

# **A Tale of Two Developments: Designing Digital Music Book for Kids and Pre-teens**

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## **ABSTRACT**

In today's digital world, children are learning in ways that are more dynamic and captivating. The project focuses on the design, development, and evaluation of two digital music books aimed at children and pre-teens, applying principles of Child-Computer Interaction (CCI) and Human-Computer Interaction (HCI) to optimize user engagement and learning outcomes. The first project utilizes Google Sites to build a website featuring famous music pieces through an immersive, story-driven layout. The second project uses Wix, a popular web-building platform, to offer enhanced interactivity by adding educational facts and audio. The projects emphasize the importance of usability, accessibility and age-appropriate design in supporting children's diverse cognitive and motor skill levels.

## **Keywords**

Google Sites, Human-Computer Interaction (HCI), Child-Computer Interaction (CCI), Cognitive development

## **1. INTRODUCTION**

Music has been recognized as a crucial element in childhood development, supporting social, emotional, and cognitive development in addition to providing entertainment. Smolarczyk et al. [1] research highlights that children's and adolescents' engagement with music not only enhances learning outcome but also fosters empowerment through digital platforms. Despite its central role in development, the way music is taught in schools has lagged technological advancements. Many young learners are still relying on outdated textbooks, sheet music and formal lessons that can be intimidating. The rapid growth of digital learning resources has reshaped how children and teens engage with education and creativity. Digital learning tools have already made an impact on subjects like math and science where interactive games and adaptive exercises help students learn at their own pace. With the rise of interactive applications and online platforms, children can explore music in a hands-on way. However, designing for young audiences is not as simple as digitizing the textbooks. There could include risks such as exposure to harmful content and cyberbullying, which in turn affect the mental health and overall performance of the child. This is where Human-Computer Interaction (HCI) offers a valuable framework for addressing this gap. HCI research emphasizes usability, accessibility, and user-

centered design, ensuring that digital platforms align with the cognitive and motor abilities of their intended audience. By applying HCI principles, a digital book can be designed to suit the developmental needs of children and teens [2]. For younger users, music-based applications and digital books provide an accessible and engaging way to combine play with education, particularly when designed with usability and age-appropriate interaction in mind. For example, Burton et al. [3] research reveals that music-based apps show strong appeal among younger children when they combine playfulness with intuitive interaction. Amico et al. [4] introduces 'Kibo', a MIDI controller featuring a tangible user interface made of wooden geometric blocks. This design allows children, including those with special needs, to intuitively interact with music parameters, fostering early music education and creativity.

Similarly, Sathara et al. [5] comparative study of educational websites for 7-8 years demonstrated how layout, navigation, and interface choices directly impact engagement and learning outcomes. The literature also demonstrates that adolescents seek different forms of interaction. Gerhardtsson [6] research revealed that children exhibit a preference for creative and engaging websites, with distinct levels of user interaction observed across different sites. This underscores the importance of adhering to appropriate design standards and considering user preferences to enhance engagement and learning outcomes. While children are drawn to bright visuals and immediate rewards, teens prefer autonomy, personalization, and creative tools that allow them to explore music on their own terms. Hourcade [7] further elaborates on this by discussing the cognitive and motor development considerations essential in creating effective interactive technologies for children. Accessibility and inclusivity are recurring themes of HCI research on education. Studies emphasize the need for multimodal learning environments, combining visual, auditory, and tactical interaction to support diverse learners [8][9]. This includes designing for students with dyslexia, ADHD, or sensory challenges, ensuring that technologies do not exclude those who may benefit most. Research in Child-Computer Interaction (CCI) by Kucirkova [10] has long argued for involving young people directly in the design process. CCI has emerged as a critical subdomain which focuses specifically on how children's cognitive, social, and emotional development influences their interaction with technology. Unlike adults, children require interfaces that are

playful, forgiving and exploratory. Researchers stress that children learn best when digital systems are designed to match their natural curiosity, providing opportunities for trial-and-error without the fear of failing [11][12]. In another study, Kucirkova [13] proposed an integrated framework for children's digital books, identifying agency, interactivity, control, and narrative as the key dimensions that shape young readers' engagement. Additionally, studies have shown that visual and auditory enhancements in digital picture books, when aligned with cognitive load principle, can reduce extraneous cognitive load and improve engagement, leading to more effective learning [14]. Recent studies using eye-tracking experiments have shown that children's user experiment with digital books can be effectively measured through a combination of gaze analysis, emotional ranking, and performance metrics, revealing how design elements influence attention and engagement [15]. This highlights the importance of applying HCI evaluation methods to create interfaces that are both engaging and developmentally appropriate.

