



Patched Studio

Research

AI Fairytales

Inhoud

Effect blue light on children	3
Attention span children	4
AVI Reading level of children	5
AVI Reading Levels Explained Briefly:	5
Research Target Audience – Frequency of reading bedtime stories.....	7
Introduction	7
Frequency of reading aloud	7
Occasions	8
Research AI – How can AI ensure the stories are age related and align with education ..	9
Introduction	9
Storytelling	9
Difference between human and AI story telling.....	9
Image Generation	10
Generative Adversarial Networks (GANs).....	11
How AI Image Generators Work	11
Limitations and capabilities	11
Dependency on Pre-Trained Images and Bias	12
Competitive analyses of trending AI image generators	12
Conclusion.....	13
Research Target audience Accesibility.....	14
Introduction	14
Benefits of reading aloud to children with disabilities in general	14
Benefits of reading aloud in family groups	14
Conclusion.....	14
Competitors.....	16
Direct competitors.....	16
Wonder tales	17

Effect blue light on children

Blue light, particularly from screens like smartphones, tablets, and computers, can have several effects on children:

1. Disrupted Sleep Patterns: Exposure to blue light, especially in the evening, can interfere with the body's production of melatonin, a hormone that regulates sleep. This may make it harder for children to fall asleep, leading to sleep deprivation.

2. Eye Strain and Discomfort: Extended screen time can cause digital eye strain, leading to symptoms like dry eyes, blurred vision, and headaches. While there's no strong evidence that blue light causes permanent eye damage, it can contribute to discomfort and fatigue.

3. Potential Impact on Development: Poor sleep quality due to blue light exposure can affect cognitive functions like attention, learning, and memory. Sleep is crucial for brain development in children, and disruptions can have long-term impacts.

4. Increased Risk of Myopia: While not directly linked to blue light, excessive screen time has been associated with a rise in myopia (nearsightedness) among children. Time spent outdoors has been shown to reduce the risk of myopia, suggesting that screen-heavy lifestyles may play a role.

To minimize the effects of blue light on children, experts recommend limiting screen time, especially before bed, and using blue light filters or night mode settings on devices. Encouraging outdoor activities during the day can also help maintain eye health and improve sleep patterns.

Sources:

<https://health.ucdavis.edu/blog/cultivating-health/blue-light-effects-on-your-eyes-sleep-and-health/2022/08>

<https://www.optometrists.org/childrens-vision/guide-to-childrens-eye-exams/8-tips-to-protect-your-childs-vision/does-blue-light-affect-children/>

<https://blog.georgiachildrens.org/2021/02/08/kids-and-the-blue-light-effect/>

Attention span children

The attention span of children between the ages of 2 and 10 varies significantly based on their developmental stage, individual interests, and environmental factors. When it comes to listening to a story, here's a general breakdown of typical attention spans for this age group:

1. Ages 2 to 3: At this stage, children have very short attention spans, typically around **2 to 5 minutes** for focused listening, especially if the story is simple, engaging, and involves interactive elements like pictures or sounds. Their attention tends to wane quickly unless they are highly interested.

2. Ages 4 to 5: By preschool age, children's attention spans improve, allowing them to focus for **10 to 15 minutes**. They can enjoy slightly longer and more complex stories, especially if the stories involve repetition, familiar characters, or vivid illustrations.

3. Ages 6 to 7: School-aged children in this range can sustain attention for around **15 to 25 minutes**. They are better able to follow multi-step narratives and can appreciate stories with more developed plots. Interactive storytelling or asking questions during the reading can help maintain their engagement.

4. Ages 8 to 10: Children in this age group can maintain focus for **20 to 30 minutes** or more, especially if the story is well-structured and aligns with their interests. They are capable of understanding more complex narratives and can follow longer chapters in books.

Key Factors that Impact Attention

- **Engagement:** Stories that involve interaction, ask questions, or are related to a child's interests can hold attention longer.
- **Story Complexity:** Shorter, more visual, and easier-to-follow stories work better for younger children, while older children can handle longer and more detailed narratives.
- **Environment:** A calm and quiet setting can significantly improve a child's ability to focus.

This progression in attention span is part of natural cognitive development, as younger children have more difficulty filtering distractions and maintaining focus for extended period.

Sources:

<https://www.brainbalancecenters.com/blog/normal-attention-span-expectations-by-age>

<https://readykids.com.au/average-attention-span-by-age/>

<https://www.kids-houston.com/normal-attention-spans-for-kids/>

AVI Reading level of children

AVI Reading Levels Explained Briefly:

The different reading levels are indications. But how does AVI work? Each letter stands for:

- **E** = end, the final phase in each grade in primary school, leading to the start of the next grade.
- **M** = middle, the phase around the middle of the school year.

As you can see, most reading levels always overlap with the next school year. This is because children move up a step in reading each year.

AVI-Start, M3, and E3: The Early Years

Learning to read well begins with simple words, which usually happens in year 3 (first grade in the Netherlands), right after kindergarten.

Reading level explanation: Simple words and short sentences.

