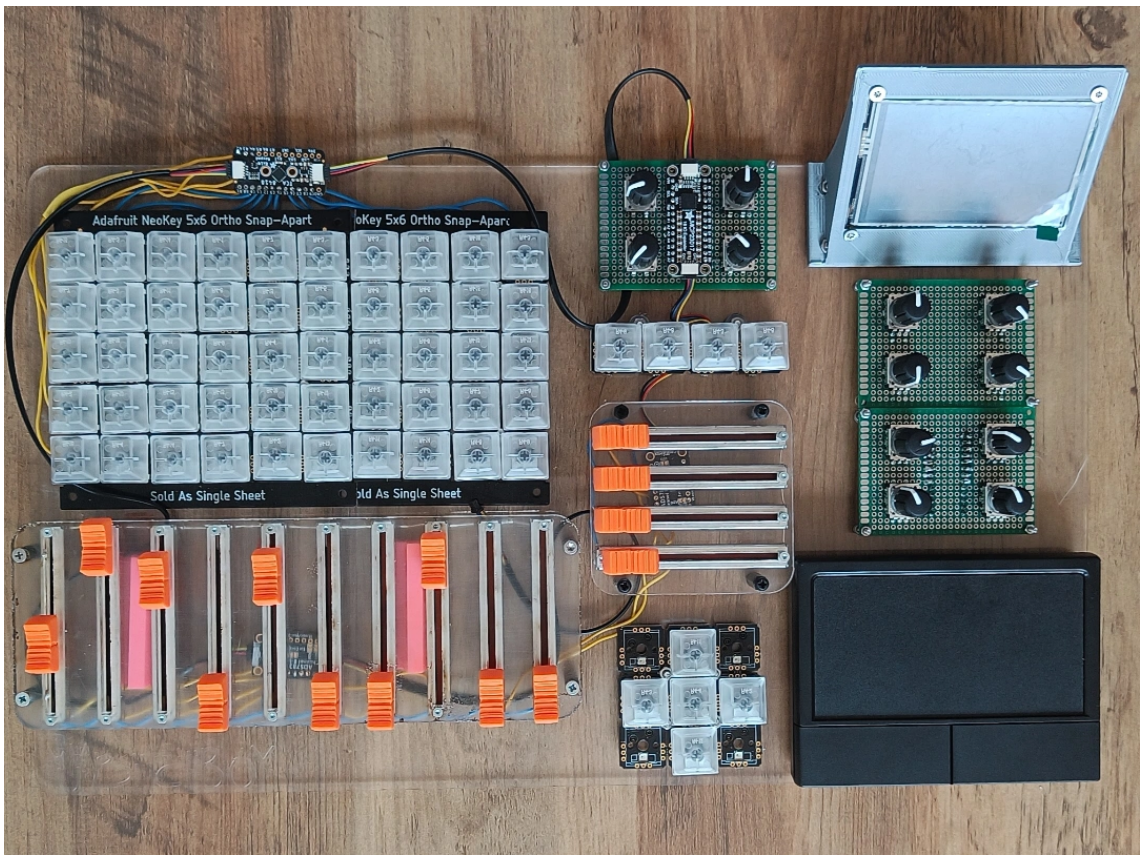

FIGURE 1.1: BitchBoy first Prototype

1.3 The VJ workflow

The VJ workflow, as defined in this research based on previous research [3] [2], includes the primary tasks and actions typically performed by VJs during live performances, within Resolume. Although individual workflows vary, establishing a common VJ workflow based on observations, interviews, and documented research helps when making design choices for Super VJ Pro.

The workflow can be divided into two main phases: Preparation (Prep) and Live Performance. Each phase contains essential tasks and actions that support a cohesive and impactful VJ performance.

1.3.1 Preparation

Before a live performance, VJs engage in a range of preparatory tasks that establish the foundation for their visual sets. These tasks include:

- **Creating Visuals**: Designing or curating video clips, animations, and graphics to be used during the performance.
- **Curating the Show**: Selecting and organizing visual elements, often based on the theme, music genre, or specific requirements of the performance.

- **Adding Effects**: Integrating effects such as color changes, distortion, and visual overlays that can be triggered during the performance to enhance the visual experience.
- **Mapping Screen Outputs**: Configuring the visual outputs for various screens or projection surfaces to ensure optimal display and audience engagement.
- **Mapping MIDI to Controller**: Assigning controls on a MIDI device to various software functions, allowing for efficient and intuitive control of visuals and effects during the performance.

In some cases, VJs also create routines, which are pre-made sequences of clips or longer videos designed to synchronize with the beat of the music. Routines serve as a base layer of visuals that can be complemented by live-triggered effects and adjustments.

1.3.2 Live Performance

During a performance, VJs execute a range of actions that are often synchronized to the beat of the music. These actions vary in frequency and complexity:

- **Clip Launching**: One of the most common actions, involving the triggering of either single clips or routines. Clips may be launched in various modes, such as toggle or gate, and can be triggered as individual layers or in columns, meaning multiple clips can be triggered at the same time and be layered on top of eachother.

FIGURE 1.2: Clip Triggering in Resolume

- **Opacity Adjusting (Fade In/Out)**: Frequently used to blend or transition between visuals, adjusting opacity helps create smooth and dynamic visual changes.
- **Clip Previewing**: Checking clips before they are displayed live to ensure compatibility with the current scene or beat.

- **Effect Triggering**: Initiating pre-configured effects to enhance or modify visuals in real-time.
- **Effect Parameter Adjusting**: Adjusting specific parameters within effects, such as color, scale, or intensity, to tailor the visuals to the performance's mood or energy.
- **Tempo Adjusting**: Adjusting tempo, either by tap or manually, to maintain synchronization with the music.
- **Fine-Tuning Project**: Making adjustments to the visual setup, such as moving clips or effects, to respond to changing performance needs.
- **Speed Adjusting**: Altering the playback speed of visuals to match or emphasize specific moments in the music.

This defined VJ workflow establishes a framework for designing Super VJ Pro's learning environment, ensuring that core tasks and actions essential to real-world VJing are digestible for beginner learners.

1.4 Objectives of the Research

The primary objective of this research is to develop an educational game or tool that teaches beginner and aspiring VJs how to VJ using a gamified, interactive learning environment. This approach aims to make VJing more accessible and engaging for beginners by combining structured tutorials, rhythm-based challenges, and real-time feedback into a fun and intuitive learning experience. The game will guide users through the fundamentals of VJing, integrating real-world VJ techniques into a gamified environment that reduces cognitive load and fosters creativity.

The research focuses on the following key objectives:

- To create a gamified learning environment that makes VJing more accessible and enjoyable for beginners, leveraging game mechanics such as progression systems, scoring, and interactive feedback.
- To design a minimalistic and intuitive user interface that reduces cognitive load and allows users to focus on learning VJ techniques without being overwhelmed by unnecessary complexity.
- To integrate real-world VJ workflows into the game, ensuring that the skills learned are directly applicable to live performances and professional VJ software like Resolume.
- To provide structured yet flexible learning paths that balance foundational skill acquisition with opportunities for creative exploration, allowing users to develop their own style while mastering essential techniques.

This research integrates four core elements to create an educational framework:

- **Resolume Arena**: Industry-standard VJ software used to simulate real-world VJ workflows.
- **BitchBoy**: A custom hardware controller designed specifically for VJing, providing an intuitive physical interface for learners.

- **Custom Game Software**: Developed in Processing, the game offers an interactive, gamified learning environment that emphasizes **performance-first learning**.
- **Curated Visual Content**: Tailored visual assets that support progressive skill development, allowing users to practice and experiment with real-world VJ techniques.

By combining these elements, the research aims to bridge the gap between learning and practice, making VJing more accessible to a wider audience and providing beginners with a supportive, engaging tool to develop their skills.

1.5 Research Questions and Hypotheses

This research is guided by the following questions:

1. How can a game-based approach make learning VJing more accessible and engaging for beginners?
2. What are the key design elements of successful educational games that can be adapted for VJ training?

To address these questions, we propose the following hypotheses:

- **Hypothesis 1**: A game-based approach can make learning VJing more accessible and engaging for beginners by providing structured, interactive, and enjoyable learning experiences. This approach leverages gamification to reduce the cognitive load associated with learning complex VJ techniques, making the process more intuitive and less intimidating.
- **Hypothesis 2**: Existing VJ tools lack the integration of educational elements that make learning through gameplay effective. The proposed tool will fill this gap by combining practical, hands-on learning with engaging gameplay mechanics, such as rhythm-based challenges, real-time feedback, and a minimalistic user interface.

These hypotheses will be tested through the development and evaluation of the educational game, with a focus on user feedback, learning outcomes, and the effectiveness of the gamified learning environment.

Chapter 2

Related Work and Literature

2.1 Introduction to VJing and Educational Challenges

Visual Jockeying (VJing) involves real-time manipulation of visuals during live performances, requiring both technical skill and creative improvisation [3]. However, current VJ training relies heavily on self-learning through tutorials and trial-and-error [4], leading to inefficiencies and demotivation. Existing tools like Resolume Arena and MIDI controllers lack structured educational integration, creating a gap for beginner-friendly solutions [2]. This section reviews literature on gamification, educational tools, and design methodologies to contextualize *Super VJ Pro*'s contribution.

2.2 Gamification in Education

Gamification enhances learning by embedding game mechanics (e.g., scoring, progression) into non-game contexts. Platforms like *Duolingo* use incremental challenges and rewards to motivate language learners [1, 19]. Similarly, *Rocksmith* teaches guitar through rhythm-based gameplay, demonstrating that real-time feedback and gradual skill progression improve retention [7, 17]. However, these tools focus on linear skill acquisition, often neglecting creative exploration—a gap addressed by *Super VJ Pro*'s non-strict grading system.

2.3 Existing VJ Tools and Limitations

Commercial VJ software (e.g., Resolume Arena) and controllers prioritize professional workflows over beginner education [2]. While tools like *VJ Hero* [13] simplify live visuals, they lack structured tutorials. Music games like *Rez Infinite* [16] and *Lumines* [15] blend audiovisual interaction but are not designed for skill transfer to real-world VJing. This underscores the need for a tool that bridges gameplay and practical application.

2.4 Educational Games for Creative Skills

Games like *Synthesia* (piano learning) and *Rhythm Heaven* [12] use minimalistic interfaces to reduce cognitive load while teaching timing and coordination [8]. *DJ Hero* [9] gamifies turntablism but simplifies hardware interaction, limiting real-world relevance. *Super VJ Pro* addresses this by using a custom MIDI controller mirroring professional setups, ensuring seamless transition to live performances.

2.5 Cognitive Load and Multimodal Interfaces

Effective educational tools balance complexity and usability. Zimmerer et al.[20] show that multimodal interfaces (visual/auditory/tactile feedback) reduce cognitive load during skill acquisition. This aligns with *Super VJ Pro*'s design, which uses real-time audiovisual cues (e.g., BPM dots, button highlights) to guide users without overwhelming them. The VARK (Visual, Aural, Read/write, and Kinesthetic) model [6] further supports catering to diverse learning styles through interactive feedback.