The primary goal of this paper is to explore how HCI can inform the design of a digital music book that bridges the gap between traditional music education and the expectations of a generation raised on technology. The aim is to create an immersive, interactive experience that makes music education playful for kids, empowering for teens, and accessible for learners of all activities.

## 2. IMPLEMENTATION USING GOOGLE SITES

With regard to ease of use, Google Sites are extremely simple, with a drag-and-drop editor. It has limited design flexibility, but it is quick to build. It is ideal for a "straightforward, no-frills" digital book. With regard to design and interactivity, Google Sites has minimal customization options (basic themes, fonts, and layouts). It is easy to embed multimedia (YouTube videos, Google Drive files, audio). It is less appealing for kids visually as it is hard to make it "fun." With regard to multimedia support, Google Sites has good integration with Google Drive (audio, PDF, video). YouTube and Google Slides can be embedded easily. It has limited options for custom music players or interactive activities. With regard to collaboration and sharing, Google Sites has strong in real-time collaboration (like Google Docs). It is easy to share with specific groups (parents, teachers, students). It works well in educational settings with Google Classroom integration. With regard to cost, Google Sites is completely free with unlimited storage as it is tied to your Google account/Drive. It also has no ads and does not pose any upgrade pressure. With regard to mobile and accessibility, Google Sites are automatically mobile-responsive and has clean layouts but is not optimized for child-friendly interactivity. In general, Google Sites is best if the goal is simplicity, free access, classroom integration, and easy sharing with teachers/parents. Works well for a "study resource" style music book.

### 2.1. Design and Implementation

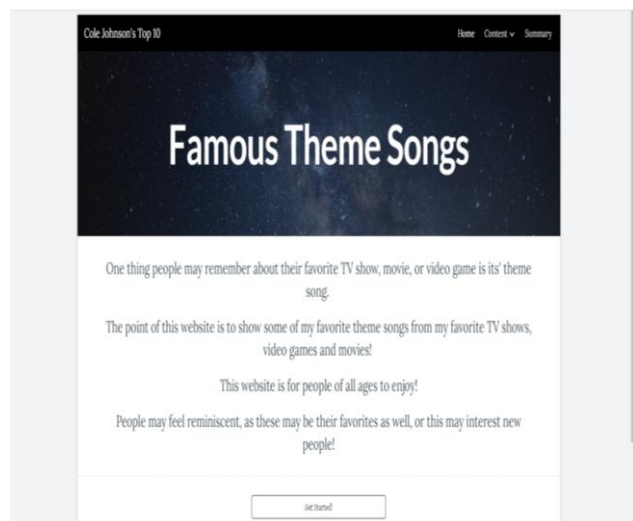
To create the digital book, the implementation steps are:

- Plan the Content: First, defined the age-appropriate sections (e.g., Introduction to Music, Instruments, Songs, Activities). Second, decide on multimedia (videos, audio clips, images, quizzes) to include. Third, organize content into short, engaging lessons or chapters.
- Set Up Google Sites: First, go to Google Sites. Second, Click "+ Blank" to start a new site. Third, choose a playful name for the book.
- Design the Layout: First, select a colorful theme and adjust fonts to be kid-friendly and easy to read. Second, create a homepage with a welcoming message and navigation to different sections. Third, use simple menus for easy browsing.
- Add Content Pages: First, for each topic, create a new page. Second, insert text, images, and embedded videos. Third, upload or link audio files of songs for kids to listen to.
- Embed Interactive Elements: First, use Google Slides to create interactive flashcards or games, then embed them. Second, add Google Forms quizzes (optional). Third, incorporate links to child-friendly external music tools .
- Organize Navigation: First, ensure all sections are easy to access from the menu. Second, add "Back to Home" buttons for younger users. Third, keep layouts simple, colorful, and uncluttered.
- Test the Site: first, preview on desktop, tablet, and phone to check readability and responsiveness. Second, ask a small group of kids/parents to try it and give feedback. Third, simplify or adjust based on how easily children navigate the site.

