

MSc Interaction Technology Research Topics

Interaction Technology Super VJ Pro

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Abstract

This research explores the research phase of developing Super VJ Pro, an educational game-based tool designed to teach beginner Visual Jockeys (VJs) how to use a dedicated VJ controller, BitchBoy. By bridging past work of the researcher with literature reviews, expert interviews, and focus group discussions, the study identifies key elements for creating an engaging, gamified learning environment. It addresses gaps in existing VJ learning methods, which often rely on unstructured resources like tutorials and self-exploration of professional software. Drawing inspiration from educational games and rhythm-based tools, the research combines game design principles, cognitive load theory, and the VARK learning model to propose a structured yet creative approach to teaching VJ techniques. The study outlines a development plan focusing on tutorials, rhythm and effect lessons, interactive feedback, and gamified challenges. The findings highlight the potential of integrating educational tools with creative arts, making VJing more accessible while retaining its emphasis on self-expression and performance. Future iterations may explore advanced features, such as DJ and lighting integration, while maintaining a focus on foundational skills.

Keywords: Visual Jockey, gamification, educational tools, cognitive load, creative arts, interactive learning.

Keywords: computer, science

Chapter 1

Introduction

1.1 Background Context

This research explores how to develop Super VJ Pro, an educational game-based tool that teaches beginner Visual Jockeys (VJs) how to use a specialized VJ instrument. Many VJs currently use repurposed musical instruments and controllers to manipulate visual elements in live performances. This often results in inefficiencies and a suboptimal experience for VJs who must adapt tools not specifically designed for their work. Through my previous research [3] [2], which involved interviewing VJs, conducting co-design sessions, and testing, I developed BitchBoy, a prototype for a dedicated VJ controller. The design is inspired by what VJs are already using and their current workflow but presented in a VJ-centric context, which makes for a controller that balances familiarity with innovation to enhance the workflow of VJs.

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]. 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.

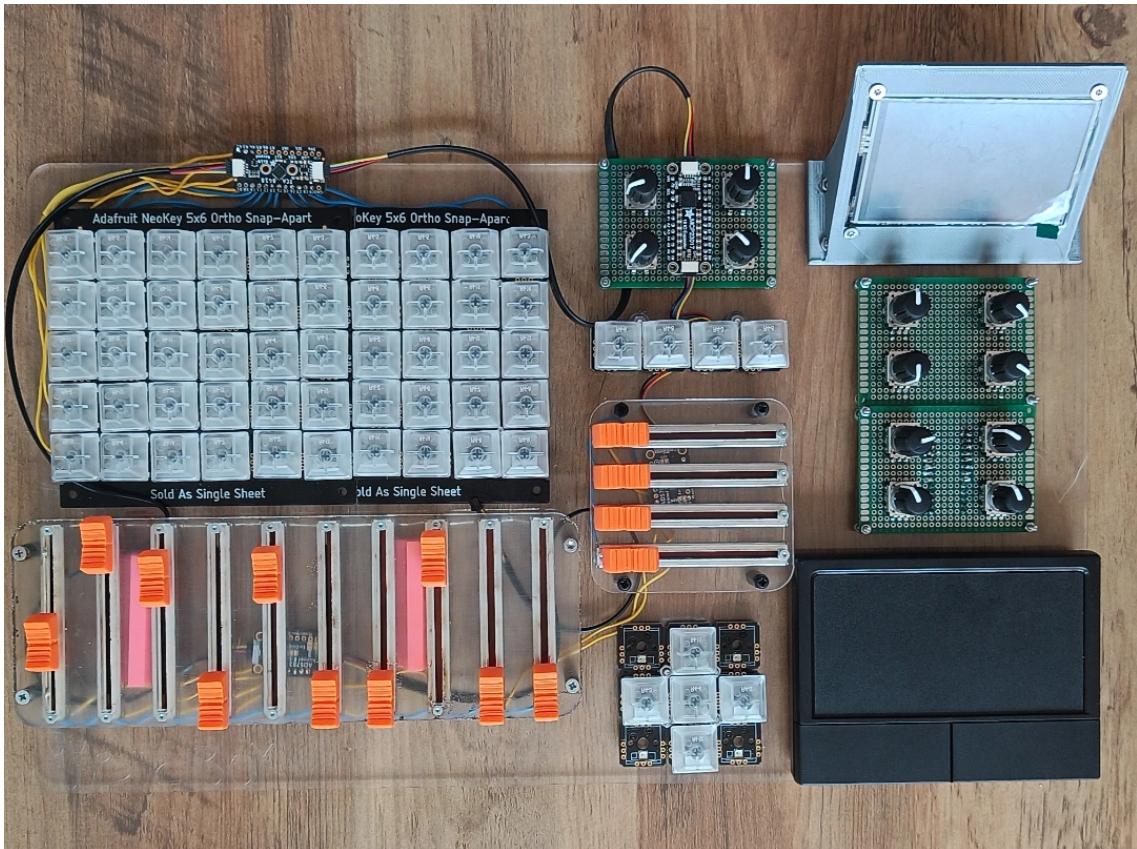


FIGURE 1.1: BitchBoy first Prototype

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. 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 (Prep)

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.
- **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 with BitchBoy. This game-based approach aims to provide an engaging and intuitive learning experience by leveraging the controller as the primary interface. The game will guide users through the fundamentals of VJing while making use of real-world VJ techniques, integrating them into a fun and interactive environment. The ultimate goal is to bridge the gap between learning and practice, making VJing more accessible to a wider audience.

1.5 Initial Hypotheses

- A game-based approach can make learning VJing more accessible and enjoyable.
- Similarities to popular educational games like "Rocksmith" and "DJ Hero" can be leveraged to create an intuitive learning curve for VJs.
- 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 fun gameplay mechanics.
- The custom VJ controller, which has been optimized through prior research, will serve as an ideal interface for this educational tool, helping learners to seamlessly transition from the game environment to live performance settings.

To assess these objectives, the research will begin with a comprehensive literature review, which will examine successful educational games such as *Rocksmith* and *Synesthesia* alongside gamified learning platforms like *Duolingo*. This review will focus on identifying effective mechanics, including dynamic difficulty adjustment, feedback systems, and achievement tracking, that can be adapted for VJ training. Following this, semi-structured interviews will be conducted with experts from the fields of VJing, game development, and music education, along with a focus group from the VJ communities at veejays.com and vjacademy.nl. These interactions aim to uncover insights into the VJ workflow, preferences for feedback, and key gameplay features. This phased research and development approach will build the backbone for developing a real life educational VJ tool for beginners.

Chapter 2

Literature Review

2.1 Existing Educational Games and Tools

In the context of developing a VJing learning tool, it is important to review existing games and tools that successfully combine gameplay with skill acquisition.

2.1.1 Games and Tools that utilize specialized instruments

Since the idea is to use BitchBoy, a physical controller, as the main instrument for Super VJ Pro, other games or tools that utilize physical instruments can act as one of the main sources of inspiration. Some of the most relevant projects on this area are:

Senna by Eboman

Senna is an audio-visual instrument created in 2010 by Eboman and EboStudio [5]. Designed as an interactive tool for children, Senna is based on Eboman's professional audio-visual instrument, SenS IV. The main goal of Senna was to educate children or beginners on how to create audiovisual compositions.

Concept: Senna guides children through the process of creating an audio-visual composition step-by-step. They learn how to download YouTube videos, create video beats and melodies, build a narrative with video samples, and apply 3D audio-visual effects. By the end, users have completed their first composition, which can be performed live. The app bridges the gap between a music and visual editing tool, making it ideal for children to express themselves creatively.

The interface is set in a virtual 3D space where all elements coexist, guiding children through the process with integrated instructions. Over 25 steps, users create a video collage with four layers: video rhythm, melody, bassline, and story. Each element is customizable in real time with effects and samples, leaving room for self expression and experimentation.

Making a Composition: In Senna, children follow sequential steps to create each element of their composition:

- **Video Rhythm:** Children select videos representing bass drum, snare drum, and percussion, and use a sequencer to create rhythm patterns. They then apply audio-visual effects that enhance the beat's impact.
- **Video Melody and Bassline:** They pick additional video samples for the melody and bassline, using a sequencer to arrange them harmoniously.

- **Storyline:** For the narrative layer, users choose video samples of people speaking to add context and depth.
- **Performance Mode:** After creating the layers, children store compositions and can perform them live using a controller. This includes toggling layers, adjusting effects, and arranging elements in 3D space.

Senna Controller: With the Senna controller, children can perform their compositions live, interacting with their audio-visual creations in real time. The controller features sliders that allow users to turn individual layers on or off and adjust audio-visual effects dynamically. Additionally, dials on the controller enable children to rotate layers, creating a sense of movement as the elements shift and “dance” within the 3D space.



FIGURE 2.1: Senna and Senna Controller by Eboman

The Senna project can act as a big inspiration for Super VJ Pro, since its goals and methodology align with this research.

Rocksmith

Rocksmith is a game developed by Ubisoft that allows players to connect a real electric guitar to their gaming console. The game offers multiple learning modes:

- **Learn a Song Mode:** This mode uses a dynamic difficulty system that adapts to the player's skill level, offering personalized feedback and lessons as the player progresses [8].
- **Lesson Mode:** Players watch video tutorials and receive feedback after practicing the guitar techniques shown [8].
- **Jam Session Mode:** A virtual band accompanies the player, simulating a live jamming experience that helps improve improvisation skills [7].
- **Arcade Mode:** This mode uses gameplay elements to teach musical skills in a fun way, for instance, by practicing chords while defending against alien invaders [7].

Rodriguez and Marone's analysis of *Rocksmith* extends the understanding of how games can facilitate learning beyond gameplay. Their study uses multimodal approaches to evaluate how users interact with *Rocksmith* to build real-world skills. This intersection between gameplay and learning can provide valuable insights for the development of educational tools in other domains, such as VJing. The mix of allowing users to practice on a real life instrument with traditional gameplay elements like score, feedback and engaging art, could provide significant inspiration for the development of Super VJ Pro. [17].