2.6 User Interface Design and Player Engagement

The work by Lindström Söraas and Rydgren [11] provides a qualitative investigation into how user interface (UI) design can enhance player engagement in educational games. Their research highlights the importance of intuitive and visually appealing UI design in reducing cognitive load and improving the learning experience. Key findings from their study include:

- **Minimalistic Design**: A clean and uncluttered interface helps players focus on the core gameplay mechanics without being overwhelmed by unnecessary information. This aligns with the design philosophy of *Super VJ Pro*, which uses a minimalistic approach inspired by games like *Rhythm Heaven* [12]. By minimizing text and focusing on clear visual cues, the game ensures that players are not distracted by excessive information, allowing them to concentrate on learning VJing techniques.

- **Real-Time Feedback**: Immediate and clear feedback is crucial for maintaining player engagement and reinforcing learning. Lindstorm and Rydgren [11] emphasize the use of visual and auditory cues to provide instant feedback, a principle that has been integrated into *Super VJ Pro* through dynamic messages like "NICE" and "PRESS BUTTON," as well as audiovisual indicators like BPM dots and scratching sounds. These feedback mechanisms help players understand their performance in real-time, making the learning process more interactive and engaging.

- **Player Motivation**: The study highlights the role of positive reinforcement in keeping players motivated. By rewarding players for correct actions and providing encouraging messages, educational games can create a more enjoyable and effective learning environment. This approach is reflected in *Super VJ Pro*'s scoring system and feedback mechanisms, which prioritize positive reinforcement over punitive measures. For example, players receive messages like "DUDE, AWESOME!" for successful actions, while negative reinforcement is reserved for significant mistakes, such as changing visuals off-beat.

- **Graphical Appeal**:Lindström Söraas and Rydgren [11] stress the importance of graphical appeal in maintaining player interest. A visually appealing interface can significantly enhance player engagement, especially in educational games where motivation is key. In *Super VJ Pro*, the graphical design was carefully crafted to maximize appeal, with vibrant visuals, intuitive layouts, and a consistent aesthetic that aligns with the game's theme. The use of the *BitchBoy* mascot in different variations for button presses adds a layer of visual feedback that enhances the overall experience.

- **Customization and Adaptability**: Lindström Söraas and Rydgren [11] suggest that allowing players to customize their experience can enhance engagement. While

Super VJ Pro currently focuses on a structured progression system, future iterations could explore customizable learning paths to cater to different skill levels and preferences. This could include options for players to adjust the difficulty, choose different visual themes, or personalize the interface to suit their individual learning styles.

The insights from Lindström Söraas and Rydgren [11] have informed several design choices in *Super VJ Pro*, particularly in the areas of UI design, feedback systems, and player motivation. By incorporating these principles, the game aims to create an engaging and effective learning environment for aspiring VJs, ensuring that players not only learn but also enjoy the process of VJing.

2.7 Design Methodologies for Educational Tools

The design thinking process (empathize, define, ideate, prototype, test) ensures user-centered development [5]. [14] emphasize iterative testing in sports interaction technology, a principle applied to *Super VJ Pro*'s four prototypes. Co-design with VJs and beginners ensured alignment with real-world needs Lindström Söraas and Rydgren [11], while Rosenthal and Ratan [18] highlights balancing enjoyment and learning—key to the game's rhythm-based challenges.

2.8 Gaps and Contributions

Prior work neglects structured VJ education with real-world hardware integration. *Super VJ Pro* fills this gap by combining:

- Gamified progression inspired by projects like *Rocksmith* and *Duolingo*,
- A custom controller optimized for VJ workflows [3],
- Real-time feedback informed by cognitive load theory [20].

This combination advances both VJ education and gamified learning research.

Chapter 3

Requirements

3.1 Introduction

This chapter is based on the *Research Topics* report [4], which serves as the foundation for the development of *Super VJ Pro*. The report was structured around literature reviews, expert interviews, and focus group discussions with experienced VJs. The methodology followed a mixed-method approach, with qualitative insights from VJs and game-based learning examples. The objective was to explore how gamification, interactive learning, and real-time feedback can effectively translate VJ training into an engaging and educational gameplay experience.

3.2 Findings

The research examined various educational games, with some major examples being *Rocksmith* and *Synthesia*, to isolate successful teaching methodologies that could be applicable to VJ training.

Interviews and focus groups with VJs also provided significant insights into how professionals and beginners approach VJing.The interviews were transcribed and coded to quantify important themes that can be translated into gameplay features.

The findings indicated that most VJs rely on self-learning through online tutorials or trial-and-error experiences, which can be inefficient and demotivating. Key issues identified include:

The need for hands-on practice with an intuitive controller.

The importance of real-time feedback to refine skills.

The necessity for structured learning that still encourages creative exploration.

Furthermore, the study identified a gap in existing VJ education methods, where traditional tutorials and written guides fail to provide an interactive or engaging experience. This underscores the importance of integrating gameplay mechanics that can apply to different learning styles.

3.3 MoSCoW Prioritization

A **MoSCoW prioritization framework** was applied to determine essential and desirable features for *Super VJ Pro*.

FIGURE 3.1: Themes Overview: The common themes from the interviews and focus group were grouped together to identify potential key mechanics and features of the tool

Emerging Themes and Features Prioritized Using MoSCoW

Priority	Feature
Must-Have	Abstraction instead of tool
Must-Have	Short, informative tutorials
Must-Have	Curation of Visuals
Must-Have	Menu of Lessons
Must-Have	Rhythm Lesson
Must-Have	Effect Lesson
Must-Have	Clear Objective with Reward/Punishment
Must-Have	Constructive Feedback Mechanism
Must-Have	See and Repeat Mechanic
Must-Have	Basic Tools with Creative Freedom
Must-Have	Pre-mappings/Default Mappings
Should-Have	Light/Laser Matching Lesson
Should-Have	Color Synergy Lesson
Should-Have	Start Slow and Gradual Increase in Complexity
Should-Have	Compatibility with Mouse and Keyboard
Should-Have	Fake Venue Mode
Could-Have	Projection Mapping and Stage Design
Could-Have	Challenge Mode
Could-Have	Game Over Mechanic
Could-Have	Virtual Teacher/Mentor VJ
Won't-Have	Additional gameplay challenges
Won't-Have	VR Compatibility
Won't-Have	Virtual DJ/ Virtual Light Engineer

FIGURE 3.2: MoSCoW table of the findigs

3.4 Gameplay Features

The research findings and prioritization framework should be implemented in the core gameplay mechanics. The game will incorporate the following features to enhance learning and engagement:

Step-by-Step Tutorials: Structured lessons that introduce VJing concepts progressively, ensuring accessibility for beginners while maintaining depth for advanced users.

Rhythm-Based Challenges: Tasks that require syncing visuals to beats, reinforcing timing and performance skills essential to live VJing.

Real-Time Feedback System: Continuous evaluation that provides immediate insights into player performance, highlighting strengths and areas for improvement.

Non-strict grading style: The goal is to create an environment where users can freely experiment with visuals, layering, and effects to develop their unique style.

By integrating these elements, *Super VJ Pro* aims to provide a gamified yet structured learning experience, making VJing more accessible and interactive for aspiring and professional VJs alike. The approach balances **skill acquisition** with **creative exploration**, ensuring that players not only learn but also enjoy the process of VJing.

Chapter 4

Methodology

4.1 Hardware

The hardware development began with a non-functional UI mockup, which served as a conceptual prototype for the custom VJ controller. Through iterative refinement, this evolved into BitchBoy, a fully functional custom device designed specifically for VJing. The final version features a custom PCB and a laser-cut enclosure, improving both durability and usability. This hardware evolution was crucial in providing users with a tactile, intuitive interface for practicing essential VJing techniques, such as clip launching, effect triggering, and beat synchronization. The hardware was also subjected to real-world testing in a live

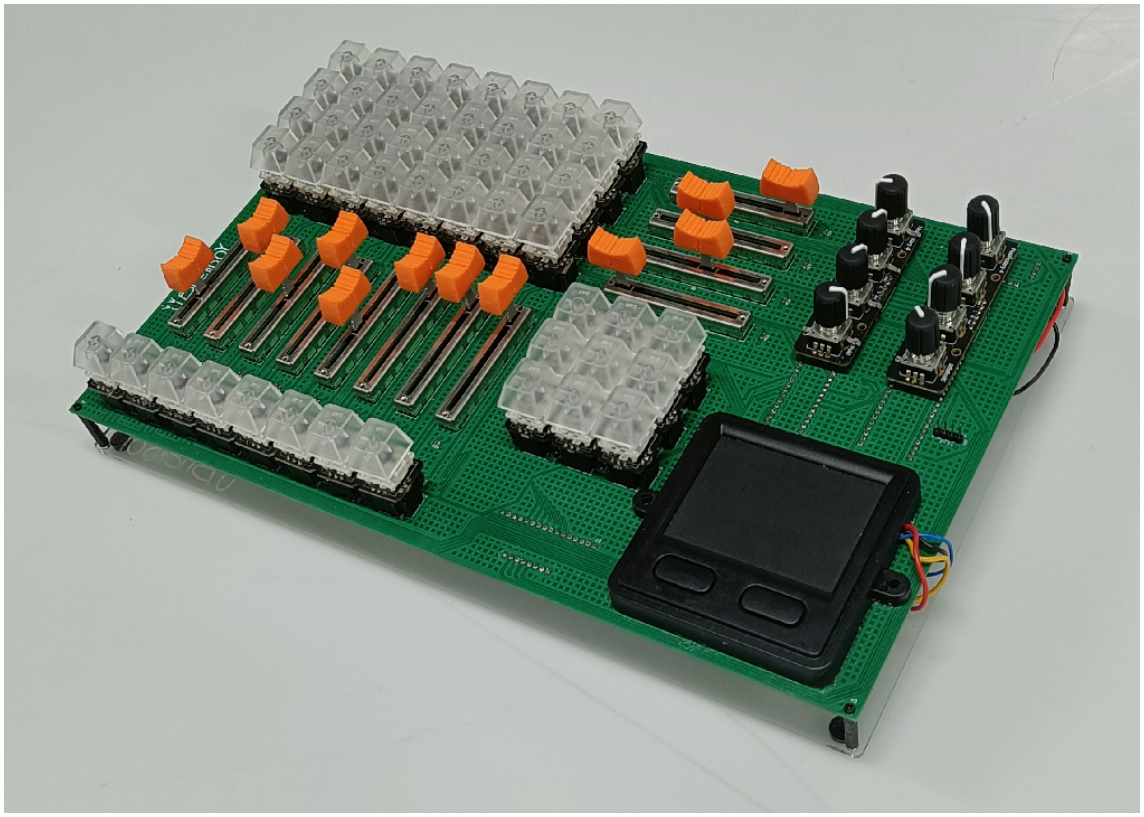

FIGURE 4.1: The BitchBoy

environment at a local rave. This test provided valuable insights into the reliability of the

controller, its responsiveness in high-pressure performance scenarios, and its integration with the software. Feedback from live testing indicated that the controller successfully met performance expectations, validating its design and functionality for practical VJ applications. When compared to existing VJ hardware, the added value of such a custom device is significant since it provides aspiring VJs a plug-and-play solution for getting started with VJing. [2] [4]