The following 2 steps are future work:

- Publish & Share: first, click Publish and choose a web address. Second, Set sharing permissions (public, or restricted to parents/teachers). Third, share the link through email, Google Classroom, or QR codes.
- Maintain & Update: first, add new songs, games, or seasonal activities over time. Second, encourage feedback from teachers and kids to improve the resource.

Figures 1 to 4 are examples of the different pages.



**Figure 1: Home page**

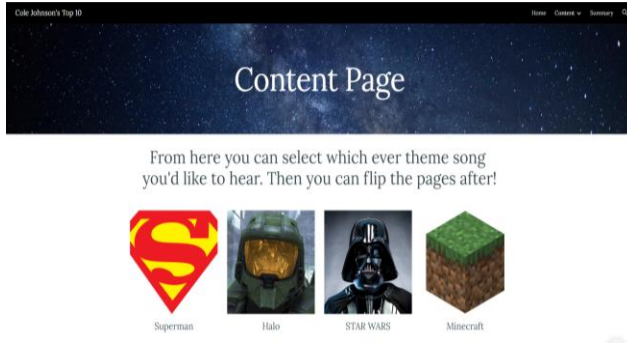


Figure 2: Content page 1/2

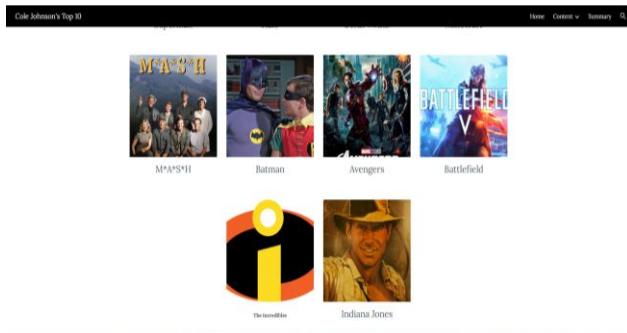


Figure 3: Content page 2/2

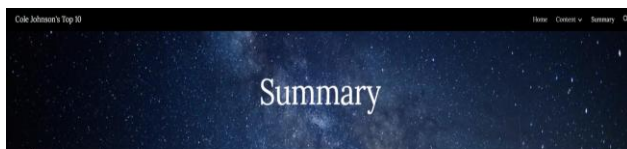


Figure 4: Summary page

## 2.2. Evaluation and results

Subjects were asked to explore the following open ended questions (qualitative):

1. Does this system work?
2. Is the system easy to understand?
3. Is the system easy to use?
4. Can the user easily identify the purpose of the system?
5. What improvements can be made?

Subjects were asked to try the system in a controlled environment, and their behavior was observed. They followed a set of instructions and help was provided when needed. In general, the subjects were able to test different links with no issues. Some struggled while using the touch pad on the laptop. They were able to navigate through the pages easily. One indicated that the concept was nice, and that it actually worked like a book. The table of contents made sense, and the “next” and “previous” buttons all made sense as well. Overall the website was successful in being user friendly, and easy to understand its purpose. All videos played well.

## 3. PROJECT 2 IMPLEMENTED USING WIX

With regard to ease of use, Wix is a more powerful drag-and-drop builder with creative freedom. It offers many templates and design elements. It has a slightly higher learning curve, but allows users to create a more engaging, playful design for kids. With regard to design and interactivity, Wix has Rich design tools, animations, and colorful templates tailored for children. It allows embedding videos, music players, interactive quizzes, and even games. It is better suited for creating a visually engaging and interactive digital music book. With regard to multimedia support, Wix supports audio players, playlists, and background music. It allows embedding SoundCloud, Spotify, or custom files. It allows the creation of interactive music-learning experiences (e.g., clickable notes, animated instruments). With regard to collaboration and sharing, Wix allows collaboration, but less seamless than Google’s ecosystem. Sharing options are mostly public although one can set password-protected pages. It is not as streamlined for school/classroom use. With regard to cost, Wix has free plans available (with Wix branding and ads). The aid plans are required for custom domain, ad removal, extra storage, and advanced features and costs can add up if you want a polished product. With regard to mobile and accessibility, Wix allows mobile editing and customization possible. One can design with accessibility in mind and make a fun, touch-friendly interface for kids. In general, Wix is best if the goal is engagement, color, interactivity, and making music learning fun and immersive. It works well if the goal is to allow kids explore and interact creatively with music elements.