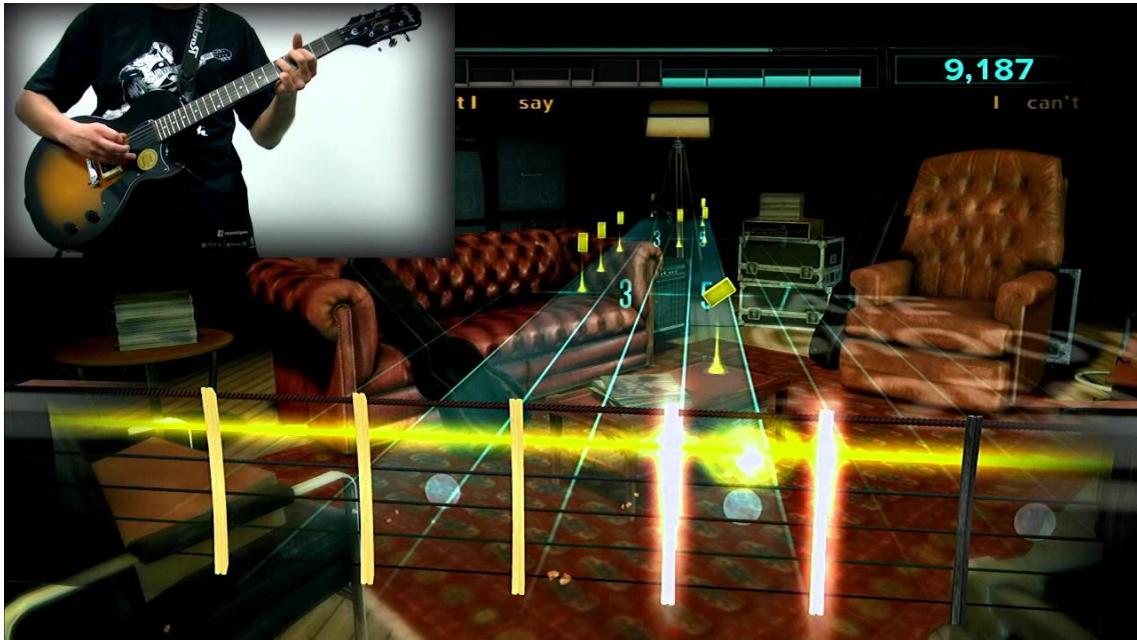


FIGURE 2.2: Rocksmith

Synthesia

Synthesia is an application designed to simplify the process of learning to play the piano by moving away from traditional music notation. Instead, it uses a game-like interface where falling visual blocks represent notes, which users must play on a virtual or real keyboard in time with the display. This approach aims to lower the barrier for beginners, allowing them to focus on playing rather than reading sheet music.

In one study, *Synthesia* was applied to teach Angklung, a traditional Indonesian musical instrument, to a group of students. The study found that the visual-based learning provided by *Synthesia* allowed students to overcome the challenge of reading traditional

music notation, which had been a significant barrier to learning the instrument. By translating the piano learning method to Angklung, students with minimal prior experience were able to grasp the basics more easily, demonstrating that Synthesia's methodology can be adapted beyond the piano to facilitate learning other instruments [10].

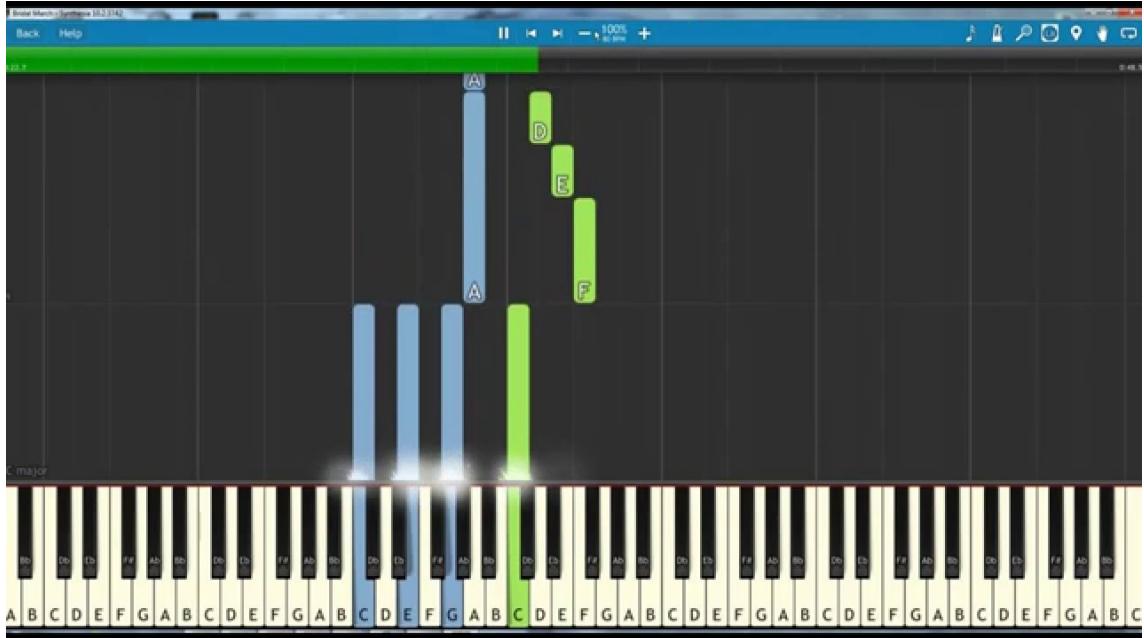


FIGURE 2.3: Synthesia

Rhythm Games: DJ Hero, Guitar Hero, and Band Hero

DJ Hero, *Guitar Hero*, and *Band Hero* are rhythm-based games that simulate music performance by having players press buttons or strum notes in time with the music.

- **DJ Hero:** Focuses on DJ techniques like beat matching, cross-fading, and scratching. It incorporates remix culture and provides an immersive experience by allowing players to interact with popular music tracks [11].
- **Guitar Hero/Band Hero:** These games require players to strum and press buttons on a guitar or drum-shaped controller or sing in sync with notes or lyrics displayed on the screen. By matching their input with the game's visual cues, players gain points and by the end a badge depending on how well they performed the song.

It can be argued that such games don't build up any instrument-related skill apart from basic sense of rhythm, however the focus on physical instruments and introduction to culture and basic concepts that are related to the skill itself can inspire Super VJ Pro.

2.1.2 Games and Tools that don't utilize specialized instruments

Projects that don't feature a physical device but teach the user a skill through gamification can act as inspiration for Super VJ Pro.

Duolingo: Gamified Language Learning

Duolingo has become one of the most popular platforms for language learning. The platform's popularity can be largely attributed to its integration of gamification, as outlined

by the *Octalysis Framework* developed by gamification expert Yu-kai Chou. This framework analyzes human motivation and structures engaging user experiences around eight core drives, such as *Epic Meaning and Calling*, *Development and Accomplishment*, and *Empowerment of Creativity and Feedback* [1, 19].

Methods to Assess and Enhance Learning Duolingo utilizes several strategies to support and track language learning progress:

- **Checkpoint Quizzes:** Periodic assessments help learners gauge their knowledge retention and monitor their progress within the course [13].
- **Review Exercises:** These exercises encourage learners to revisit previously learned material, reinforcing long-term retention [13].
- **Streaks and Leaderboards:** Streaks are a motivational tool that encourages daily practice by rewarding users who maintain a consistent learning routine. Leaderboards further enhance this motivation by introducing social competition [1].
- **Experience Points (XP) and Progress Bars:** XP serves as a reward system for completing lessons, while progress bars visually track learners' advancement in specific language topics. These tools provide immediate feedback and a sense of accomplishment [19].

Duolingo recently expanded its platform with the launch of a *music learning app*. The new app integrates similar gamified techniques, adapting Duolingo's established strategies to teaching musical instruments, which could hold potential to inspire educational tools for VJing.

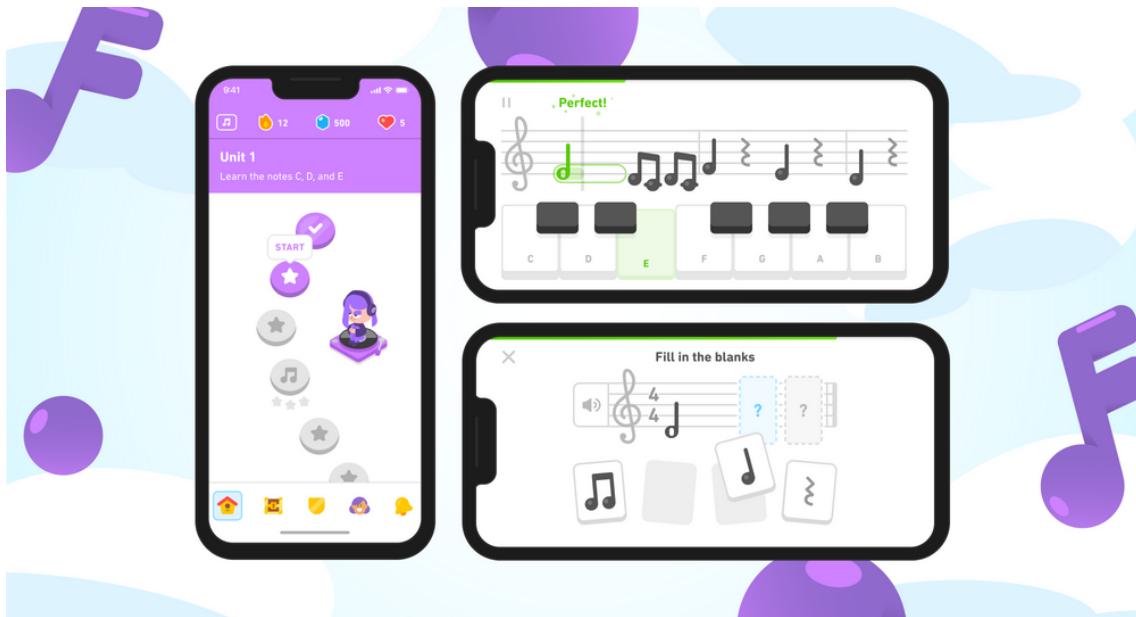


FIGURE 2.4: Duolingo Music

Kerbal Space Program: Balancing Learning and Fun in Serious Games

Kerbal Space Program is a serious game designed to teach players about rocket science and space exploration. It strikes a balance between learning and enjoyment by enabling players to experiment in a virtual environment:

- **Self-Efficacy Development:** Players develop a sense of accomplishment by completing increasingly complex missions, reinforcing their confidence and skills [18].
- **Trial and Error Learning:** The game provides immediate feedback on players' attempts, encouraging them to learn from their mistakes and try again [18].