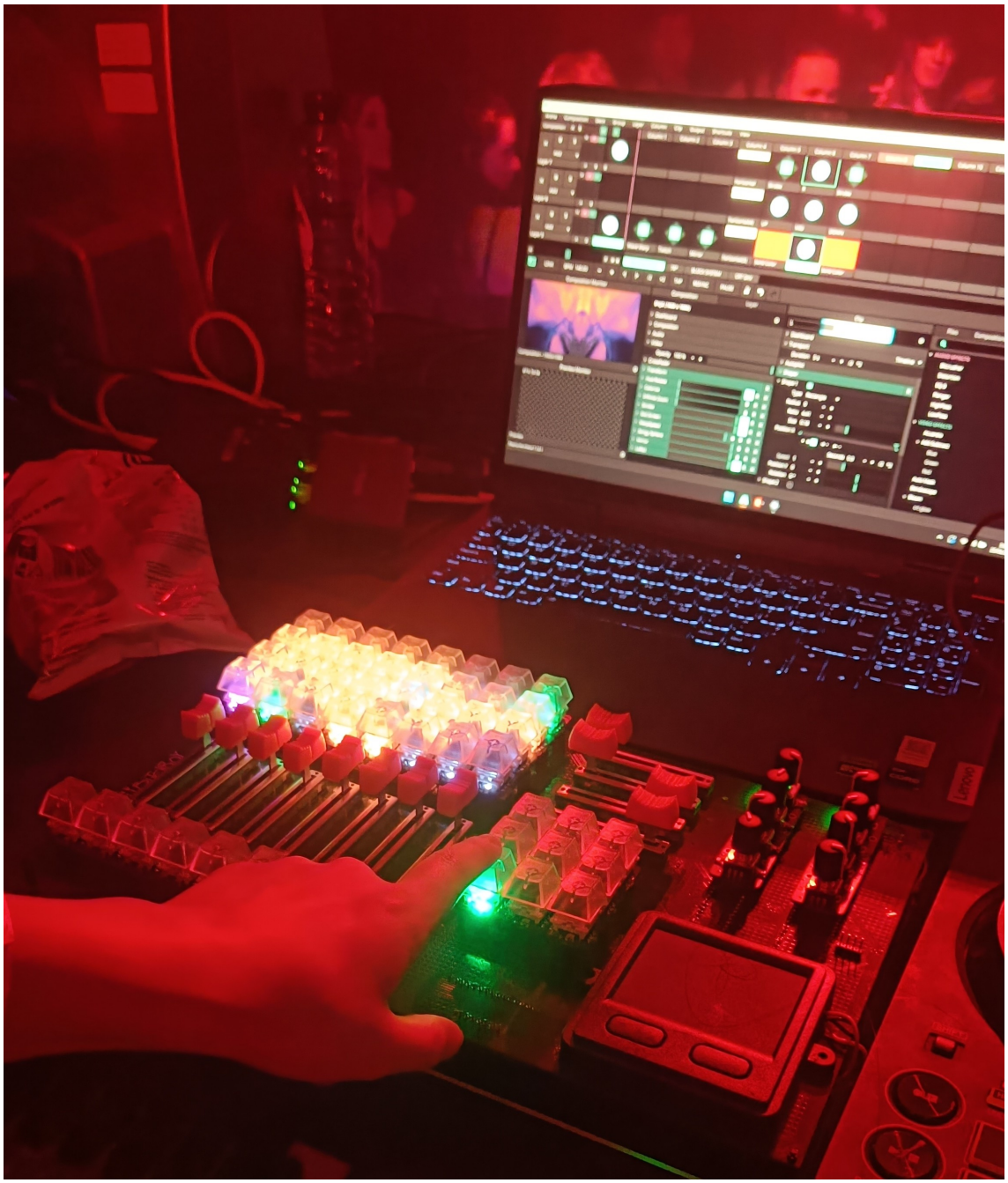

FIGURE 4.2: BitchBoy in a rave

4.2 Development Cycle

The development cycle for *Super VJ Pro* follows the five-step design thinking process [5]. The initial **empathize phase** was largely completed during previous research [4], which included interviews, focus groups, and co-design sessions with VJs. Additionally, the iterative progress on the hardware involved further engagement with VJs, enhancing the understanding of their needs and workflows. This extensive groundwork allowed for a deeper connection with the target audience, ensuring that the design choices were user-centered.

Given that the empathize phase is well-established, the development process will primarily focus on the remaining stages: **define**, **ideate**, **prototype**, and **test**.

- **Define**: In this phase, the insights gathered from the empathize phase were synthesized to define the core problems and objectives. This included identifying the key features and functionalities that would make *Super VJ Pro* an effective and engaging learning tool for beginner VJs.
- **Ideate**: During this stage, brainstorming sessions were conducted to generate creative solutions and gameplay mechanics. The goal was to design a game that not only teaches VJing techniques but also keeps users motivated through interactive and enjoyable gameplay.
- **Prototype**: Prototypes were developed to test the core gameplay features, such as step-by-step tutorials, rhythm-based challenges, and real-time feedback systems. These prototypes were iteratively refined based on feedback from VJs and game developers.
- **Test**: The prototypes were subjected to rigorous testing with both beginner and experienced VJs. This testing phase aimed to evaluate the usability, learning impact, and overall engagement of the game. Feedback from these tests informed further iterations and improvements.

Future phases of development could explore enhancing realism by incorporating simulated live environments, allowing users to practice in settings that closely mimic real-world VJ performances. Additionally, customizable options could be introduced to support diverse learning paths, catering to the unique preferences and skill levels of individual users.

4.3 Testing through development

The testing plan for *Super VJ Pro* is designed to ensure constant improvement throughout the development process. Testing occurs iteratively, with feedback gathered at multiple stages to refine the game's design and functionality.

Apart from regular feedback from the project supervisor, a seasoned game developer and academic researcher, three individuals were recruited to assist in the co-design of the game. These recruiters were selected based on their diverse backgrounds in game design and varying levels of VJing expertise:

- **Pro VJ**: An experienced VJ with extensive knowledge of live visual performances.
- **DJ with Minimal VJing Experience**: A DJ who has limited exposure to VJing but understands the basics of live performance.

- **Aspiring VJ**: A beginner with a strong interest in learning VJing but no prior experience.

The co-design process involves bi-weekly meetings with these individuals, during which the current state of the game is demonstrated, and qualitative feedback is collected through structured interviews. The feedback sessions focus on identifying areas for improvement in the game's design, usability, and educational effectiveness. Key questions asked during these sessions include:

- What aspects of the game did you find most engaging or enjoyable?
- Were there any features or mechanics that felt confusing or difficult to use?
- How well do you feel the game teaches VJing techniques?
- What improvements would you suggest to make the learning experience more effective or enjoyable?

At the end of the development cycle, a final test will be conducted with at least three aspiring VJs who have little to no prior experience with VJing. The details of the final test will be covered in 6.

4.4 Game Design

The development of *Super VJ Pro* involved several key design choices, driven by the need to balance educational effectiveness, usability, and engagement. Below is an overview of the development process and the rationale behind the design decisions. The design choices can be correlated to the "define" phase of the development cycle.[5]

4.4.1 Design Choices

The design of *Super VJ Pro* was guided by insights from previous research and interviews with VJs [4]. Key design choices include:

- **Level-Based Progression**: The game is structured into levels, with each level focusing on mastering one specific VJing task. This approach was chosen because previous research [2] [3] showed that tasks like clip launching and opacity adjustment are more common in VJing workflows. The sequence of the levels was chosen with the mindset that prioritizing the more common tasks in the early levels, the game ensures that beginners learn the most frequently used skills first, reducing cognitive load and building confidence.
- **Minimalistic Design**: Inspired by games like *Rhythm Heaven*, the game features a minimalistic interface with limited text and on-screen information. This design choice was made to avoid overwhelming the player, as excessive text or features can detract from both the learning and gaming experience. The focus is on providing clear, intuitive feedback through visual and auditory cues.
- **Scoring System**: A scoring system was implemented to reward players for performing tasks correctly and experimenting with visuals. Points are awarded for actions like making on-beat visual changes or creatively layering effects. This system encourages players to engage with the game and reinforces positive behavior.

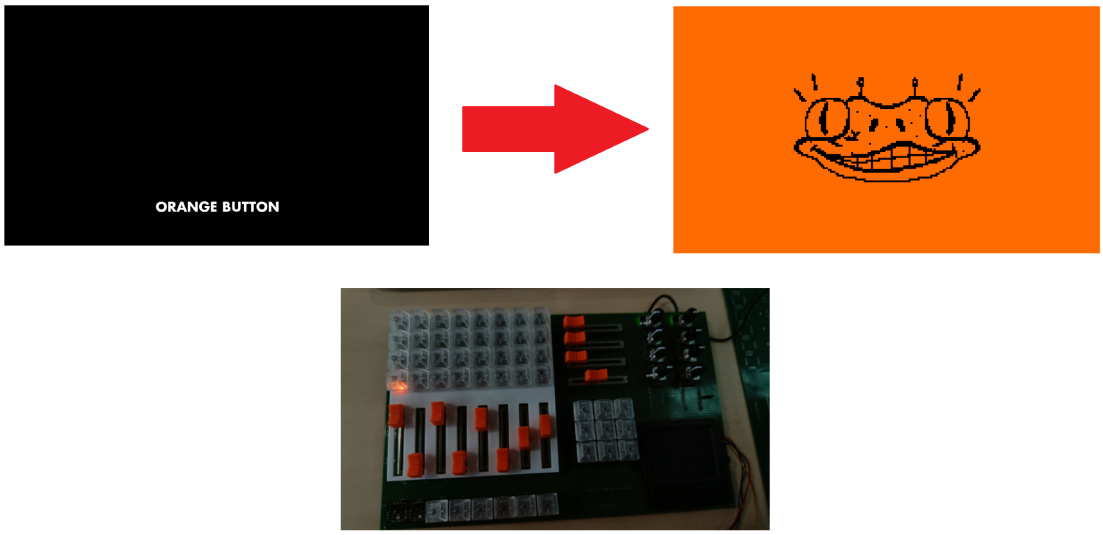

FIGURE 4.3: Level 1 example

- **Instant Feedback**: The game provides immediate feedback to players through dynamic messages such as "NICE" or "PRESS BUTTON." This approach mimics the role of a teacher, offering real-time guidance and encouragement. According to past research [4], this type of feedback is highly effective in educational contexts.
- **Positive Reinforcement**: The game primarily uses positive reinforcement, with messages like "DUDE, SICK" to reward players for correct actions. Negative reinforcement is reserved for significant mistakes, such as changing visuals off-beat. This balance ensures that players feel motivated and supported while learning.

Features selected via the MoSCoW prioritization specifically emphasized performance-first learning goals, prioritizing immediate skill application during performances. Tasks such as live clip triggering and real-time effect manipulation were included as "Must" or "Should" features due to their frequent use and importance in VJing performances. Conversely, setup and preparation-oriented tasks, although valuable, were designated "Could" or "Won't" due to time constraints and because they are not directly performance-based.

4.4.2 Future Additions

While the current design focuses on core gameplay mechanics, future iterations of the game could explore additional features, such as:

- Simulated live environments to enhance realism.
- Customizable learning paths to cater to different skill levels and preferences.
- Advanced scoring algorithms that adapt to the player's performance.

These additions would further enhance the game's effectiveness as an educational tool while maintaining its engaging and intuitive design.

FIGURE 4.4: Rhythm Heaven

4.4.3 Development Tools

Initially, the project began in **GameMaker**, with the intention of fully developing the game within this engine. A first prototype was successfully created, but as the complexity of the project increased, it became clear that continuing with GameMaker would hinder progress and make it difficult to meet deadlines. As a result, the decision was made to switch to a programming-based solution.