### 3.1. Design and Implementation

To create the digital book, the implementation steps are:

1. Plan the Structure & Content
  - Decide on chapters or sections.
  - Collect multimedia: music clips, child-friendly videos, illustrations, and interactive exercises.
  - Sketch a playful, engaging flow that encourages exploration.
2. Set Up a Wix Account & Site
  - Go to [Wix.com](https://www.wix.com) and sign up.
  - Choose “Education” or “Kids/Entertainment” templates for a colorful starting point.
  - Select Wix Editor (for full customization) or Wix ADI (for quick auto-design).
3. Design the Layout
  - Pick bright colors, large fonts, and playful icons to match a kid-friendly theme.
  - Create a homepage that feels like a “book cover,” with big navigation buttons to each chapter.
  - Use animations or transitions to make navigation fun.
4. Add Pages & Chapters
  - Create new pages for each section.
  - Use interactive galleries, slideshows, or card layouts for lessons.
  - Make content bite-sized and visually engaging.
5. Embed Multimedia
  - Use Wix Music Player to upload songs or playlists.
  - Embed YouTube or Vimeo videos for tutorials and sing-alongs.
6. Add downloadable PDFs or images (
  - Include Interactive Features

- Add quizzes or forms with Wix Forms to test musical knowledge.
  - Use animations to highlight notes, instruments, or buttons when kids hover over them.
  - Incorporate fun drag-and-drop or clickable elements via Wix Apps.
7. Ensure Mobile-Friendliness
    - Switch to the mobile editor and adjust elements so kids can easily use the site on tablets and phones.
    - Make buttons big enough for touch navigation.
  8. Test the Site
    - Preview and test all links, audio, and interactive features.
    - Ask kids, parents, or teachers to try navigating and provide feedback.
    - Adjust layout or content based on ease of use.
- The following are future work:
9. Publish & Share
    - Click Publish to make the site live.
    - Use a free Wix URL or upgrade for a custom domain
    - Share the link with parents, schools, and social media.
  10. Maintain & Update
    - Add new songs, interactive games, or seasonal activities regularly.
    - Monitor site analytics to see what kids engage with most.
    - Keep the design fresh and fun to encourage repeated visits.

Figures 5 to 14 are examples of different pages.