Rhythm Games: Lumines, Rez, Rhythm Heaven, Osu etc

While more traditional rhythm games may not be educational in nature, their aesthetics and gameplay elements be an inspiration for Super VJ Pro. Furthermore their focus on concepts like rhythm and audiovisual composition are directly related to VJing. Even though there are a lot of games that fit this category four diverse, audiovisual-centric rhythm games that can be used as examples are *Lumines*, *Rez*, *Rhythm Heaven*, and *Osu*.

- **Lumines:** A puzzle game with rhythm-based mechanics, *Lumines* uses vibrant visuals and pulsating beats to engage the player. The way the visuals sync with the music offers insight into how rhythmic elements can be integrated into gameplay, a potential inspiration for designing the visual elements in Super VJ Pro [15].
- **Rez:** *Rez* is known for its synesthetic experience, where music, visuals, and player actions are tightly intertwined. The game's ability to create an immersive audiovisual experience through minimal controls could influence the audiovisual design in Super VJ Pro, focusing on simplicity while enhancing immersion [16].
- **Rhythm Heaven:** This rhythm game series emphasizes quirky, visually creative mini-games that teach rhythm through fun and simple mechanics. While it doesn't directly align with VJing, its approachable design and rhythmic cues can help inspire more playful and intuitive ways to engage players in Super VJ Pro [12].
- **Osu:** *Osu* is a rhythm game that challenges players to follow patterns on the screen while syncing their actions to the beat of a song. The game's fast-paced, pattern-based gameplay and integration of community-generated content provide valuable insights into user engagement, customization, and replayability that could benefit Super VJ Pro's gameplay [9].

In reviewing educational games and tools, it becomes clear that integrating elements like real-instrument interaction, rhythmic engagement, and adaptive gamification are strategies for aiding skill acquisition. Applying these insights to Super VJ Pro involves creating an immersive, hands-on learning environment with a physical controller, rhythm-based challenges, and adaptive feedback systems. By blending these mechanics into the VJing context, Super VJ Pro can combine engaging gameplay with practical, performance-ready skills, guiding beginners through essential VJing techniques in a structured way.

2.2 Game-Based Learning in Music and Visual Arts

Game-based learning often includes interactive and immersive elements, such as feedback mechanisms, challenge levels, and reward systems, to help learners build practical skills [19]. In creative fields like music and visual arts, these elements can offer users to learn within a simulated, responsive environment while keeping engagement high.

For example, rhythm-based games or tools like *Synthesia* and *Rocksmith* utilize real-time audiovisual feedback to build users' musical timing and coordination. This kind

of feedback and interactive element is essential in disciplines like VJing, where timing, aesthetics, and coordination are foundational skills. For Super VJ Pro, integrating similar principles can morph traditional VJing concepts into a gamified learning experience that's both accessible and effective.

2.2.1 VARK Scheme and Learning Styles

The VARK model, developed by Fleming and Mills [6], identifies four primary sensory modalities that people use for learning: Visual, Aural, Read/write, and Kinesthetic. Understanding these modalities can be helpful for designing educational tools that cater to diverse learning preferences, making VARK a potentially effective framework for structuring Super VJ Pro's instructional design .

Visual (V): Learners with a Visual preference engage best with graphical representations, such as maps, charts, and flow diagrams. These learners benefit from symbolic visuals that illustrate relationships or hierarchies. Visual design elements in Super VJ Pro, like charts or graphical feedback, can enhance understanding for this group by providing a structured way to conceptualize VJ techniques and performance flow.

Aural (A): Aural learners prefer information that is spoken or heard, including discussions, lectures, and audio-based feedback. For Super VJ Pro, incorporating audio cues can help users learn VJing techniques better.

Read/Write (R): Those who favor the Read/write modality engage best with text-based information, such as manuals, essays, and written instructions. For Read/write learners, Super VJ Pro could include written guides, glossaries, or text-based feedback options.

Kinesthetic (K): Kinesthetic learners prefer hands-on experiences that connect with real-world applications. This includes learning through practice, demonstrations, and simulations. In the context of Super VJ Pro, kinesthetic elements like interactive tutorials, real-time feedback, and performance simulations can provide these learners with an immersive experience.

Multimodal Learning: Super VJ Pro can support multimodal learners by offering diverse learning experiences, such as combining text with visuals, providing real-time auditory feedback, and allowing hands-on practice with interactive modules.

Incorporating the philosophy of the VARK model into Super VJ Pro's instructional design can enhance its effectiveness by catering to these distinct learning preferences. Although VJing is an art that largely revolves around Aural and Visual expression it would be incorrect to equate that with the learning experience of beginner or inexperienced VJs, however this fact can be leveraged when making design choices that are relevant with the user's own creative expression.

2.2.2 Cognitive Load

Cognitive load theory is crucial for designing effective educational interfaces, especially when complex tasks are involved, as in VJing. High cognitive load can lead to learner frustration and disengagement, particularly when mastering new tools or techniques. Reducing cognitive load through clever and clear design is essential to help users focus on the learning task itself rather than navigating the tool's interface.

For Super VJ Pro, minimizing cognitive load can be achieved by simplifying interface elements, using familiar control mechanisms, and implementing multimodal interaction options. Research has shown that multimodal interfaces (e.g. combining visual and auditory feedback) reduce cognitive load by distributing mental effort across multiple resources,

leading to enhanced user performance and satisfaction. In this context, providing visual cues alongside real-time feedback on audio sync, color harmony, or rhythm alignment could help learners engage with VJing fundamentals more intuitively [20].

2.3 Current VJ Learning tools and Limitations

Currently, beginner VJs often rely on self-directed learning methods, such as browsing forums, watching YouTube tutorials, and experimenting directly with VJ software like Resolume and TouchDesigner. These online resources provide a foundation for learning, but they often lack structured guidance and hands-on practice that would help new learners progress more efficiently.

Popular VJ software platforms like Resolume and TouchDesigner include help sections on their websites, where users can access basic guides, troubleshooting tips, and FAQs. However, these resources are generally limited to specific software features rather than offering a holistic approach to VJing as an art form. YouTube also hosts numerous VJ tutorials created by independent artists and educators, which cover topics ranging from basic setup to advanced techniques. While these videos are valuable, they vary in quality, depth, and teaching style, making it challenging for beginners to find the right material for their skill level and needs.

While these tools provide essential information, they lack interactive elements, real-time feedback, and cohesive progression paths, which are critical components of effective learning. As a result, new VJs often spend a significant amount of time on trial and error without clear guidance, leaving a gap for a tool like Super VJ Pro that could offer structured, engaging, and responsive VJ education.

Chapter 3

Research Methodology

The primary goal of this research is to identify and understand the key elements needed to develop an effective learning tool that teaches beginners how to VJ, specifically with the use of a custom VJ controller. To achieve this goal, I have chosen a research setup that includes expert interviews, a focus group with members of the VJ community, and a literature review. This mixed-method approach allows for a holistic understanding of both the technical requirements and educational strategies needed to design a VJ learning tool. By gathering insights from those directly involved in VJing, educational game design, and interactive technology, this setup enables a big picture view of the challenges in creating Super VJ Pro. This groundwork will later guide playtesting and iterative development in the next phase of the project.

3.1 Recruitment Strategies

Participants will be recruited through professional networks, online VJ and educational game communities, and music industry forums.

3.2 Ethical Considerations

Participants will be informed about the study via an information sheet or verbally, and verbal consent will be obtained for audio recordings, which will be destroyed after transcription. Data will be anonymized to protect the privacy of participants. No personal identification data is mentioned.

3.3 Research Population & Target Groups

To gather diverse insights for the development of Super VJ Pro, I conducted individual interviews and a focus group with individuals from target groups relevant to the project. These groups include:

- **Visual Jockeys (VJs)**
- **Game Developers** (Engineers, Designers, Artists)
- **Musicians / Instrument experts**

3.3.1 Individual Interviews

I conducted one-on-one interviews with seven individuals who possess expertise across the fields of VJing, game development, music, and audiovisual tools. In order to avoid personal identification I codenamed the participants as colors, which also corresponds in the visualization of the interviews in the coding section.

- **Mr. Teal:** An academic with experience in MIDI controller development and research on cognitive load and playfulness in using MIDI controllers for music-making.
- **Mr. Blonde:** CEO of a company that connects people who want to learn musical instruments with teachers. He is also a drummer.
- **Mr. White (Eboman):** Over 20 years of experience with audiovisual projects. Developed a game for children to create AV compositions and is the creator of Ebosuite, a tool for live audio-visual performance.
- **Mr. Red:** A graduate in interaction technology, who is a VJ, DJ, and light engineer, as well as an artist.
- **Mr. Pink:** A PhD candidate in interaction technology, researching ways to enhance music education through interaction technology. He has worked on multiple projects aimed at teaching music to beginners and children.
- **Mr. Green:** A game design student and DJ with experience in designing educational games.
- **Mr. Purple:** A game design graduate, artist, and visual artist who has developed their own real-time audio visualizer and has experience as a VJ.

3.3.2 Focus Group (referenced to as the Grey Family)

In addition to individual interviews, I conducted a focus group with six members from the VJ communities at veejays.com and vjacademy.nl . This group included individuals from a VJ collective and an academy dedicated to teaching beginner VJs, providing further insights on the learning needs and preferences of aspiring visual jockeys.

3.4 Interview Methodology

To gather insights on effective learning methods for VJing, I conducted semi-structured to open-ended interviews with individuals from the identified target groups. These interviews were adjusted to each participant's background and expertise, allowing for flexible exploration of topics most relevant to them. The questions varied depending on the individual's field, with some overlap where interviewees had experience across multiple domains.