The first programming language tested was **Python**, but due to limitations in handling real-time visual output and integration with VJ software, the project transitioned to **Processing** (Java). Processing was chosen for several reasons:

- **OSC and Spout Integration**: Processing has readily available libraries for sending OSC (Open Sound Control) messages and handling Spout output, which are essential for connecting the game to **Resolume**, the industry-standard VJ software. This integration allows the game to use Resolume as the backend for handling the actual VJing, while Processing handles the front-end interaction and user interface.
- **Beat Detection**: Processing includes a built-in beat detection library, which was useful for developing the game's rhythm-based scoring algorithm.

4.5 Development

The development of *Super VJ Pro* followed an iterative process, with each iteration addressing feedback from the supervisor and test groups. Below is a detailed timeline of the different iterations. Since the project was developed with real time feedback along the way, the ideate phase and prototype phase were happening in parallel.

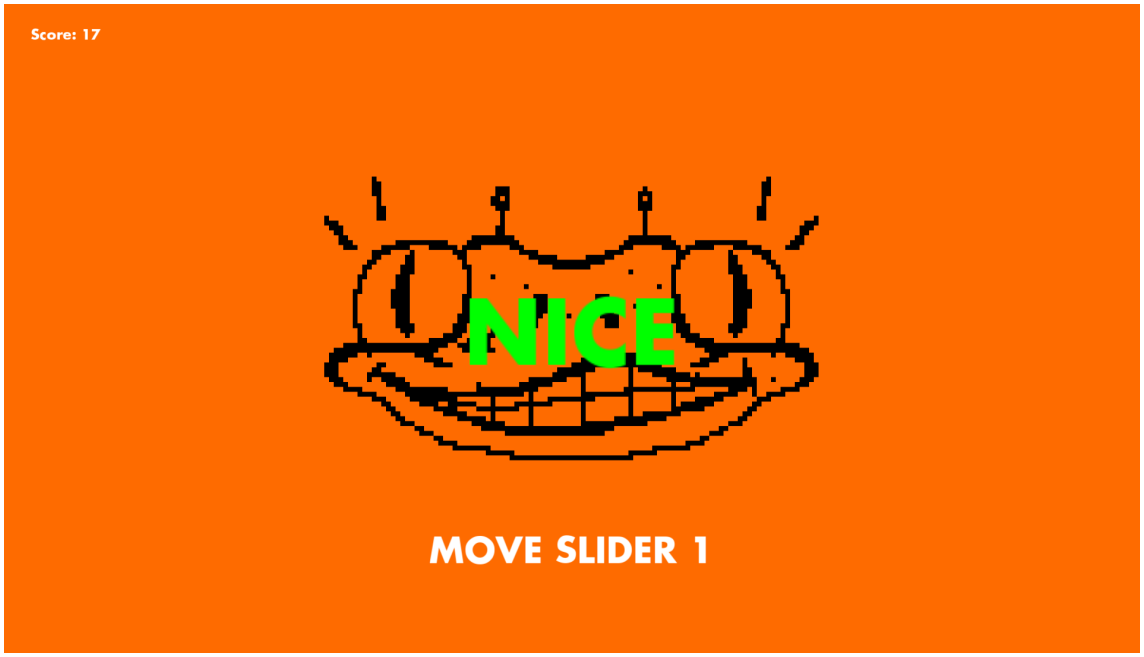

FIGURE 4.5: On-beat feedback

4.5.1 First Iteration: GameMaker Prototype

The project began with the creation of a prototype in **GameMaker**. This initial version featured a simple rhythm-based game where players clicked buttons on a MIDI controller in sync with a beat. The game included:

- A custom-made song and visuals.
- A scoring system where players earned points for on-beat actions, lost points for off-beat actions, and received extra points for freestyling.

Feedback from the supervisor and test group highlighted several issues:

- The tutorial was unclear, with no explicit guidance on what the user needed to do.
- The progression system was not gradual enough, making it difficult for beginners to learn advanced techniques.
- The scoring system was confusing, with terms like "freestyle" and multiple scoring mechanics overwhelming first-time users.

4.5.2 Second Iteration: Python Prototype

To address these issues, a second prototype was developed in **Python**. This version introduced a clearer progression system:

- Players started with a single button, gradually advancing to four buttons, a row of buttons, vertical sliders for opacity, and finally horizontal sliders.
- The scoring system was simplified, with each stage having a clear objective (e.g., "Press X button 8 times") and a progress indicator (e.g., "X/8").

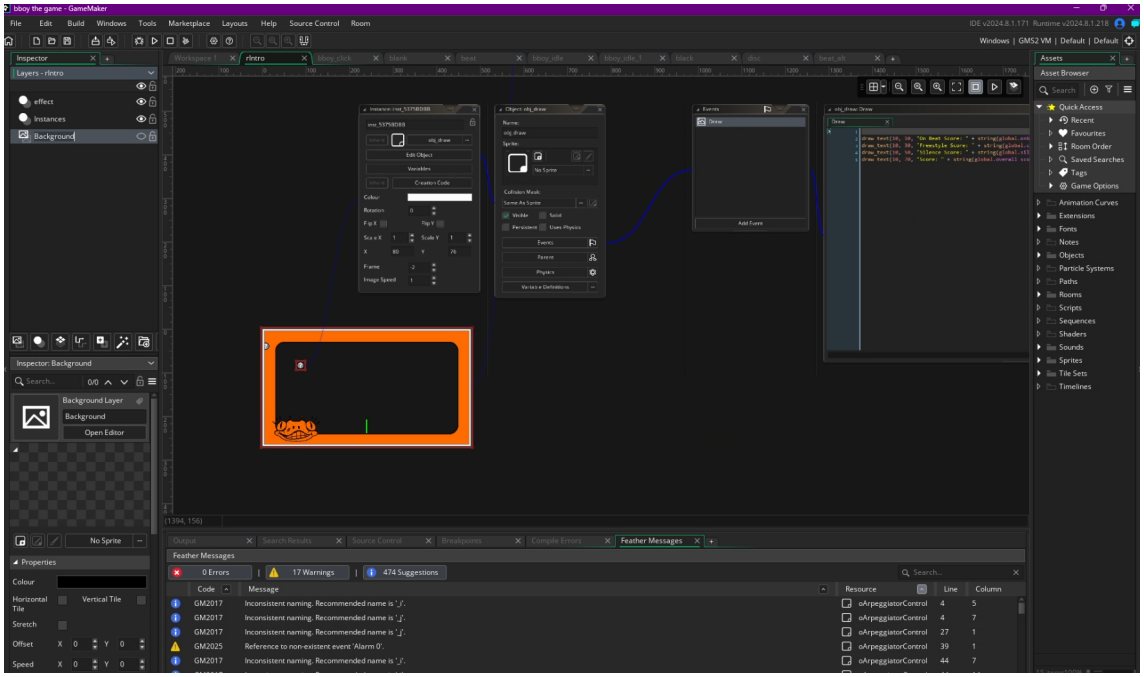

FIGURE 4.6: Game Maker iteration

Feedback from the supervisor focused on improving the clarity of feedback and ensuring that the game provided clear instructions on what actions users needed to perform. However, technical challenges arose as the Python prototype essentially required rebuilding a VJ software from scratch. To overcome this, the decision was made to use **Resolume** as the backend for handling VJing tasks, with the game acting as the front-end interface. Due to time constraints, this iteration was not shown to the test group, but the feedback from the first iteration informed the next steps.

4.5.3 Third Iteration: Processing Prototype

The third iteration was developed in **Processing**, combining the gamification elements of the GameMaker prototype with the progression system of the Python prototype. Key features included:

- A gradual progression system that introduced new features step-by-step.
- A more musical song, replacing the initial metronome, to create a more engaging experience.

Feedback from the test group indicated that:

- The game was too difficult for beginner VJs, as the beat was too fast.
- The tutorial and progression instructions were still unclear.
- There was insufficient audiovisual feedback, making it hard for users to know if their actions were correct.

Despite these challenges, the gradual progression system was well-received, with testers appreciating the step-by-step introduction of new features.

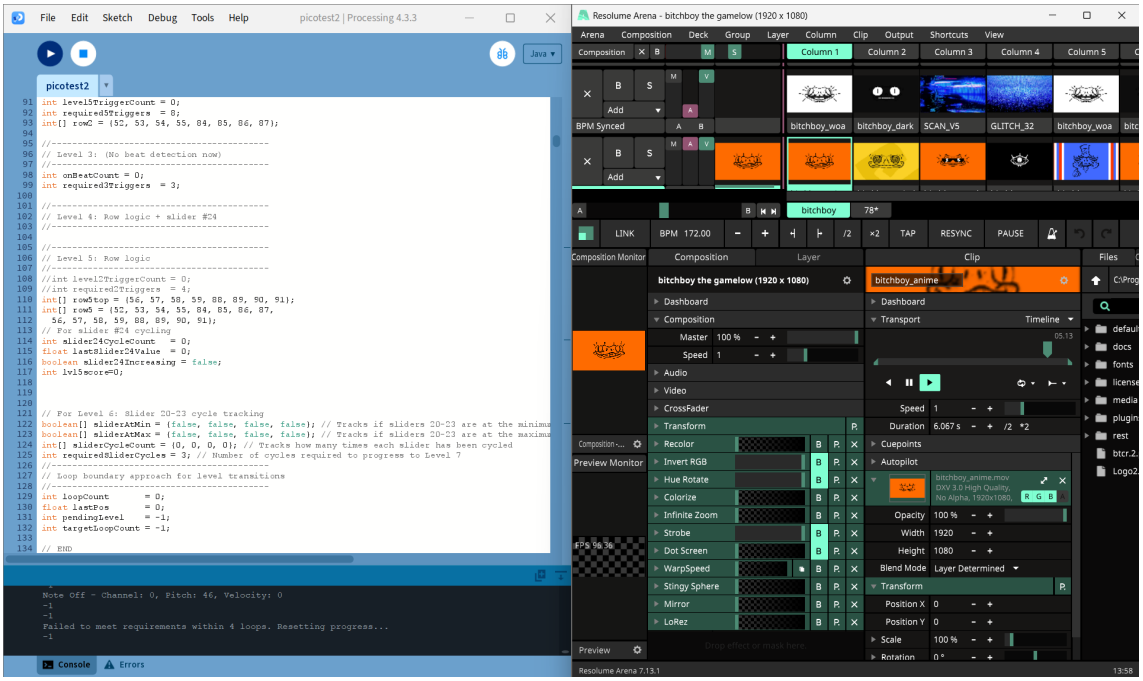

FIGURE 4.7: Processing code and Resolume Arena

4.5.4 Fourth Iteration: Improved Processing Prototype

The fourth iteration, also developed in Processing, addressed the feedback from the third iteration. Key improvements included:

- Clearer levels with distinct objectives:
  - Level 1: One button.
  - Level 2: A row of buttons.
  - Level 3: On-beat synchronization.
  - Level 4: One slider.
  - Level 5: An extra row with momentary triggers.
  - Level 6: Effects panel with 4 sliders and 8 encoders.
- A slower, more musical song created specifically for this project.
- Enhanced feedback mechanisms:
  - Large, straightforward text instructions for step-by-step guidance.
  - Real-time audiovisual feedback, including a BPM dot and scratching sounds for failed actions.
  - Visual cues, such as variations of the *BitchBoy* mascot, to indicate button presses.