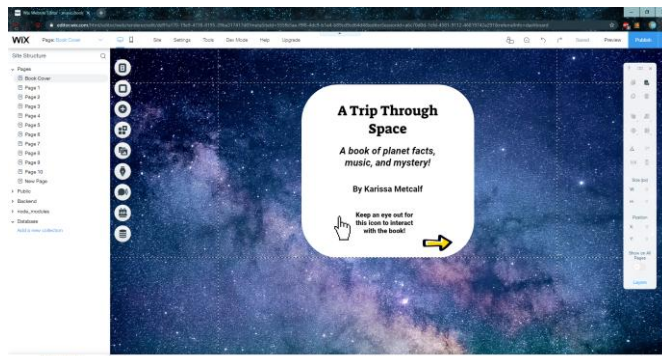


Figure 5. main page



Figure 6. sub page

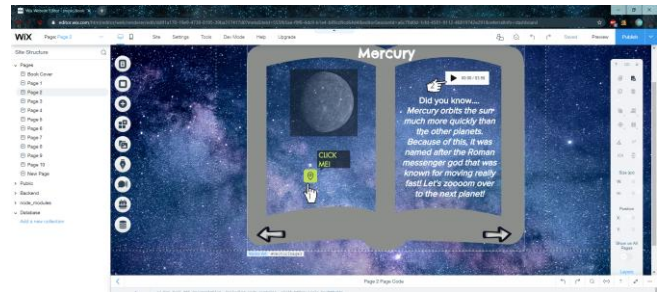


Figure 6. sub page



Figure 7. sub page



Figure 8. sub page



Figure 9. sub page

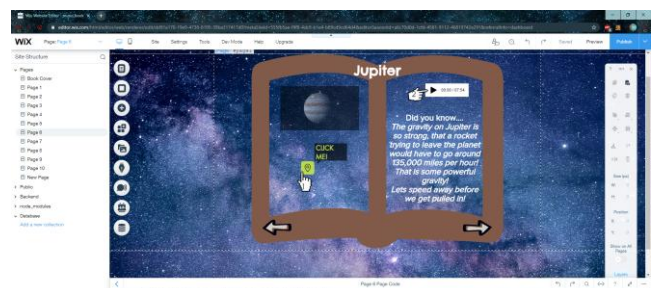


Figure 10. sub page



Figure 11. sub page



Figure 12. sub page



Figure 13. sub page

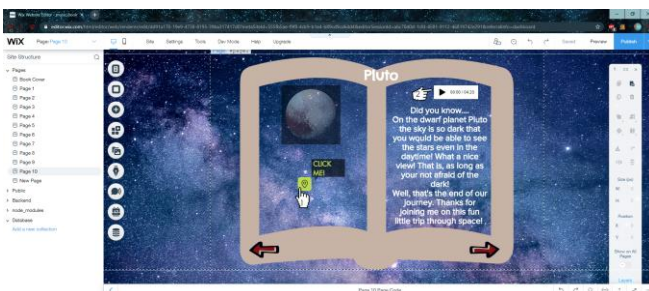


Figure 14. sub page

### 3.2. Evaluation and results

The project was created using Wix.com, which is a website builder that provides a plethora of tools and features for website making. Only a small snippet of extra code was used on each page in order to bring about some user interactivity with the digital book. Wix's development platform, Corvid, was used to add in this JavaScript code. The audio player was used to upload my tracks to play different music on each page.

The usability and user experience goals are:

- The product will have controls that users will have no problem recognizing and knowing how to use.

- The product will have controls and a design that the users will be able to easily use even after not using the product for an extended period of time.
- The product will be designed in a way that allows users to easily carry out the tasks of reading and listening to the music book.
- The product will provide an enjoyable experience.
- The product will entertain users.
- The product will not frustrate users when they are using it.

The goals as questions are:

- Can users recognize the controls used? Will they know how to use them at a glance?
- Will users still recognize how to use the products controls after not using the product after a month? How about after six months or a year?
- How easily are users able to read the music book? Is the music being played loud enough? Is it too loud?
- Does the product provide enjoyment?
- Does the product entertain users, or do they quickly become bored?
- Are using experiencing frustration while using the product?

The user needs and requirements include:

- Engaging story
- Good use of color
- Interactivity

The main tasks are:

- Navigate through book
- Read Book
- View Pictures
- Play Music

Figures 15 to 18 is a summary of the data collected.