3.4.1 Interview Structure

As mentioned, the interviews and the focus group, were semi-structured, allowing for a natural flow of conversation while covering key topics. Here's a breakdown of the question focus by group:

- **VJs:** Interview questions for VJs centered around the process of VJing, as well as how they learned and taught it. Example questions included: *How did you learn VJing?, How do you teach VJing?, What aspects should you give feedback on?, What kind of feedback do you provide?, and How do you determine "good" VJing?*
- **Game Developers:** For game developers, questions focused on creating engaging and effective educational games and tools. Example questions included: *What makes an educational game effective?, How do you measure player progress?, How would you approach gamifying VJing?, and What elements make a game engaging?*
- **Musicians, Instrument Experts, and Teachers/Academics:** Questions for this group were based on teaching methods and frameworks for beginners. Key questions included: *How do you teach beginners to use an instrument?, What frameworks or models of learning can be used and why?, How does feedback/grading work in your field?, How do you encourage self-expression while teaching?, and How do you teach physical instruments?*

3.4.2 Interview and Focus Group Transcription

The interviews were color coded by interviewee and transcribed (the transcripts are included in the Appendix). These transcripts include a timeline of each interview, from top to bottom, that mentions the essential questions and answers or other relevant comments that were made during the interview.

The transcription process ensures that all insights are documented for thematic coding and reference in the development of Super VJ Pro.

3.5 Data Analysis (Coding)

The interviews were analyzed to identify patterns for designing a game/tool based VJ learning tool. I used a thematic coding process, grouping related responses to reveal common themes.

3.5.1 Coding Process and Thematic Categorization

After transcribing each interview into a timeline format, I reviewed each comment, question and answer, grouping similar responses across interviews. This process of grouping allowed common themes to emerge, which were then categorized into two main areas: **features** and **mechanics**. As seen in A.15 the common themes were grouped from left to right and the resulting theme is the golden card at the very right for each group.

With the identified themes in place, I cross-referenced these themes with insights from relevant research and the literature review. This comparative analysis helped in verifying the relevance of the themes and informed the selection of features and mechanics for the VJ learning tool.

As a result, the analysis led to a more focused selection of features and mechanics, slightly reducing the initial list by removing elements deemed less impactful or redundant. This streamlined set of elements forms the basis for the design of Super VJ Pro, ensuring that each feature and mechanic serves a clear educational purpose and enhances user engagement without overwhelming the learner.

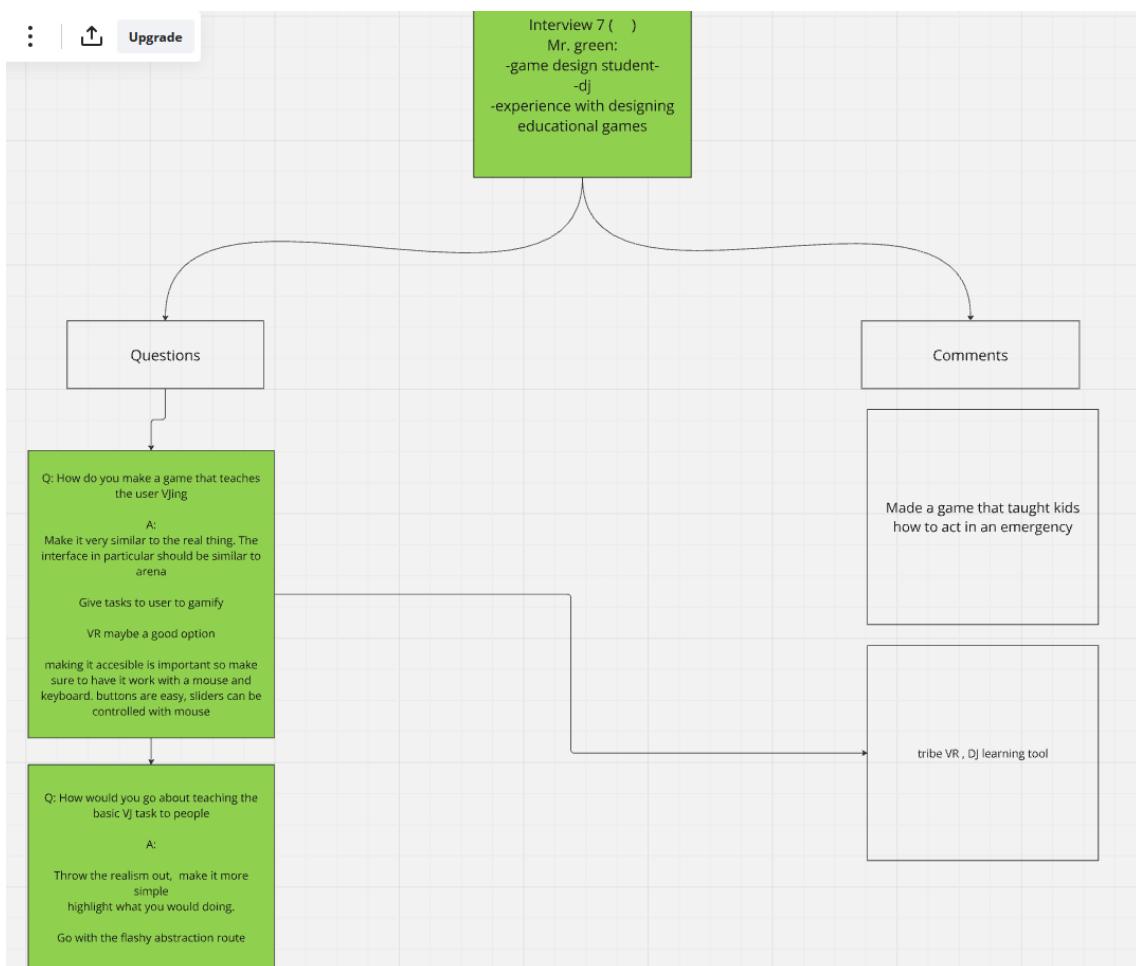


FIGURE 3.1: Excerpt from Interview Transcriptions



FIGURE 3.2: Themes Overview: The common themes from the interviews and focus group were grouped together to identify potential key mechanics and features of the tool

Chapter 4

Initial Findings and Discussion

4.1 Controversies

During the research phase, several controversial themes emerged in the context of game-based learning, particularly around balancing structure with creativity and the effectiveness of gamification for skill acquisition.

4.1.1 Realism versus Abstraction in Design

A key debate emerged around whether the VJ tool should strive for realism or adopt a more abstract, stylized design. Some interviewees argued that a realistic interface, mirroring professional VJ software such as Resolume, would facilitate a smoother transition from the tool to real-world VJing, especially for users planning to perform professionally. However, others favored a more abstract, game-like aesthetic, arguing that a "flashy abstraction" would keep the learning experience enjoyable and distinguish it from traditional software, which might feel intimidating to novices. They suggested that making the interface too realistic could increase cognitive load, whereas a simplified, stylized design might enhance user engagement without sacrificing the core VJ skills being taught. Even though both approaches can be validated, ultimately for the purposes of this research the route of a more flashy abstraction that introduces the basics of VJ is chosen for the reasons already mentioned.

4.1.2 Balancing Structure and Creative Freedom

One of the primary challenges for *Super VJ Pro* is finding the right balance between guiding users effectively and allowing creative expression, which is essential in a creative field like VJing. The initial findings indicate a divide between structured, goal-oriented learning (often beneficial for foundational skill acquisition) and the need for open-ended exploration, which fuels creativity and personal style development. For example, structured gameplay elements, such as tutorials or reward systems, might provide beginners with direction, but too much rigidity could inhibit self-expression. On the other hand, open-ended environments can risk leaving learners without the foundational skills needed to progress confidently, especially in technical areas like timing and effect synchronization. To combat this different mechanics that take inspiration from both camps should be implemented (i.e structured tutorial but more open main gameplay loop with free combos).

4.1.3 Effectiveness of Gamification in Skill Acquisition

The role of gamification in learning complex, performance-based skills like VJing is another area of contention. Similar research in the sports realm argues that gamified elements, such as rewards for task completion, may encourage shallow engagement or "playing to win" instead of fostering deep learning and skill mastery [14]. While gamification can boost extrinsic motivation, its educational impact and enabling intrinsic motivation depends heavily on design. Similar tools, such as rhythm-based educational games (like *Synesthesia*), suggest that when gamification focuses on feedback that highlights technical skills (like timing), it supports skill-building more effectively. However, critics maintain that pure simple gamified rewards, such as points or badges, can dilute the intrinsic motivation required for skill development. This highlights the importance of meaningful gamification for *Super VJ Pro*.

4.1.4 Role of Practice with DJ and Light Integration

The integration of DJ and lighting elements into the VJ tool sparked mixed reactions. Several interviewees supported a realistic approach that incorporates virtual DJ and lighting elements, simulating the collaborative environment of live VJ performances. They argued that this would teach users how to coordinate visuals with music and lighting, essential skills for a professional VJ. In contrast, others felt that integrating these elements would add unnecessary complexity, distracting from foundational VJ skills. Instead, they proposed focusing solely on visual effects and rhythm matching to avoid cognitive overload, suggesting that the role of DJ and lighting integration could be explored in more advanced stages of the tool's development. This feature can be further examined in early testing phases.

4.1.5 Cognitive Load: Complexity vs Accessibility

Looking at the findings from the cognitive load theory perspective, also highlighted disagreements on how much complexity should be present in *Super VJ Pro*. It is expected that high cognitive load could hinder user learning, especially for beginners who may struggle to grasp the multiple technical skills required in VJing. To address this, some interviewees recommended breaking down complex tasks into smaller, manageable chunks, using progressive tutorials to gradually introduce more complex concepts. The other side, however, argues that the tool should embrace a steeper learning curve to better prepare users for real-world VJing, suggesting that cognitive load can also act as a challenge that users gradually learn to manage as their skills develop. Further user testing could be done before reaching a final decision.