This iteration aimed to provide a more intuitive and engaging learning experience, with clear feedback and gradual progression. Following feedback on this iteration, key issues were identified and addressed to improve the game's educational effectiveness and user experience:

- **Progression Clarity**: Testers and the supervisor noted that players could progress without fully understanding the required techniques. To address this, an **assessment mechanic** was introduced. Players must now complete specific tasks within defined time frames to progress:
  - Level 1: Press the single button 6 times within 4 music loops (5 seconds per loop).
  - Level 2: Press buttons from the row 4 times within 2 loops.
  - Level 3: Press on-beat 4 times within 4 loops.
  - Level 4: Slide the vertical slider 4 times within 4 loops.
  - Level 5: Press the new row of buttons that are triggered only when held down.
  - Level 6: Slide the horizontal sliders 2 times within 4 loops.
  - Level 7: Freestyle with everything that was introduced.

  The task counter is intentionally hidden to avoid overwhelming the player, aligning with findings from Lindström Söraas and Rydgren [11] on minimalist UI design. Instead, encouraging messages like *"KEEP GOING"* and *"LIKE THAT"* are displayed to confirm progress and guide the player.

- **Anti-Cheating Mechanic**: To prevent button mashing, a **cooldown system** was implemented. This restricts MIDI signal triggers to one per 200ms, ensuring deliberate input and reinforcing skill mastery.

- **Endgame Reflection**: A leaderboard was added to contextualize the player's final score. The leaderboard displays three tiers of fictional scores:
  - *Low Score*: Represents minimal effort (e.g., random button presses).
  - *Mid Score*: Achievable through basic beat synchronization and experimentation.
  - *High Score*: Requires near-perfect execution.

  Players also receive qualitative feedback based on their performance, such as *"YOU SCORED HIGH, BUT YOU A BUTTON MASHER"*, *"YOU A REAL MINIMALIST HUH"*, *"YOU ARE A TRUE VJ"*, or *"YOURE SHIT MATE"*. This adds personality while encouraging self-reflection.

4.5.5 Final Prototype Readiness

With these refinements, the prototype now features:

- A structured progression system with skill-based assessments.
- Clear, non-intrusive feedback mechanisms.
- Anti-cheating safeguards to ensure deliberate learning.
- An engaging endgame experience that rewards mastery and experimentation.

The final iteration is now prepared for the final testing to evaluate its effectiveness in teaching VJing fundamentals while maintaining player engagement. Future iterations may explore advanced features such as more levels to cover the entirity of the controller and visual curation, but the current version provides a robust foundation for beginner VJ education.

Chapter 5

Final Prototype

5.1 Overview of the Final Prototype

The final prototype of *Super VJ Pro* integrates four core components: 1) **Custom Game Software** (developed in Processing), 3) **The Educational & Visual Content** of the custom software, 2) **The BitchBoy** (a custom MIDI controller), and 4) **Resolume Arena** (the industry-standard VJ software),

The game software acts as the front-end interface, while Resolume handles the backend VJing tasks. The BitchBoy controller serves as the physical interface, and the featured educational and visual content supports progressive skill development. This framework provides a structured, gamified learning environment where users practice real-world VJ techniques through performance-first tasks. The prototype's design emphasizes gradual skill progression, real-time feedback, and skill transfer to professional tools.

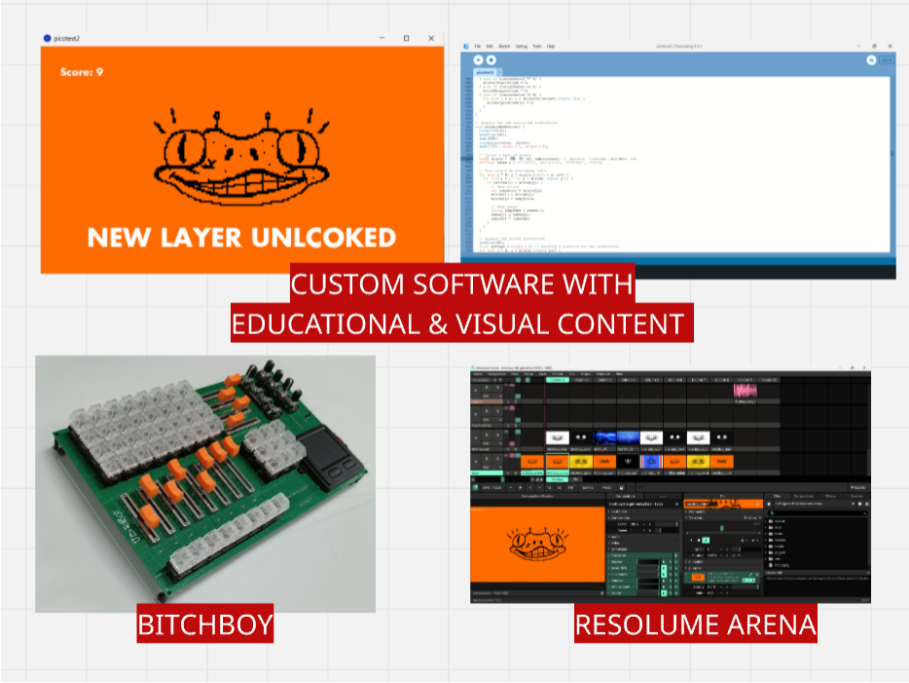

FIGURE 5.1: Core components of Super VJ Pro

FIGURE 5.2: Integration of framework components.

5.2 Implementation of Gameplay Features

5.2.1 Educational Content

The game's educational content is structured into seven levels, which act as ste-by-step tutorials, each targeting specific VJing skills:

- **Levels 1–2**: Basic clip launching (single buttons → row of buttons)
- **Level 3**: Clip launching with on-beat synchronization
- **Levels 4–6**: Opacity adjustments and effect triggering (vertical/horizontal sliders)
- **Level 7**: Freestyle mode (combining all skills creatively)

Key Educational Elements:

- **Performance-First Approach**: Users learn by doing, mimicking live VJ workflows rather than passive instruction.
- **Minimalist Instructions**: Text prompts (e.g., `"PRESS BUTTON"`) are paired with visual cues (BPM dots, button highlights) to reduce cognitive load.
- **Error Tolerance**: Off-beat actions trigger scratching sounds and visual feedback but no penalties.

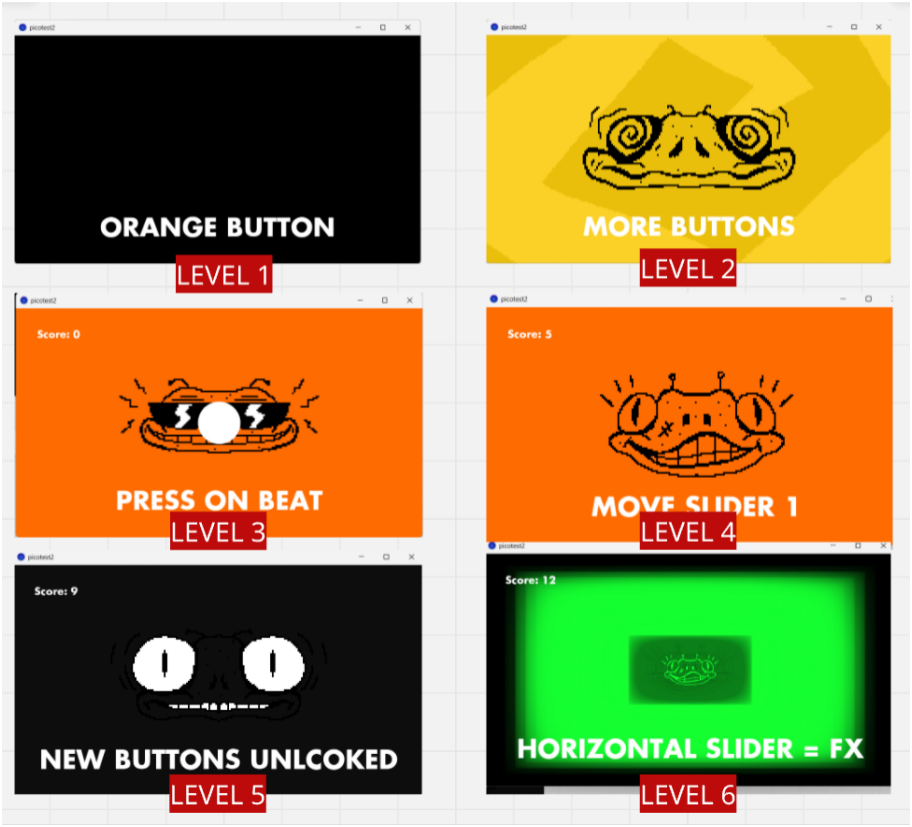

FIGURE 5.3: Progression from basic (Level 1) to advanced (Level 6) tasks.

5.2.2 Scoring System

The game rewards users for on-beat actions:

- **+1 Point**: Awarded for every successful on-beat action (e.g., pressing a button or sliding a fader in sync with the music) or experimentation when the user tries different actions.
- **Anti-Cheating**: A 200ms cooldown prevents button mashing, ensuring deliberate input.

5.2.3 Leaderboard & Feedback

At the game's conclusion, users see their score categorized into three tiers:

- **Low Score (Under 34)**: Random/off beat button pressing (e.g., `"YOU'RE SHIT MATE"`).
- **Mid Score (35 - 77)**: Basic synchronization (e.g., `"YOU A REAL MINIMALIST HUH"`).
- **High Score (78+)**: Great syncronization and experimentation (e.g., `"YOU ARE A TRUE VJ"`).

This system contextualizes performance while encouraging self-reflection and improvement.

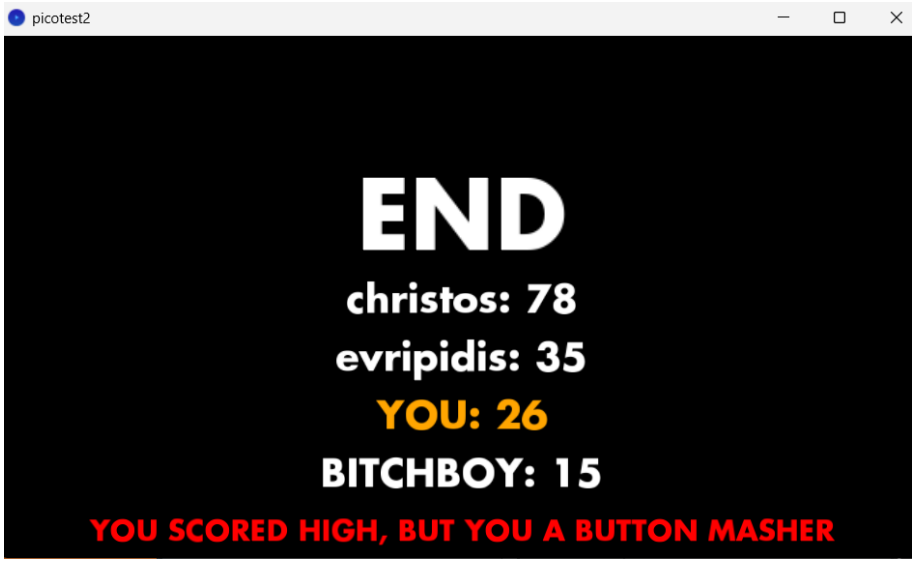

FIGURE 5.4: Leaderboard with qualitative feedback based on score tiers.