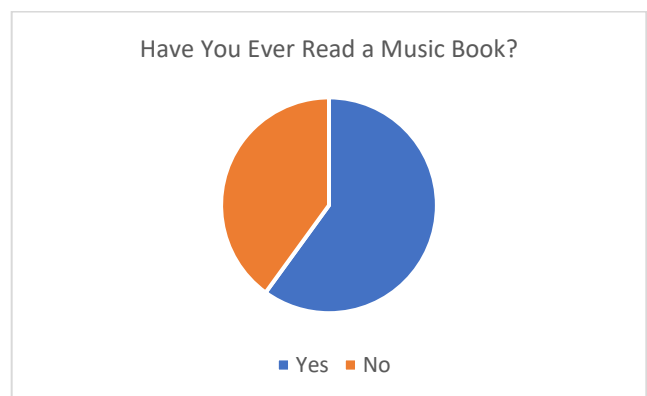


Figure 15. main page

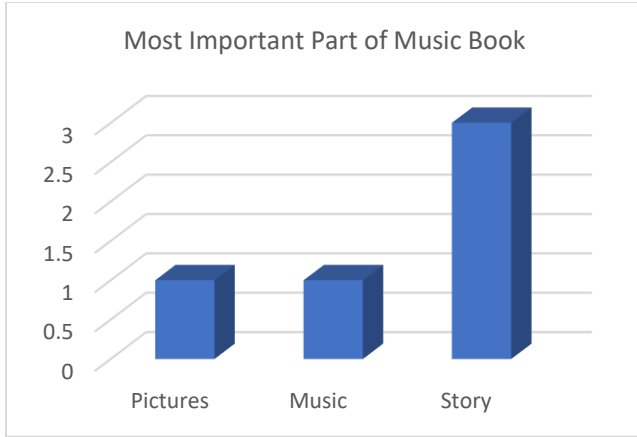


Figure 16. main page

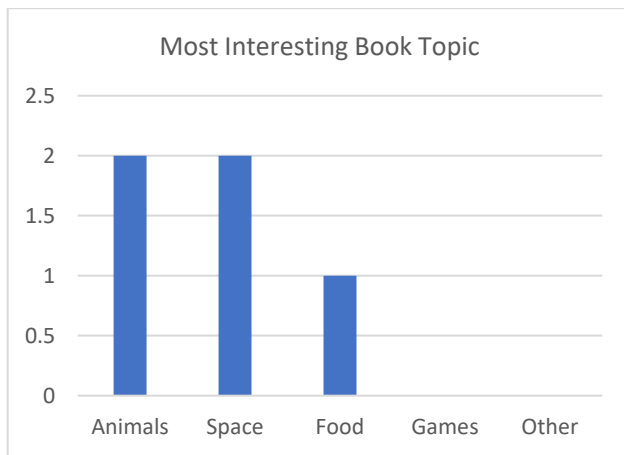


Figure 17. main page

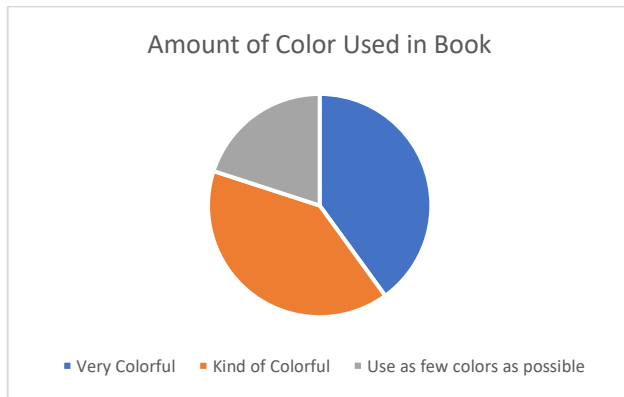


Figure 18. main page

#### 4. ANALYSIS AND COMPARISON

Google Sites and Wix offer different strengths for developing a Digital Music Book for kids and pre-teens. Google Sites is free, simple, and ideal for classroom use, but has limited design features. Wix provides colorful templates, music players, and interactive tools that create a more engaging experience, though it requires more time and may involve costs. In short, Google Sites suits structured educational projects, while Wix is better for dynamic and

playful learning. Table 1 compares the steps taken to implement the system.

**Table 1: comparison of the steps to implement a Digital Music Book for Kids and Pre-teens using Google Sites and Wix.**

|                                   | Google Sites                                                                                                        | Wix                                                                                                                                                                |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Planning Content</b>           | Focus on simple sections (text, images, videos, quizzes). Works best for structured, classroom-style lessons.       | Plan for more playful, interactive chapters with music players, animations, and games                                                                              |
| <b>Setup</b>                      | Access through your Google account. Start with a blank site (no fancy templates).                                   | Sign up on Wix.com. Choose from colorful, kid-friendly templates or use Wix ADI for quick design.                                                                  |
| <b>Layout &amp; Design</b>        | Limited customization (basic themes, fonts, colors). Clean but plain design, suitable for academic use.             | Rich design freedom: bright colors, animations, fun icons. Can look like a playful “storybook” with page transitions.                                              |
| <b>Adding Content</b>             | Easy to embed Google Docs, Slides, Forms, and YouTube videos. Best for structured lessons, worksheets, and quizzes. | Upload audio files with Wix Music Player. Embed videos, add slideshows, and create galleries. Supports downloadable resources and custom visuals.                  |
| <b>Interactivity</b>              | Embed quizzes via Google Forms. Embed interactive slides (Google Slides). Limited animations.                       | Built-in interactive elements (hover effects, animations). Add quizzes, drag-and-drop games, or clickable instruments using Wix Apps. Much more engaging for kids. |
| <b>Mobile &amp; Accessibility</b> | Automatically mobile-responsive.                                                                                    | Has a mobile editor to adjust                                                                                                                                      |

|                                 |                                                                                                                             |                                                                                                            |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
|                                 | Simple layouts but less optimized for playful interactions.                                                                 | layout for tablets/phones. Great for touch-friendly buttons and interactive content.                       |
| <b>Testing</b>                  | Test mostly for navigation and readability.                                                                                 | Test both navigation and interactivity (animations, music players, quizzes).                               |
| <b>Publishing &amp; Sharing</b> | Free publishing with a simple Google URL. Easy to share with teachers, parents, or students (Google Classroom integration). | Free plan has Wix branding and ads. Paid plan needed for custom domain and ad-free experience.             |
| <b>Maintenance</b>              | Quick and easy to update, especially for lesson-style content.                                                              | Updates take more effort but allow more creativity (adding seasonal designs, new music games, animations). |

Table 2 compares the two systems developing a Digital Music Book for kids and pre-teens using Google Sites vs Wix. Google Sites is best to be used if the goal is simple, collaborative, cost-effective music books for classroom or school projects. It is best to use Wix if the goal is highly interactive, visually engaging, and multimedia-rich digital music books for broader or more entertaining experiences.