4.2 Emerging Themes from Preliminary Interviews

The preliminary interviews revealed various themes essential for creating a functional and engaging educational VJ game/tool. These themes were categorized and prioritized using the **MoSCoW model** to align with the project's limited timeframe and scope. The categorization of the requirements was based on overlapping findings of the interviews, literature review and observations from previous research.

- **Must-have:** Essential features and mechanics required for a functional educational VJ game or tool.

- **Should-have:** Important elements that enhance the learning experience but are not strictly necessary for initial implementation.
- **Could-have:** Additional features that add value but can be postponed if time does not permit.
- **Won't-have:** Elements that are not feasible within the project scope or timeframe.

4.2.1 MoSCoW table

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 4.1: MoSCoW table of the findings

Chapter 5

Conclusion and Future Work

5.1 Summary of Findings

The research found that gamification, combined with cognitive load theory and the VARK model, can significantly enhance the learning experience for beginner VJs. Critical elements include structured tutorials, interactive feedback, and a balance between structured and open-ended gameplay. By focusing on these components, Super VJ Pro can provide a hands-on, engaging, and effective learning experience that prepares beginners for real-world VJing.

5.2 Challenges and Future Directions

Developing Super VJ Pro presents several challenges, such as balancing user engagement with cognitive load and designing intuitive interfaces that accommodate various learning styles. Other challenges include ensuring real-time responsiveness, aligning gameplay with real-world VJ skills, and incorporating effective feedback mechanisms. Future research could explore advanced levels, adding complex interactions with DJ and lighting elements, or implementing user customization options, allowing users to tailor their experience according to their progression.

5.3 Proposed Research Question

The literature review and interviews highlighted key concepts, including cognitive load management, gamification's impact on skill acquisition, and the need for a balance between structured learning and creative freedom. These insights led to defining the initial research question, focusing on identifying game-based elements essential for effectively teaching beginner VJs to use a VJ instrument. The question now specifically addresses both the educational and practical components necessary for a comprehensive beginner's learning experience: *“What key elements must be incorporated into a game-based learning tool to effectively teach beginner VJs how to VJ with an instrument?”*

5.4 Next Steps in the Development Process

Based on the findings, the development process will begin with prototyping the core gameplay features, focusing on tutorials, feedback systems, and rhythm-based mini-games. Iterative testing, following the five step design thinking process [4], with VJs and game

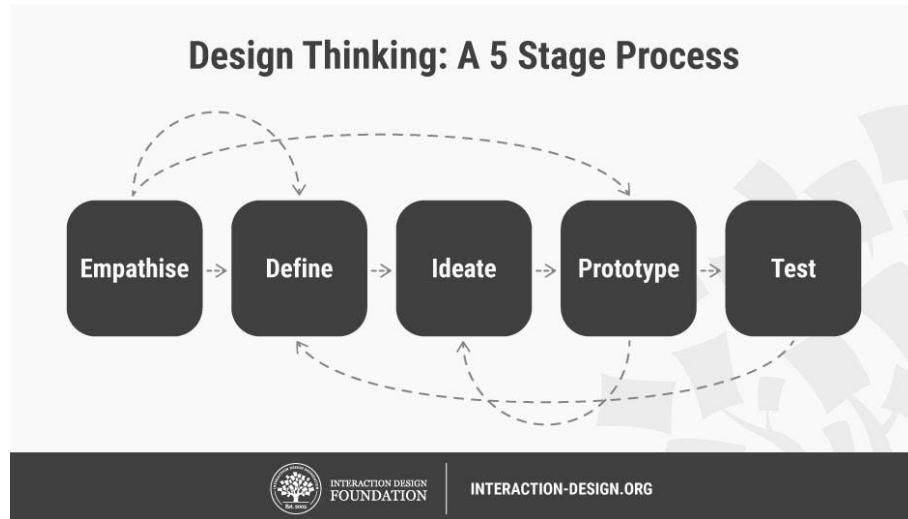


FIGURE 5.1: Five step design thinking process

developers will guide adjustments to ensure usability, learning impact, and engagement. It is worth mentioning that the empathize phase is largely complete with this research. Hence, the development process will mostly focus on the define, ideate, prototype and test cycle. Future phases could explore enhancing realism by incorporating simulated live environments and eventually offering customizable options to support diverse learning paths.

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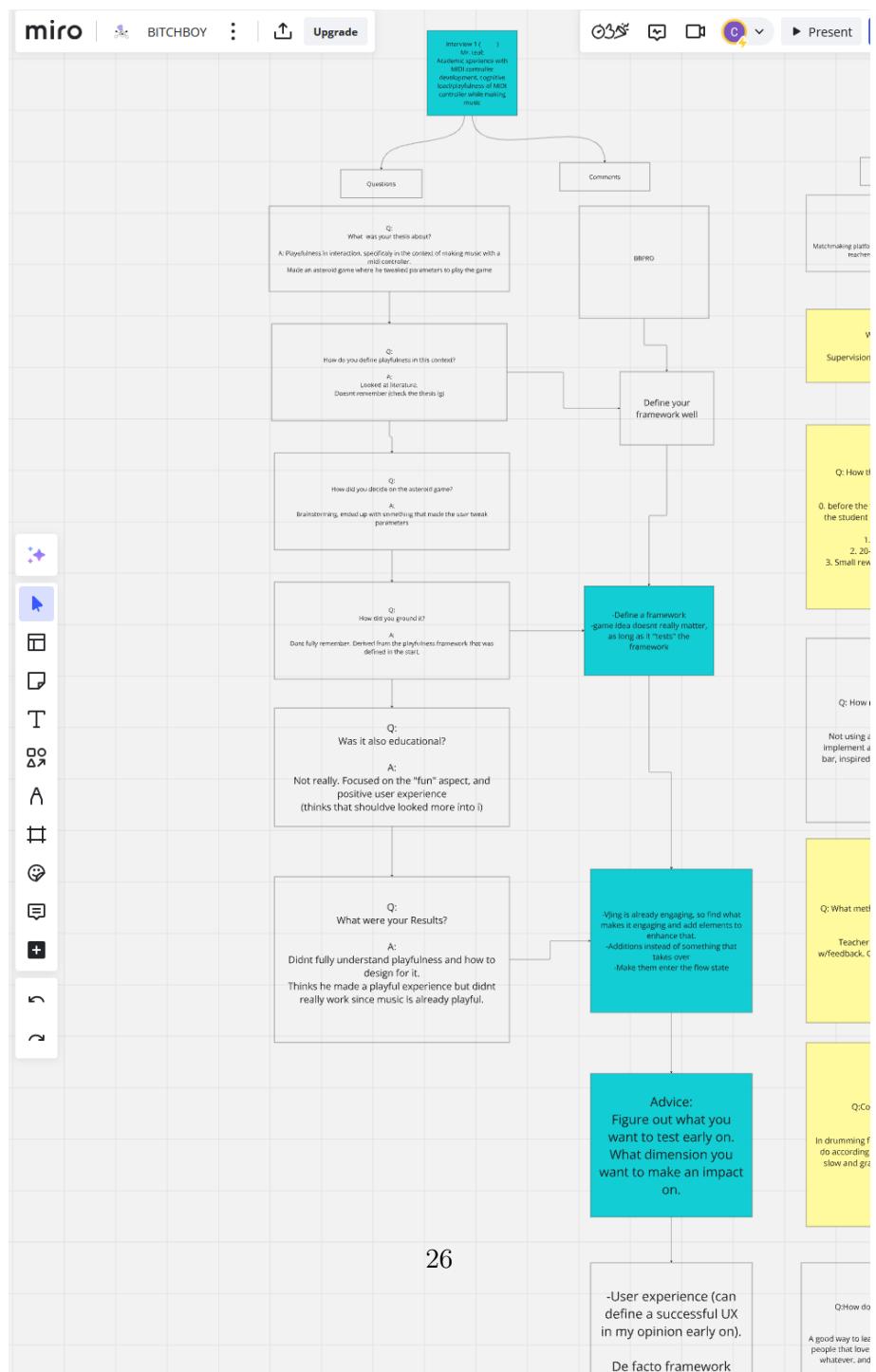
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Appendix A