5.3 Integration with BitchBoy and Resolume

5.3.1 BitchBoy Controller

The controller's physical interface maps directly to game mechanics:

- Buttons → Clip triggering
- Sliders → Opacity/effect adjustments
- LEDs → Visual feedback for active controls

FIGURE 5.5: BitchBoy view at level 1 (Orange Button)

5.3.2 Resolume Integration

The game connects to Resolume Arena using OSC (Open Sound Control) and Spout for real-time visual output. This integration allows users to transition seamlessly from the game to professional VJ software. The game acts as the front-end interface, while Resolume handles the backend VJing tasks, ensuring that the skills learned in the game are directly applicable to real-world scenarios.

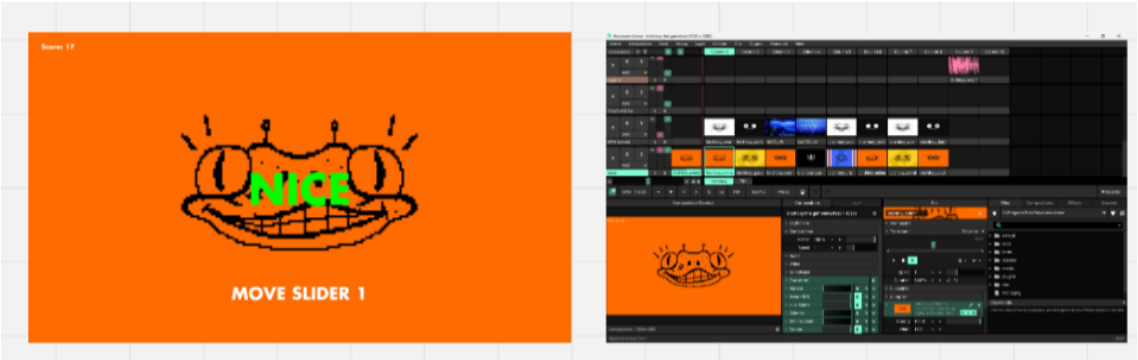

FIGURE 5.6: Game action (left) mirrored in Resolume (right) via OSC/Spout.

Chapter 6

Evaluation

The final testing phase was designed to evaluate the value of *Super VJ Pro* in teaching beginner VJs the fundamentals of VJing and to assess the transition from the game to real-world VJ software. The testing involved 6 participants with little to no prior experience in VJing, ensuring that the game's educational value and usability were thoroughly examined.

6.1 Procedure

The final test followed a main structure, divided into seperate phases:

1. **Gameplay Session**:
    - Participants were shown the prototype and allowed to interact with it, completing a series of tasks designed to teach basic VJing techniques.
    - The gameplay session was observed closely to identify how participants interacted with the game, their level of engagement, and any difficulties they encountered.
2. **Post-Gameplay Interview**:
    - After interacting with the game, participants were interviewed to gather feedback on their experience. The interview was semi-structured, with common topics including:
        - What are your first thoughts about the game?
        - What did you think you learned about VJing?
        - What did you think about the progression system?
        - Was there anything that you found confusing or didn't understand?
        - How do you think the tool could be improved?
    - Depending on the participants' responses and observations during gameplay, the interviews sometimes diverged into more specific topics, but all main topics were consistently covered.
3. **Resolume Interaction Session**:
    - After the gameplay session, participants were introduced to **Resolume**, the industry-standard VJ software on which *Super VJ Pro* is based.

- Participants were given time to explore a premade project file in Resolume that mirrored the functionality of the game, allowing them to apply what they learned in a real-world context.

4. **Post-Resolume Interview**:

   - A second semi-structured interview was conducted after participants interacted with Resolume. The topics included:
     - What are your first thoughts after using the software?
     - How do you think playing the game affected your ability to use the software?
     - How is the transition from the game to the software, and what would make it smoother?
     - Do you have any additional suggestions for improving the game after interacting with the software?

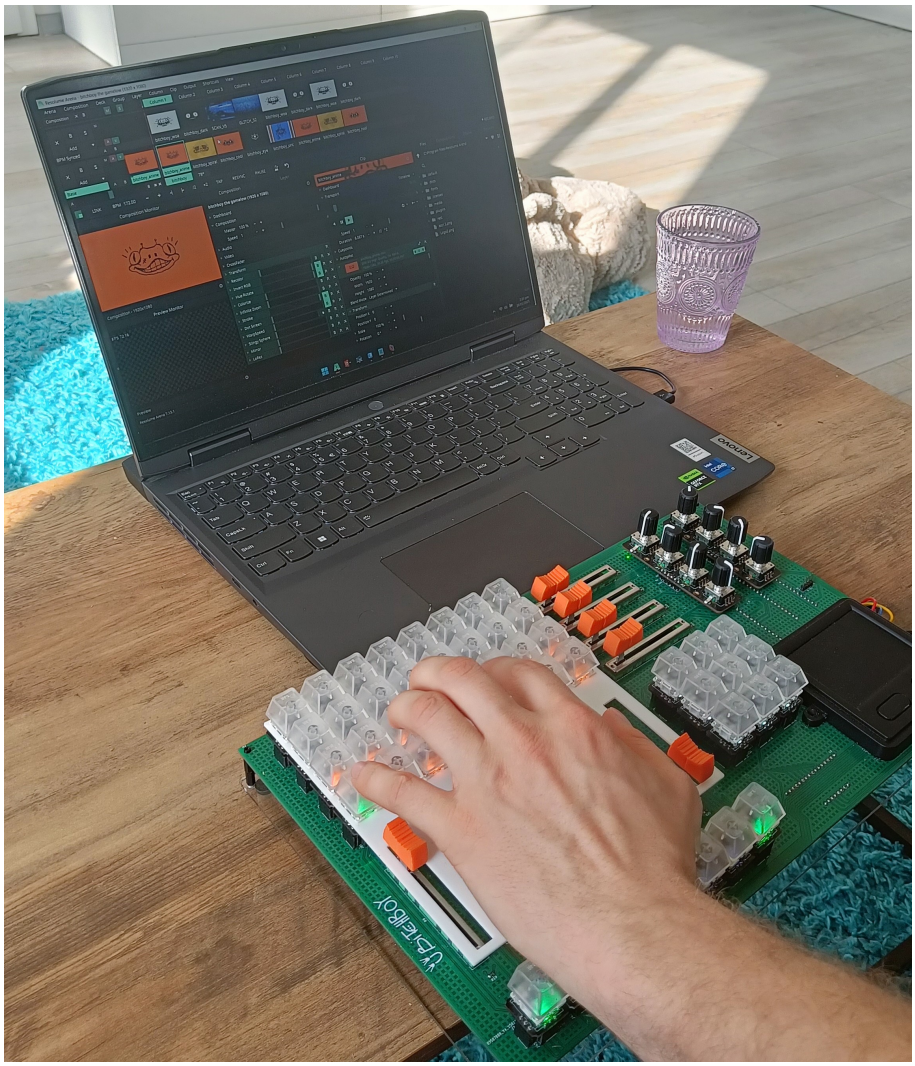

FIGURE 6.1: Interaction with Resolume

The tests were carried out in isolated environments and lasted 30-60 minutes. No major deviations or unexpected events occurred in the interviews.

6.2 Testing Approach Rationale

Multiple testing approaches were considered, such as A/B testing between the software and the game or testing separate groups with either the software or the game. However, after discussions with the co-design team and supervisors, the chosen approach was deemed most appropriate. The primary goal of this research was to explore how the game acts as the first layer of interaction for a potential user with VJing and how the skills acquired through the game could be transferred to a real-world application like Resolume. This approach allowed for a comprehensive evaluation of the game's effectiveness as an introductory tool and its impact on users' ability to transition to professional VJ software.

6.3 Observations and Data Collection

Throughout the testing process, observations played a crucial role in understanding how participants interacted with both the game and Resolume. Key behaviors, such as how participants interacted with the controller and software, their ability to synchronize visuals with beats and their overall VJ performance, were noted. With participants' consent, recordings and photos were taken to further analyze their interactions and provide additional insights.

6.4 Data Analysis

The data collected from the interviews and observations were coded and analyzed to identify recurring themes and insights. These themes informed further refinements to the game, ensuring that it meets the needs of its target audience and provides an effective, engaging learning experience for aspiring VJs. The analysis focused on:

- The success of the game in teaching VJing techniques.
- The clarity of the progression system and feedback mechanisms.
- The ease of transitioning from the game to real-world VJ software.
- Suggestions for improving the game's design and educational impact.

The thematic analysis will be used to extract how the game influenced the users behavior in regards to VJing and interacting with VJ software and concepts.

6.5 Results

After conducting thematic analysis on the feedback from participants, several key findings emerged, highlighting the strengths of *Super VJ Pro* and areas for improvement. The following sections present the raw data collected from the participants, followed by an analysis of how these findings inform the evaluation of the game.

6.5.1 Progression and Learning

Raw Data

Participants provided the following feedback on the game's progression system:

- "Good, clean, accurate on the beat. Layout is straight forward and intuitive."

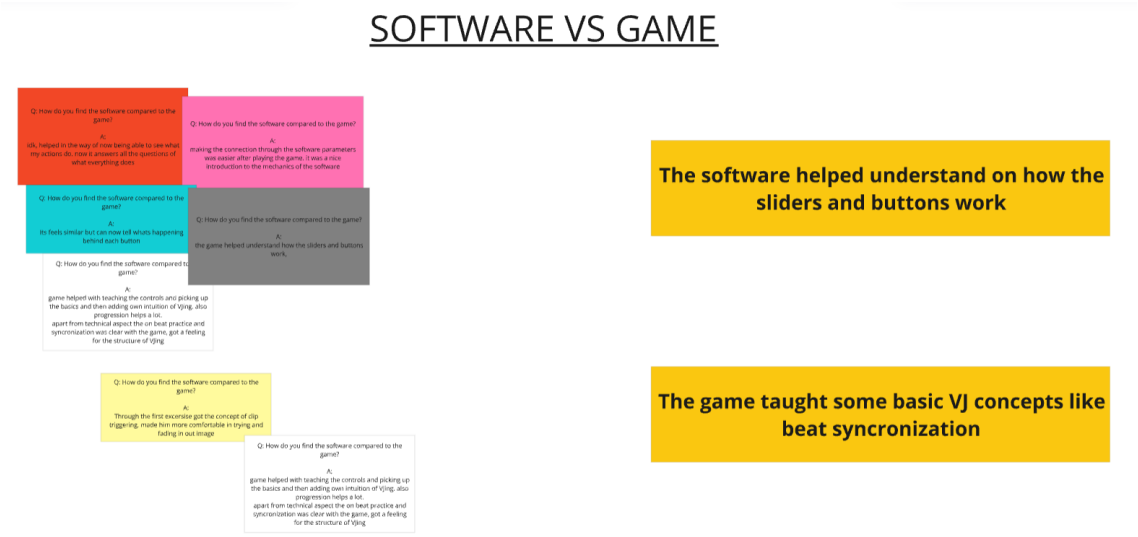

FIGURE 6.2: Thematic analysis example

- "Liked how the components were isolated and presented."
- "Was really cool, helped with not overwhelming the user. The messages were productive/clear points were nice."
- "It was fast but didn't bother me. An idea would be to take it a bit slower by introducing combos between the new buttons."
- "Gamification [that is already implemented] is needed."

Analysis

The step-by-step progression system was well-received, with participants appreciating the gradual introduction of new concepts. However, some users suggested that the progression could be slowed down further, particularly when introducing advanced techniques like combining multiple inputs or freestyling. This feedback highlights the importance of balancing accessibility and challenge in the game's design. While the current progression system effectively reduces cognitive load, additional intermediate steps could help users master more complex skills.