**Table 2: Comparison table for the two systems developing a Digital Music Book for kids and pre-teens using Google Sites vs Wix**

| Feature / Requirement                    | Google Sites                           | Wix                               | Notes / Comments                                                                    |
|------------------------------------------|----------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------|
| <b>Ease of Use</b>                       | Very simple, beginner-friendly         | Moderate; more tools to learn     | Google Sites is faster to set up; Wix allows more creativity but requires learning. |
| <b>Design &amp; Layout Customization</b> | Limited templates & colors             | Hundreds of templates & drag-drop | Wix is better for visually engaging, kid-friendly layouts.                          |
| <b>Interactive Elements</b>              | Minimal (mostly links, embedded media) | Quizzes, games, animations        | Wix allows gamified learning experiences.                                           |

|                                  |                                   |                                     |                                                                          |
|----------------------------------|-----------------------------------|-------------------------------------|--------------------------------------------------------------------------|
| <b>Audio Integration</b>         | Embed via Google Drive or YouTube | Built-in audio player, playlists    | Wix allows richer audio experiences (loops, background music).           |
| <b>Video Integration</b>         | YouTube or Google Drive           | Built-in video player, streaming    | Both support video, Wix supports more customization.                     |
| <b>Multimedia Interactivity</b>  | Limited                           | Rich interactive widgets            | Wix supports animations, hover effects, and drag-and-drop interactivity. |
| <b>Collaboration</b>             | Real-time multi-user editing      | Limited; mostly single-user editing | Google Sites is better for classroom group projects.                     |
| <b>Mobile Responsiveness</b>     | Automatic, limited customization  | Fully responsive, customizable      | Wix allows adjusting layouts specifically for mobile.                    |
| <b>Cost</b>                      | Free with Google account          | Free limited; Premium recommended   | Wix free version has branding and feature limits.                        |
| <b>SEO &amp; Discoverability</b> | Basic SEO                         | Advanced SEO tools                  | Wix is better if publishing publicly and reaching wider audiences.       |
| <b>Security &amp; Privacy</b>    | Google-hosted, access control     | SSL included, privacy options       | Both are secure; Google Sites is easier for restricted access.           |
| <b>Ease of Publishing</b>        | Instant, shareable link           | Publish to custom domain            | Wix allows more branding and professional appearance.                    |
| <b>Best for Kid Engagement</b>   | Basic content presentation        | Interactive, multimedia-rich        | Wix is better for keeping pre-teens engaged with visuals and games.      |

## 5. CONCLUSION

In developing a Digital Music Book for kids and pre-teens, both Google Sites and Wix.com present valuable but distinct

advantages. Google Sites offers simplicity, free access, and seamless integration with classroom tools, making it highly suitable for educational environments where ease of sharing and collaboration are priorities. In contrast, Wix provides richer design flexibility, multimedia options, and interactive features that can enhance engagement and make the learning experience more visually appealing and playful for young audiences. Ultimately, the choice depends on the intended purpose: Google Sites is ideal for straightforward, accessible, and school-centered projects, while Wix is better suited for creating a dynamic, interactive, and entertainment-oriented digital music experience.

Future development of the digital music book will focus on enhancing interactivity through gamified lessons, quizzes, and multimedia to engage children effectively. Personalized learning paths and interactive music notation tools can support adaptive skill development. Expanding mobile access and accessibility features for children with hearing or visual impairments will broaden usability. Collaborative features, such as peer sharing and teacher dashboards, alongside analytics for progress tracking, will improve guided learning. Cross-platform integration with music apps and libraries will further enrich resources. While Google Sites supports collaborative classroom use, Wix offers greater potential for visually rich and interactive content, guiding platform choice for future enhancements

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