Age: 5-8 years

Primary school group: Beginning of year 3 up to the beginning of year 4.

AVI M4 to M5: Building and Exploration

Once they have mastered the basics, children move on to the next reading level. Words and sentences become slightly more challenging. If they don't reach this level yet, it's advisable to step back a bit first.

Reading level explanation: Increased complexity with longer sentences.

Age: 7-9 years

Primary school group: Middle of year 4 to the middle of year 5.

AVI E5 to M6: The Middle Years of Reading Development

As children advance further in reading, they move to a higher level. Now, words and sentences form the foundation for fully independent reading.

Reading level explanation: Advanced sentences and storylines.

Age: 9-12 years

Primary school group: End of year 5 to the middle of year 6.

AVI E6 to E7: Mastery and Preparation for Advanced Reading

At this level, children go one step further, preparing for secondary school.

Reading level explanation: Advanced language and complex storylines.

Age: Corresponding to year 7 and 8.

Primary school group: End of year 6 to the end of year 7 and year 8.

AVI Plus

Reading level explanation: AVI Plus is the final reading level. Children reach this level in year 8. They can then read more difficult books. But E7 is the average reading level in year 8.

Source: <https://www.kinderboekenland.nl/blogs/nieuws/avi-leesniveau-uitleg-hoe-werkt-avi>

Research Target Audience – Frequency of reading bedtime stories

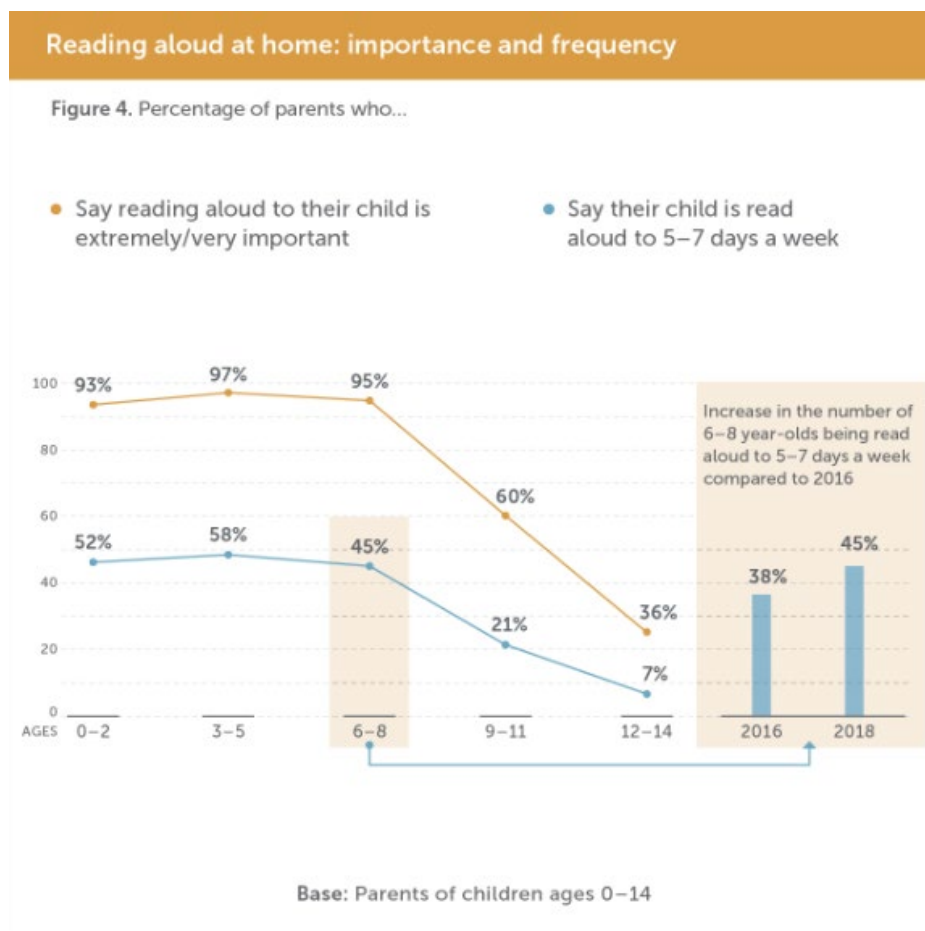
Introduction

This research study investigates the frequency of bedtime stories read to children across different countries. It also aims to analyze how often parents in various cultures engage in reading as part of their child's bedtime routine. The focus is on identifying factors that will contribute to variations in reading habits.

Frequency of reading aloud

The Kids & Family Reading Report shows that more parents are starting to read to their kids earlier than before. In 2014 only 30% of parents with children aged five or younger read to them before they turned three months old, but now that number has gone up to 43%. Also by their first birthday, 77% of parents have started reading to their kids. Overall, Parents and kids really enjoy reading together. More than 80% of them say they love or like read-aloud time. The report also shows that kids aged 6–8 and their parents have grown to love this time more than they did in 2016. Parents and kids both agree that reading aloud is special because it gives them time to be together.