6.5.2 What Users Learned

Raw Data

Participants reported learning the following about VJing:

- "There's a lot of possibilities in controlling visuals. Learned how to visualize music."
- "Basic concept down, still need to work on rhythm but feel confident I can do it with enough practice."
- "Clicking [visuals] on beat Learned about different opportunities when controlling visuals."
- "Learned how music can be visualized and appreciate that connection more."

- "That you can separate layers and have a lot of control over the visuals, specifically the horizontal layers."

Analysis

Participants gained a foundational understanding of VJing, particularly in controlling visuals, synchronizing them with music, and applying effects. The concept of separating layers and manipulating horizontal layers was a key takeaway. This suggests that the game successfully introduces users to core VJing techniques, although some users noted the need for more practice to master rhythm and synchronization.

6.5.3 Clarity of Instructions

Raw Data

Participants commented on the clarity of instructions:

- "Nice, intuitive."
- "Liked the immediate response. Every button was distinctly different to the other ones. Liked how the instructions allow you to slowly adjust."
- "A lot of buttons without labels, that might be nice because it gives you freedom but at the same time when it's a lot of buttons it's overwhelming."
- "The wording sometimes wasn't clear, for example 'layer' wasn't clear at first."
- "Staying on beat while freestyling was unclear."

Analysis

While the game's instructions were generally clear, some users found the lack of labels on buttons overwhelming. Specific terms like "layer" were initially unclear, and staying on beat during freestyling was occasionally confusing. These issues suggest that while the interface is intuitive, additional labeling and clearer explanations of key terms could improve usability. Future iterations could include tooltips or a glossary to address these concerns.

6.5.4 Interaction with Resolume

Raw Data

Participants shared their experiences transitioning from the game to Resolume:

- "Used all the things learned in the game and tried to decipher the software. The visual representation of the controls is nice."
- "The game helped understand how the sliders and buttons work."
- "Making the connection through the software parameters was easier after playing the game. It was a nice introduction to the mechanics of the software."
- "The UI is much worse, harder to get into for beginners. There's a lot more options that are intimidating, more technical."
- "Seems complicated but after playing the game could figure out half of the things on screen."

Analysis

Participants found Resolume more complex and less beginner-friendly compared to the game. However, they acknowledged that the game helped them understand basic functionalities like clip triggering, slider manipulation, and effect application. The visual representation of controls in the game made it easier for users to decipher Resolume's interface, though some felt overwhelmed by the software's additional options.

6.5.5 Observations on Skill Application

Raw Data

Participants demonstrated their ability to apply skills learned in the game:

- "By the final stage of the game, the freestyle level, it was observed that all users were able to apply the basic VJ concepts introduced throughout the game."
- "Playing the game absolutely helped, especially the gradual progression helped me understand the concepts of VJing."
- "Didn't learn too much but learned about the possibilities of VJing by doing both free flow and methodic approaches."

Analysis

By the final stage of the game, participants were able to apply and transfer basic VJ concepts such as clip triggering, effect manipulation, and slider adjustments. The gradual progression in the game helped users build confidence in these skills, even if they were still in the early stages of mastering them. Some users noted that they became more methodical when using Resolume, focusing on understanding the software's functionality, whereas they were more experimental and expressive in the game.

6.5.6 Suggestions for Improvement

Raw Data

Participants provided the following suggestions:

- "For now it works, but ideally a version without the device would be nice so more users can learn how to VJ."
- "Have a transitioning step before the freestyle so can use two elements together like a combo."
- "Preparation, setup, and making visuals. What does the rest of the controller do?"
- "Add feedback on what the effect sliders do, show that they control effects and how they can do multiple. Add a layer of prep to teach the user how to set up a project and how to curate the visuals."
- "Different combos and taking the progression even slower. Emphasize more the tutorial and make the user understand the on-beat concepts of VJing more."

Analysis

Participants expressed a desire for a preparation or setup level where they could configure controls and choose visuals before starting. Slowing down the progression to teach more advanced techniques, such as combining multiple inputs, was also recommended. Some users suggested utilizing the entire device rather than just a few elements to provide a more comprehensive understanding of VJing. Clearer explanations of button functionality and additional feedback on effect sliders were also mentioned as potential improvements.

6.5.7 Hardware Feedback

Raw Data

Participants commented on the hardware:

- "Cool buttons, wish I could explore it more."
- "Really nice but add labels, explain the rest of the parameters."
- "Sliders are very smooth, buttons are very tactile and good with good LEDs, good feedback."

Analysis

The hardware received positive feedback for its tactile buttons and smooth sliders. However, some users felt that adding labels to the buttons and explaining the rest of the parameters would make the device more user-friendly. The LED feedback and overall build quality were appreciated, though participants expressed a desire to explore the hardware more extensively.

Chapter 7

Discussion and Future Work

7.1 Summary of Findings

The findings from the testing and interviews suggest that *Super VJ Pro* successfully achieves its primary objective of teaching beginner VJs the fundamentals of VJing through a game-based approach. The game's design, which emphasizes structured tutorials, rhythm-based challenges, and real-time feedback, was well-received by participants, who reported learning key VJing skills such as clip triggering, effect manipulation, and beat synchronization. By the final stage of the game, all users were able to apply these basic VJ concepts, demonstrating the effectiveness of the game's structured learning approach. This directly supports Hypothesis 1, which posited that a game-based approach would make learning VJing more accessible and engaging for beginners.

7.1.1 Performance-First Teaching

One of the most significant findings from the testing phase was the effectiveness of the performance-first learning approach, which emerged as a key factor in the game's success. Although not the main focus of the initial hypotheses, the performance-first approach, where users learn by actively performing VJ tasks rather than passively consuming information, proved highly effective in helping users grasp core VJ techniques. Participants appreciated the opportunity to experiment and perform from the outset, which fostered creativity and skill acquisition simultaneously. This finding suggests that the performance-first approach could be a valuable addition to the game-based learning framework, particularly for creative and performative skills like VJing.

7.1.2 Gradual Progression and feedback

The gradual progression system was particularly praised for its ability to introduce concepts slowly and clearly, keeping cognitive load low while allowing users to build foundational skills. Participants appreciated the step-by-step approach, which enabled them to learn without feeling overwhelmed. This aligns with the research objective of creating a minimalistic and intuitive user interface that reduces cognitive load and fosters creativity. However, some users expressed a desire for additional in-between steps to teach more advanced techniques, such as combining multiple inputs or freestyling in ways that are not strictly on-beat but still aesthetically pleasing. This feedback highlights the potential for expanding the game's scope to include more complex VJing techniques in future iterations.

The game's intuitive design and real-time feedback mechanisms, such as dynamic messages and audiovisual cues, were effective in guiding users through the gameplay. Par-

ticipants found the feedback helpful in understanding their performance and improving their skills. This aligns with the research objective of integrating real-world VJ workflows into the game, ensuring that the skills learned are directly applicable to live performances and professional VJ software like Resolume. However, some users noted that certain instructions could have been presented more clearly, suggesting room for improvement in the game's tutorial and guidance systems.

7.1.3 Skill Transferability

When transitioning to Resolume, the industry-standard VJ software, participants found the game's introduction to basic VJ concepts beneficial. While Resolume's interface was perceived as more complex, users felt that the game helped them understand the software's functionality, particularly in terms of sliders, buttons, and beat synchronization. This supports Hypothesis 2, which claimed that the proposed tool would fill the gap left by existing VJ tools by combining practical, hands-on learning with engaging gameplay mechanics. It was observed that users interacted with Resolume in a more methodical and deliberate manner, focusing on understanding the software's features, whereas they were more expressive and experimental when interacting with the game. This difference in behavior underscores the game's strength in fostering creativity and experimentation, which are essential for live VJ performances.

7.2 Controversies

Previous work [4] showed several controversies in addressing the learning of VJ-ing skills. Based on the findings of this research the following controversies can be similar points of discussion.

7.2.1 Teaching Styles: Methodical vs Performance-First Approach

Although the initial hypotheses focused on a game-based approach, the testing phase revealed the effectiveness of a performance-first teaching style, where users learn by actively performing VJ tasks rather than through passive instruction. This approach proved successful, as participants quickly grasped the fundamentals of VJing, such as beat synchronization, clip triggering, and effect manipulation. This finding suggests that the performance-first approach could be a valuable addition to the game-based learning framework, particularly for creative and performative skills like VJing.

The performance-first approach aligns with the Experiential Learning Model by David Kolb [10], where users start with active experimentation. This phase encourages hands-on learning and immediate application of skills, which was evident in the game's design. In contrast, learning directly from software like Resolume often begins with abstract conceptualization, where users focus on understanding the software's functionality before applying it. This difference in starting points may explain why users were more methodical and less performative when using Resolume compared to the game. The game's performance-first approach fostered experimentation and performance, while the software encouraged a more analytical and technical understanding.

7.2.2 Template vs Game

The results suggest that a Resolume template could be just as effective as the game if the goal is just teaching the basic techniques of VJing. However, the game's gamified approach

added an element of "juice" or engagement that may enhance internal motivation and make the learning process more enjoyable. Furthermore the game's design encouraged users to focus on performance, experimentation, and creating a visually appealing show, rather than just learning the technical aspects of the software.

This observation ties back to Kolb's Experiential Learning Model [10]. In the game, users began with active experimentation, which allowed them to immediately engage with the creative and performative aspects of VJing. On the other hand, when using Resolume, users started with abstract conceptualization, focusing on understanding the software's parameters and functionality. This difference in learning phases may explain why users were more methodical and less performative with the software. The game's simplified, gamified approach pushed users to experiment and perform, while the software's complexity encouraged a more technical and methodical approach.

7.2.3 Progression Speed

The gradual progression system in the game received widespread praise for its effectiveness in teaching the fundamentals of VJing while keeping cognitive load low and engagement high. However, some users noted that the progression could be slowed down further to allow for the introduction of more advanced techniques, such as button combinations and better synchronization.

While the current progression speed was effective for teaching the basics, some participants expressed a desire for a slower pace that would allow them to explore more complex interactions and techniques. This feedback suggests that while the game successfully introduced users to VJing, there is room for additional levels or stages that focus on advanced skills, catering to users who want to delve deeper into the art form. Balancing the progression speed to accommodate both beginners and more advanced learners could further enhance the game's effectiveness as a learning tool.

7.3 Challenges and Future Directions

During the development of *Super VJ Pro*, not all features outlined in the 3 section were implemented, primarily due to time constraints. The MoSCoW model was still followed, albeit to not it's full extent. In particular, the curation of visuals and setup controls, which were identified as promising additions, were not fully realized. The inclusion of a preparation phase, where users can curate visuals and set up controls, would provide a more holistic view of VJing. This phase is an essential part of the skill, as it allows users to understand the full workflow of a VJ, from preparation to performance. Additionally, teaching users the full capabilities of the controller—such as the trackpad, encoders, and additional buttons and sliders—would offer more opportunities for creative expression and enable a deeper understanding of VJing techniques. These features could be important not only because of their alignment with findings in [4], but also because users specifically mentioned them during interviews in this research.

The development process followed in this project also imposed limitations on the implementation of additional features from the MoSCoW list. To address this, a potential future direction would be to rebuild the game in a more robust game engine like Unity or to develop it directly as a plugin for Resolume. These approaches would provide greater flexibility and scalability, allowing for the integration of more advanced features and a more seamless transition between the game and professional VJing software.