Appendix

A.1 Interview Transcriptions



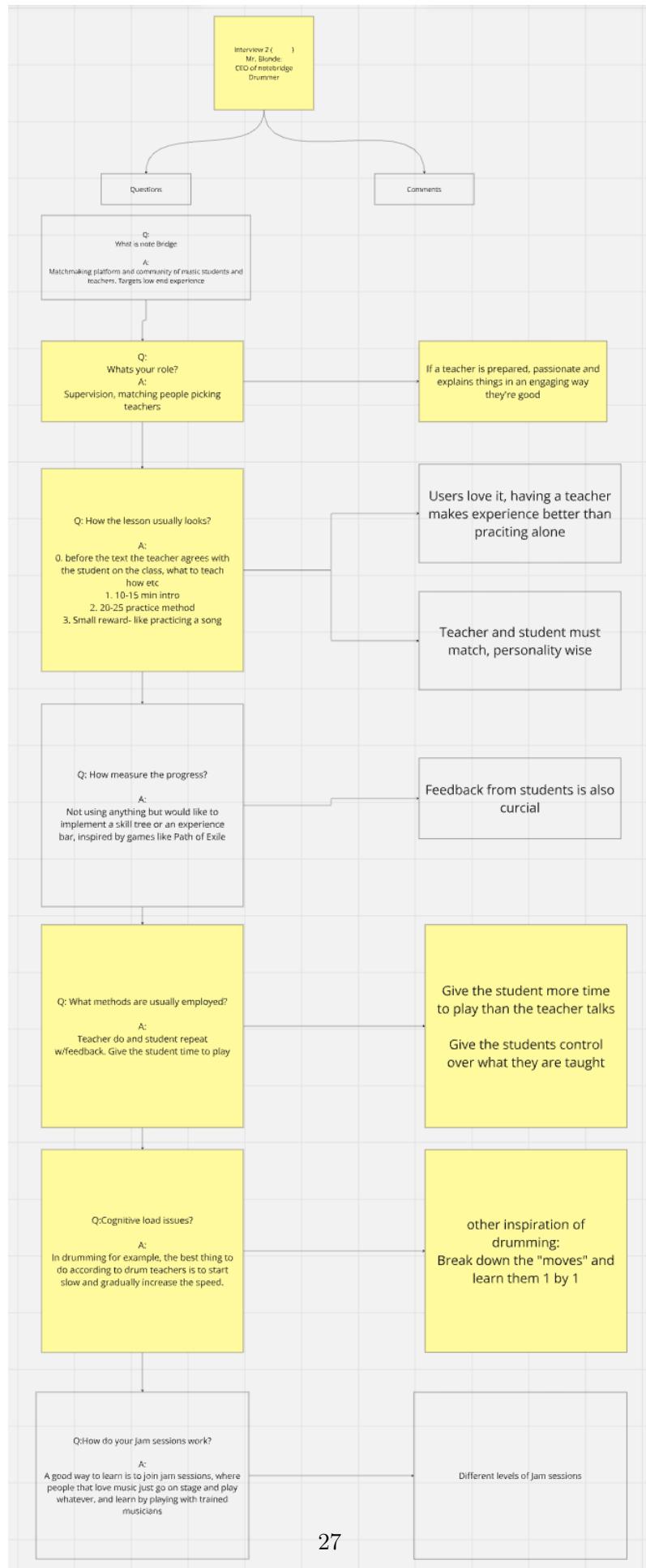


FIGURE A.2: Excerpt from Interview Transcriptions

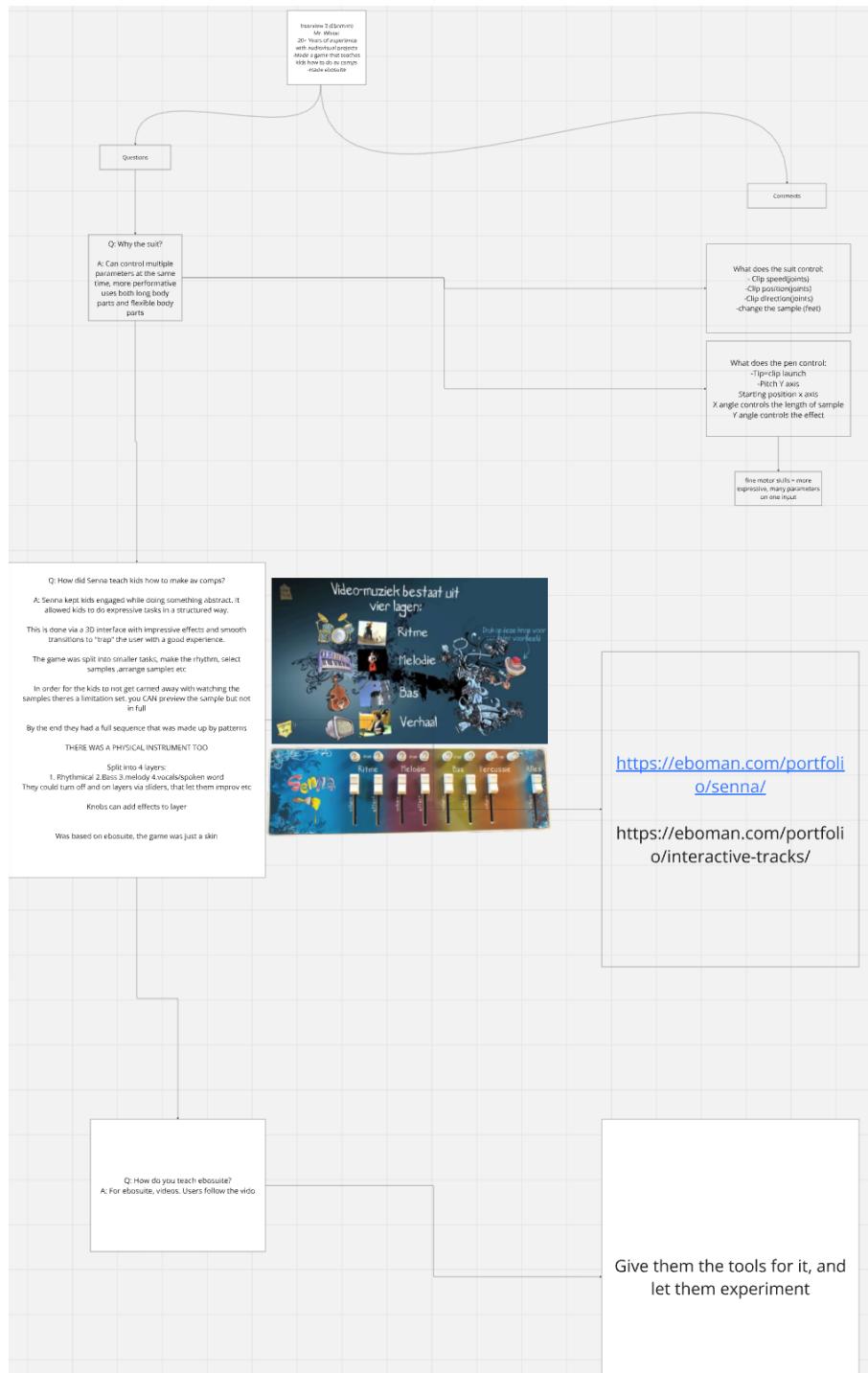


FIGURE A.3: Excerpt from Interview Transcriptions

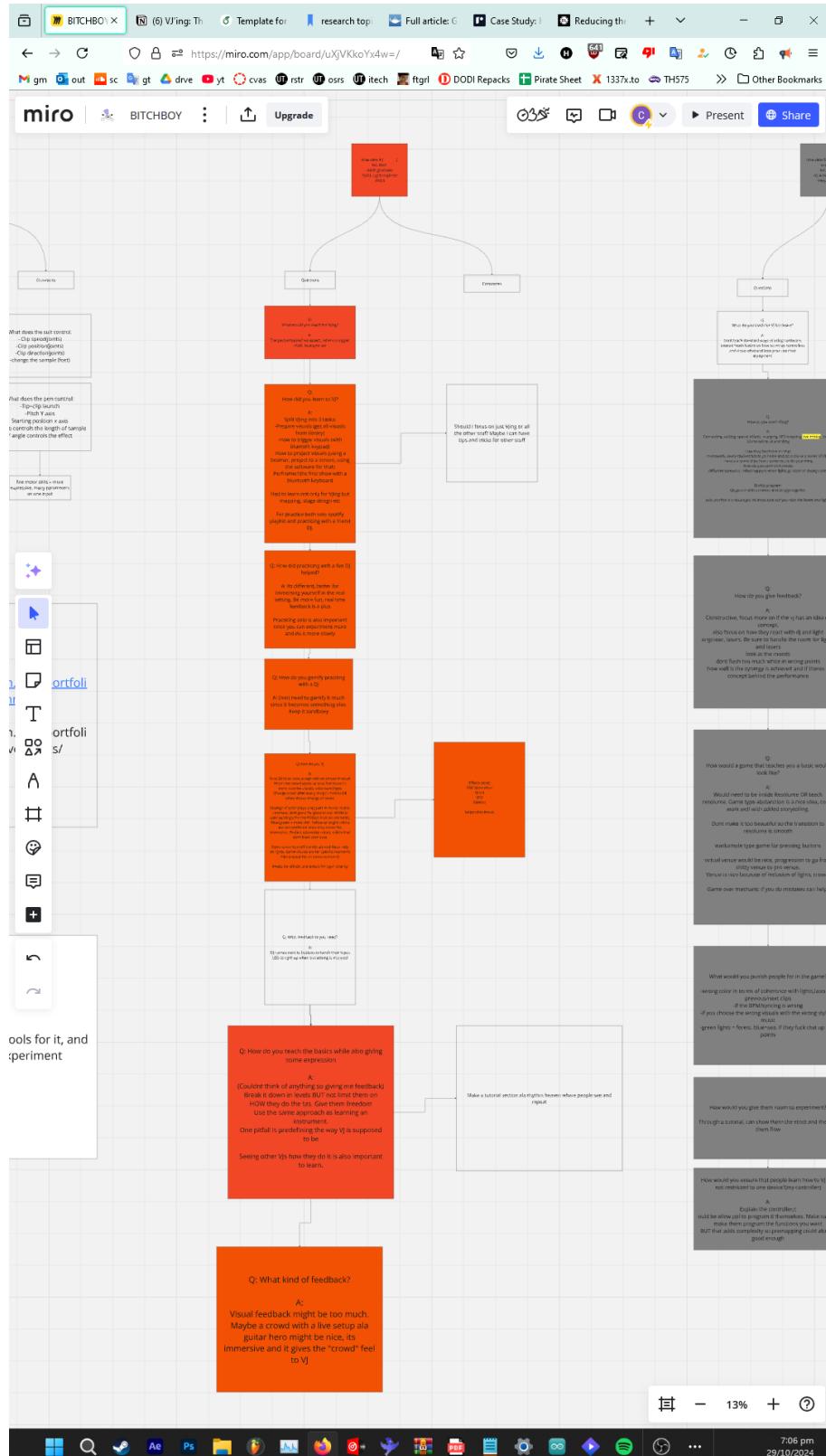


FIGURE A.4: Excerpt from Interview Transcriptions

Interview 5 (Focus Group with VJs)
Mr. Gery
-VJ anatomy.com
-freegery.com

Questions

Comments

Q: What do you teach for VJ hardware?

A: Direct teach standard ways of using hardware, instead teach basics on how to set up controllers and show what and how pros use these equipment

Q: How do you teach Vjing?

A: Concepting, editing, special effects, mapping, LED mapping [live mapping] basics 3D modeling, AI and Vjing
 -how they teach live mixing
 -sometimes like every student has to go home and do a clip or a series of clips
 -there are some clips, here some music do your thing
 -how do you work with breaks
 -different scenarios what happens when lights go black or change color
 -Body programs:
 -You go out with a mentor and do gigs together
 -this practice is encouraged, it's important but you miss the lasers and lights

Q: How do you give feedback?

A: Constructive, focus more on if the vj has an idea or concept,
 also focus on how they react with dj and light engineer, lasers. Be sure to handle the room for lights and lasers
 look at the moods
 dont flash too much white in wrong points
 how well is the synergy is achieved and if there's a concept behind the performance

Q: How would a game that teaches you a basic would look like?