Overall, the findings suggest that the current version of the game serves as a strong

foundation for further development. Not only does it function as an effective educational tool for VJing, but also demonstrates potential for broader applications. The principles and methodologies explored in this research could be adapted to teach other performative skills, highlighting the versatility of the game's design and its potential impact on experiential learning in various domains. For this approach to be successfully applied to other performative skills, certain characteristics of the domain and the learning process must be considered:

- **Real-Time Interaction**: The skill should involve real-time interaction or decision-making, as the game-based approach relies on immediate feedback and dynamic engagement. Examples include music performance, dance, or live theater, where timing and improvisation are critical.
- **Structured Progression**: The skill should be teachable through a structured progression of tasks or levels, allowing learners to build competence incrementally. This aligns with the gradual introduction of features in *Super VJ Pro*, where users start with basic tasks and advance to more complex ones.
- **Hardware Integration**: The skill should benefit from or require the use of specialized hardware, as the integration of the **BitchBoy** controller was a key factor in the success of the VJing game. For example, a similar approach could be used to teach DJing with a custom MIDI controller or digital painting with a stylus and tablet.
- **Creative Exploration**: The domain should allow for creative exploration and personal expression, as the game-based approach encourages experimentation and improvisation. This is particularly relevant for skills like music production, where learners can experiment with different sounds and effects.
- **Feedback Mechanisms**: The skill should lend itself to clear and immediate feedback, enabling learners to understand the impact of their actions. In *Super VJ Pro*, real-time visual and auditory feedback helped users synchronize their actions with the beat, a feature that could be adapted to other domains.
- **Scalability**: The approach should be scalable to accommodate different skill levels, from beginners to advanced learners. This requires careful design of the progression system and the ability to adjust difficulty based on user performance.

Considering these characteristics, the principles of *Super VJ Pro* could be adapted to teach a wide range of performance skills, from music and dance to live storytelling and interactive art. The key lies in designing a system that balances structured learning with creative freedom, providing learners with the tools and feedback they need to succeed while encouraging experimentation and personal expression.

Chapter 8

Conclusion

The development and evaluation of *Super VJ Pro* have demonstrated its potential as an effective educational tool to teach beginner VJs the fundamentals of VJing. Using a game-based approach, the game successfully bridges the gap between learning and practice, making VJing more accessible and engaging for users with little to no previous experience. The intuitive design of the game, the gradual progression system, and the real-time feedback mechanisms were well-received by participants, who reported gaining a foundational understanding of key VJing techniques such as clip triggering, effect manipulation, and beat synchronization. These findings directly support the claims made in the Objectives and Hypotheses sections of this research.

One of the most significant findings from the testing phase was the effectiveness of the performance-first learning approach, which emerged as a key factor in the game's success. The performance-first approach—where users learn by actively performing VJ tasks rather than passively consuming information—proved highly effective in helping users grasp core VJ techniques. This finding suggests that the performance-first approach could be a valuable addition to the game-based learning framework, particularly for creative and performative skills like VJing. The integration of real-world VJ workflows into the game, particularly through the use of Resolume Arena and the BitchBoy controller, ensured that the skills learned were directly applicable to live performances and professional settings. This supports Hypothesis 2, which claimed that the proposed tool would fill the gap left by existing VJ tools by combining practical, hands-on learning with engaging gameplay mechanics. Participants found the transition from the game to Resolume smoother and more intuitive, demonstrating the effectiveness of the game's design in preparing users for real-world VJing scenarios.

The feedback of the participants also provided valuable insight into areas for improvement. Suggestions such as adding a preparation phase, slowing the progression to teach advanced techniques, and utilizing the full capabilities of the controller highlight opportunities to enhance the game's educational value and user experience. Additionally, the development process revealed challenges in implementing all desired features due to time constraints, suggesting that future work could explore rebuilding the game in a more robust (game) engine to enable greater flexibility and scalability.

Super VJ Pro serves as a strong foundation for further development, not only as a VJing educational tool, but also as a model to teach other performative skills. The principles and methodologies explored in this research—such as gamified progression, real-time feedback, and minimalistic, user-centered design—have broader applications in experiential learning and creative education. By building on this foundation, future iterations of the game can further empower aspiring VJs and contribute to the growing field of gamified learning tools.

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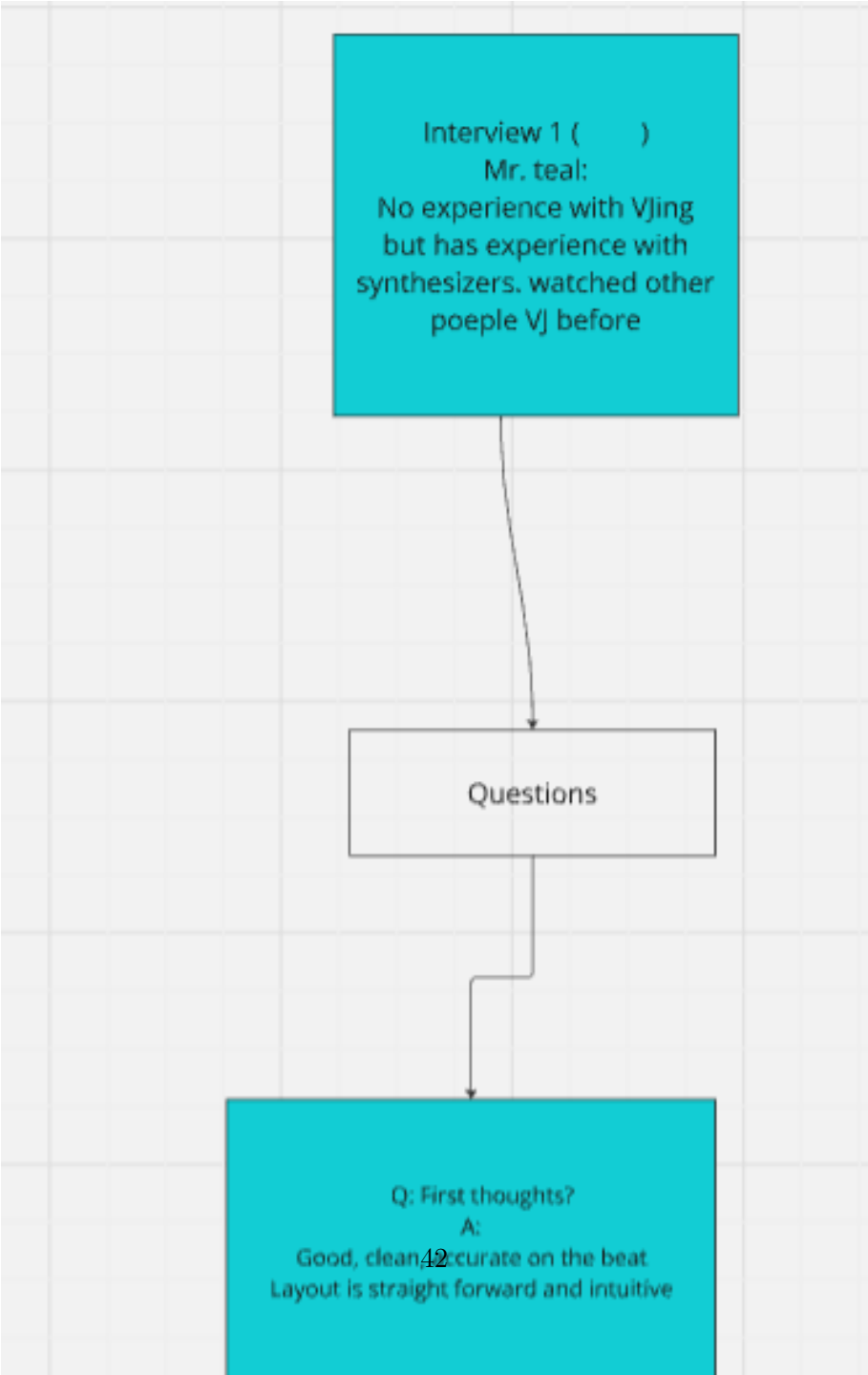
Appendix A

Appendix

A.1 Interview Transcriptions



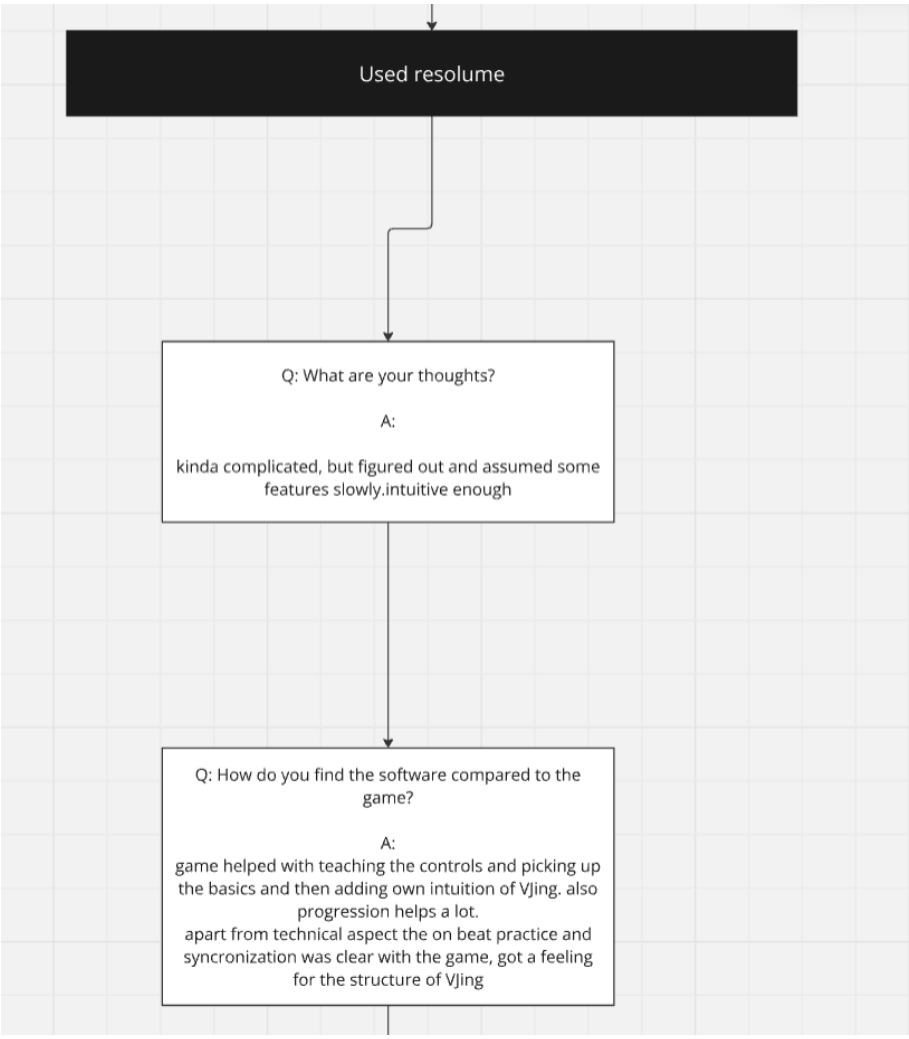


FIGURE A.2: Excerpt from Interview Transcriptions

A.2 Themes

FIGURE A.3: Themes Appendix

FIGURE A.4: Themes Appendix