A: Would need to be inside Resolume OR teach resolume. Game type abstraction is a nice idea, could work well with added storytelling.
 Dont make it too beautiful so the transition to resolume is smooth
 wackamole type game for pressing buttons
 virtual venue would be nice, progression to go from shitty venue to pro venue.
 Venue is nice because of inclusion of lights, crowd.

Q: What would you punish people for in the game?

A: -wrong color in terms of coherence with lights, lasers or previous/next clips
 -if the BPM/syncing is wrong
 -If you choose the wrong visuals with the wrong style of music
 -green lights = forest, blue = sea. if they fuck that up lose points

more gameplay elements.
 Could have challenges, from the dj, light guy or crowd i.e., if the dj does blackout and you don't catch it you fail his challenge

Q: How would you give them room to experiment?

Through a tutorial, can show them the strict and then let them flow

Q: How would you ensure that people learn how to VJ but not restricted to one device? (my controller)

A: Explain the controller. It should be able to program it themselves. Make sure to make them program the functions you want BUT that adds complexity so premapping could also be good enough

for beginners
 different colors of knobs,
 potentiometers

FIGURE A.5: Excerpt from Interview Transcriptions

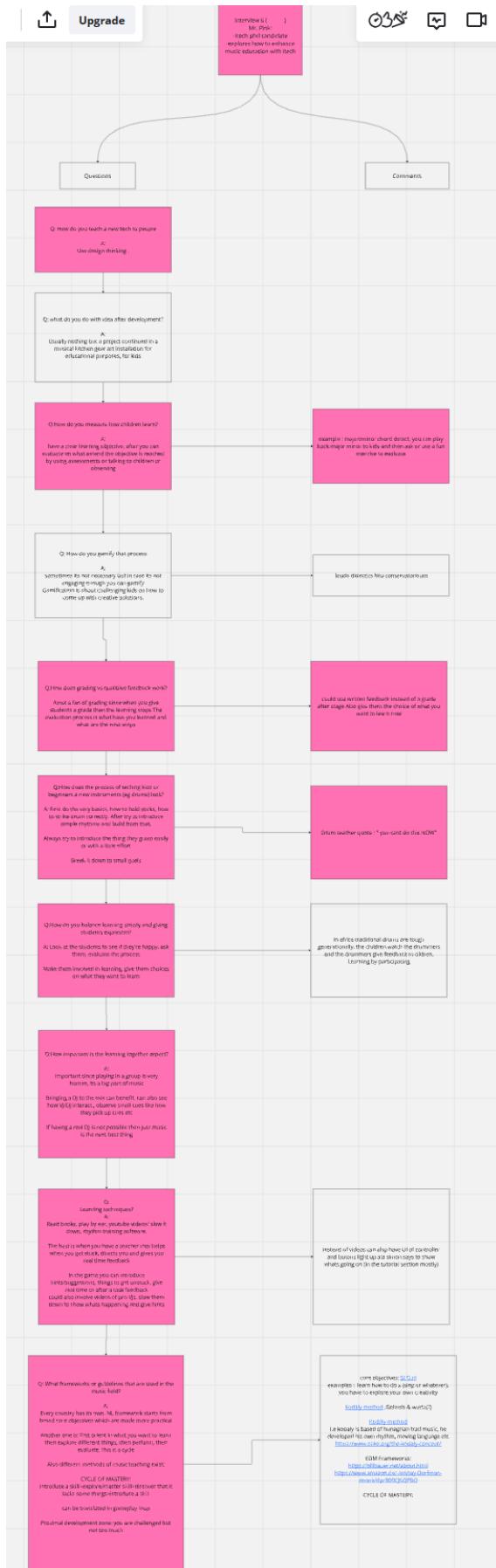


FIGURE A.6: Excerpt from Interview Transcriptions

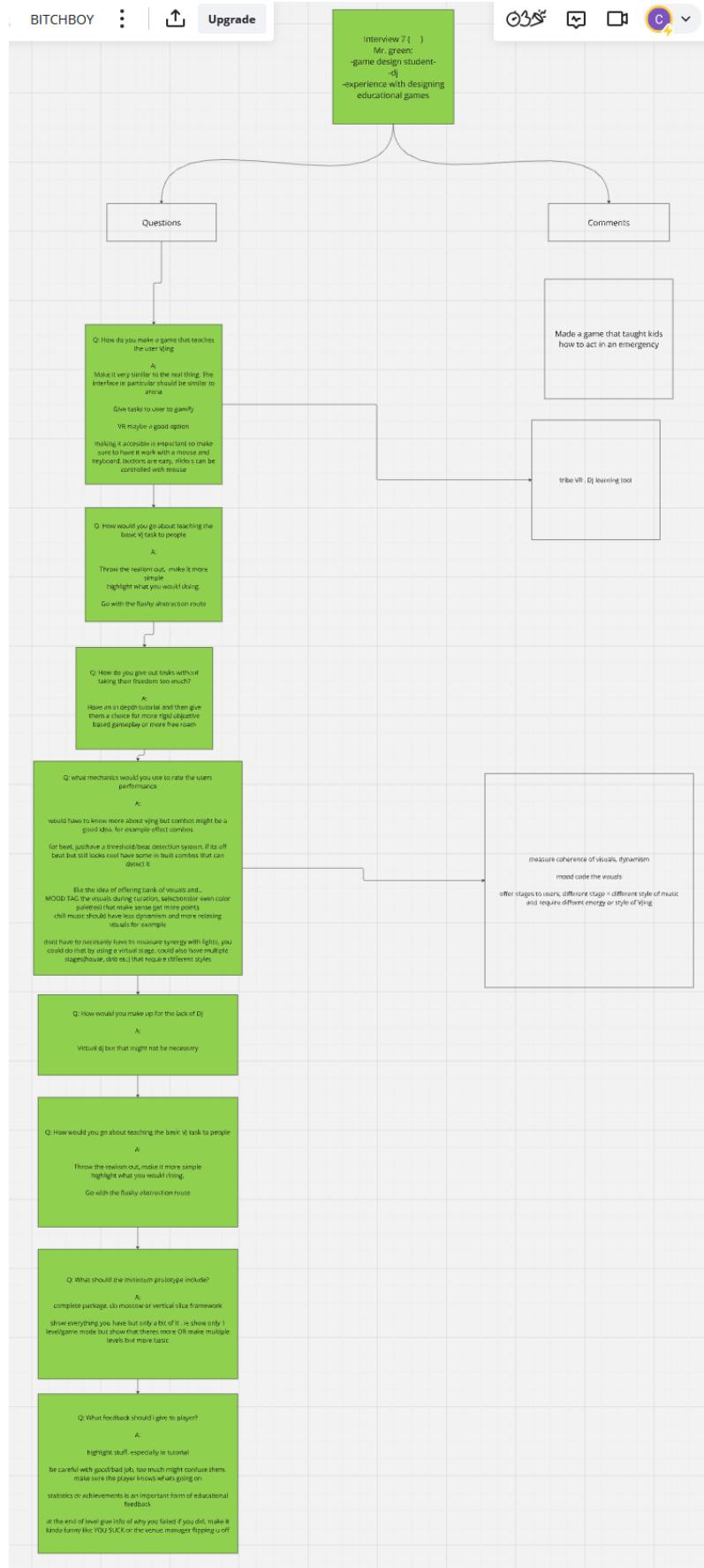


FIGURE A.7: Excerpt from Interview Transcriptions

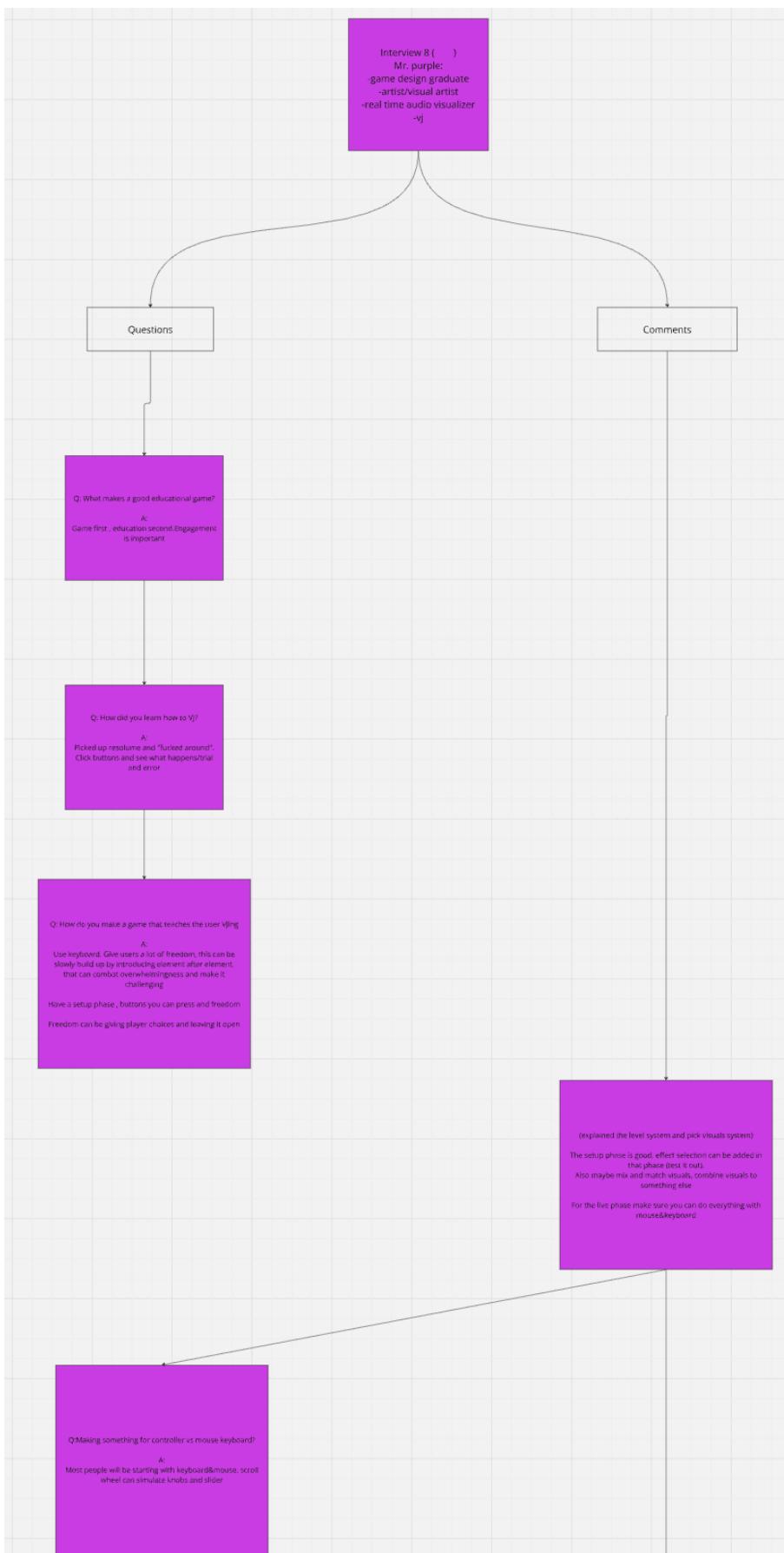


FIGURE A.8: Excerpt from Interview Transcriptions

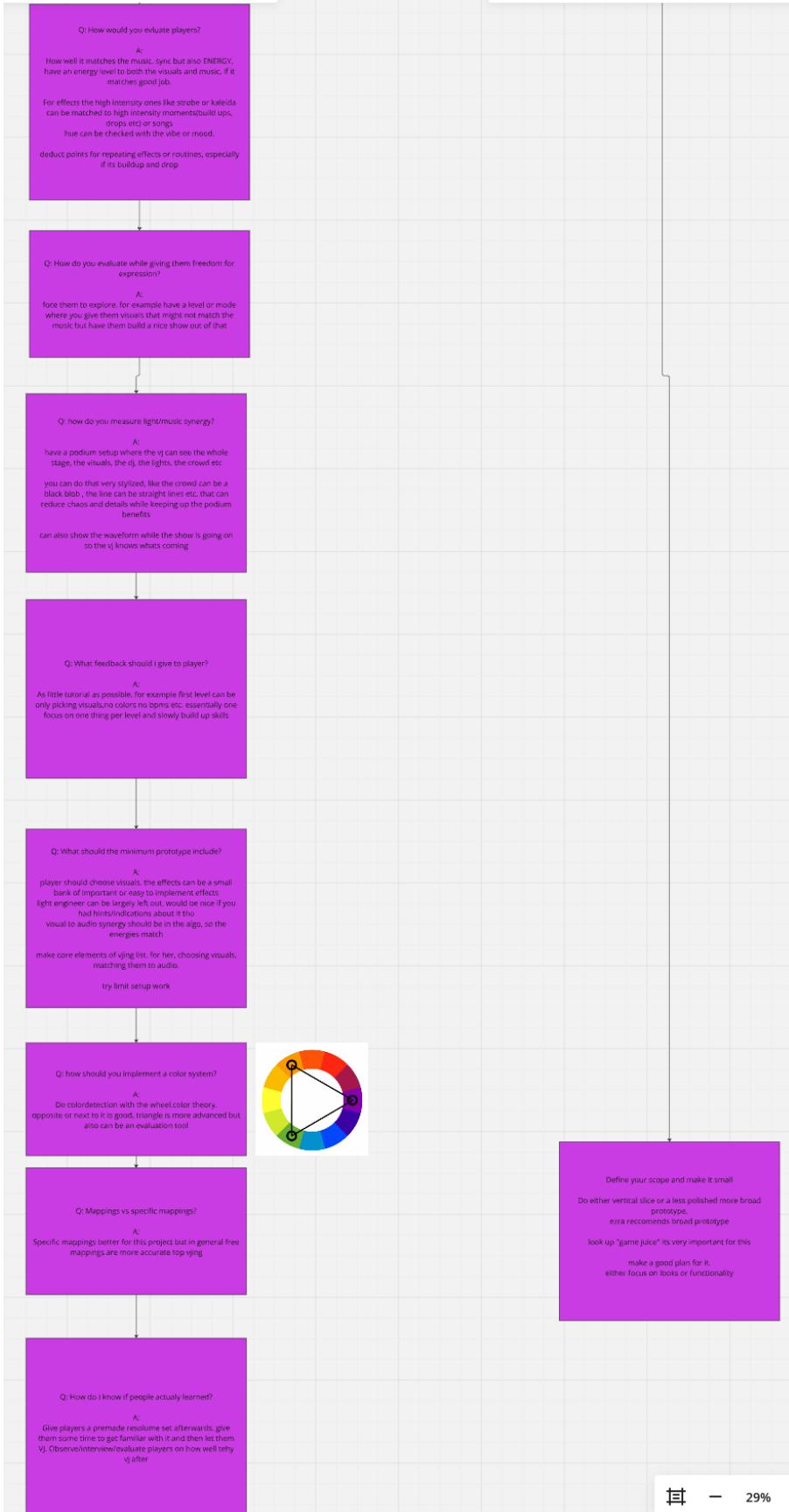


FIGURE A.9: Excerpt from Interview Transcriptions

A.2 Themes

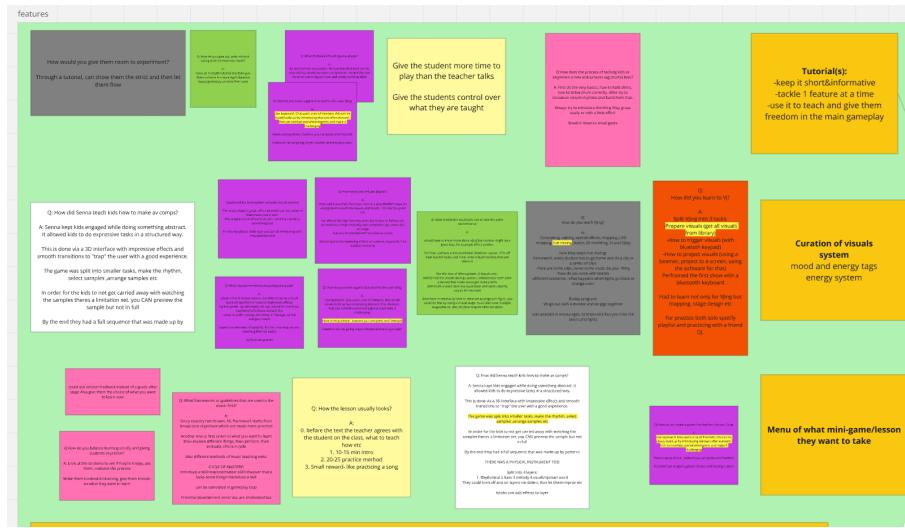


FIGURE A.10: Themes Appendix



FIGURE A.11: Themes Appendix

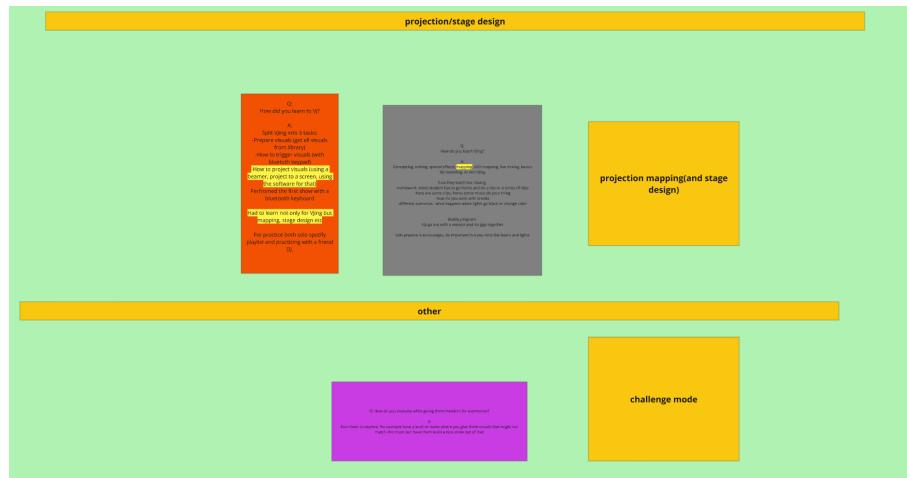


FIGURE A.12: Themes Appendix



FIGURE A.13: Themes Appendix

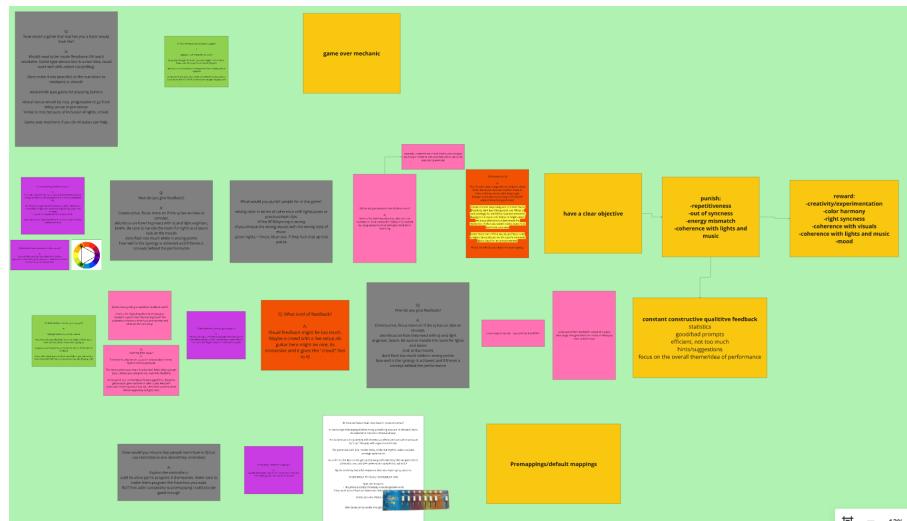


FIGURE A.14: Themes Appendix



FIGURE A.15: Themes Appendix