For children ages 0–5, 55% are read to at least five days a week, and 37% are read to every day. Some of these kids, around 52%, are even read to more than once a day. There's also a rise in the number of kids aged 6–8 being read to, going from 38% in 2016 to 45%. But as kids get older, the amount of read-aloud time drops quickly. Most parents read to their kids 5–7 days a week before they start kindergarten, but after age five, the numbers go down a lot. Parents say this happens because kids start reading on their own. It's also mentioned that families with lower incomes read aloud less often than those with higher incomes.

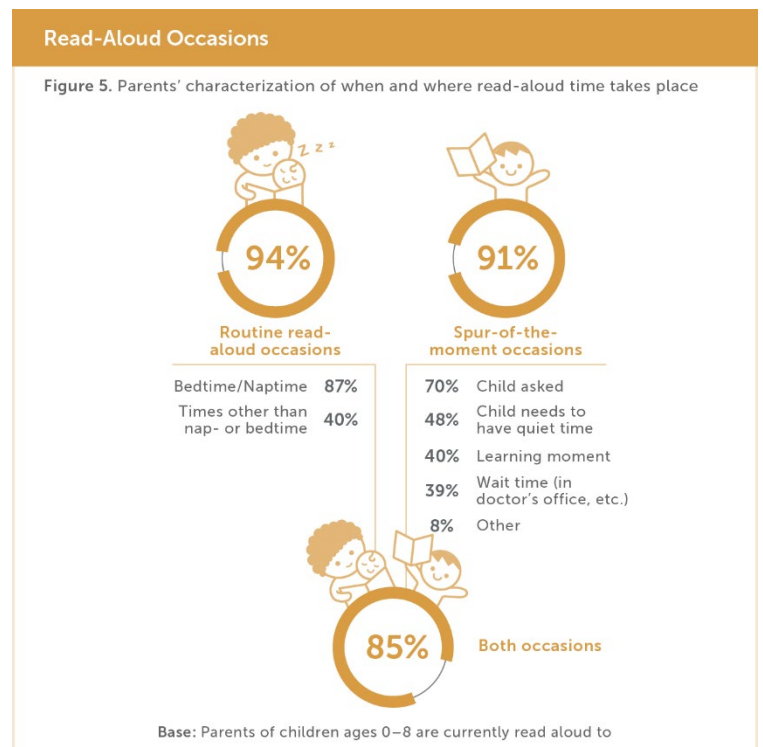


Occasions

Studies say that 94% of parents with kids aged 0–8 include reading aloud as part of a routine, like during bedtime, naptime or even at mealtime and bath time. Another 91% of parents say they read to their kids at random times like when their child is curious or wants to learn something. Most parents, 85% do both routine and impromptu reading. It also mentions that more moms read to their kids than dads (93% vs 79%), but in 66% of cases reading includes more than just the parent and child often with the other parent or siblings joining in.

Sources:

The Rise of Read-Aloud. (z.d.). <https://www.scholastic.com/readingreport/rise-of-read-aloud.html>



Research AI – How can AI ensure the stories are age related and align with education

Introduction

This research investigates how AI can help ensure stories are suitable for different age groups and align with educational standards. AI is being used more in education to personalize learning and improve content. When it comes to storytelling, AI can analyze text to make sure it matches the right age level, both in terms of complexity and themes. It can also help ensure that stories meet specific learning goals, making them both engaging and educational. This study explores how AI does this and the impact it could have on teaching and learning.

Storytelling

AI generated story telling can be defined using the criteria whether the story is sensible, specific, interesting, safe and to realism. To be able to understand this you'll have to know the weaknesses of AI generated stories:

Inability to explore and exercise curiosity: AI can generate content based on the data it has, but it doesn't actually wonder or explore new ideas like humans do. It can't independently get curious or think outside of what it already knows.

Inability to understand context: While AI can process a lot of information, it struggles to grasp the deeper meaning behind situations. It often misses context, which can lead to misunderstandings in storytelling or other tasks.

Lack of emotional intelligence: AI doesn't experience emotions, so it can't truly understand or respond to feelings. It can mimic empathy or sympathy in stories or conversations, but it doesn't really "feel" what it's communicating.

Questionable ethical judgment: AI follows the rules it's programmed with, but it doesn't have moral values. It might give inappropriate responses or make decisions that are ethically questionable because it can't make true ethical judgments.

Limited adaptability: AI can handle the tasks it's trained for, but it's not great at adapting to completely new or unexpected situations. It can struggle when there's no clear pattern or data to follow.

Difference between human and AI story telling

There are clear differences between stories written by humans and those generated by AI. These differences are most noticeable in areas like creativity, emotional depth and ethical understanding.

Creativity and Originality

Human-written stories tend to be more creative and original. Humans bring a personal touch, creating detailed characters, unique plots, and adding subtle descriptions that make stories feel more authentic. AI on the other hand, generates text based on

patterns in data it has been trained on. While it can produce content quickly, it often lacks originality and relies on existing ideas, leading to more formulaic or repetitive writing.

Context and Emotional Depth

Human writers excel at capturing emotions and complex human experiences, making their stories richer and more relatable. They are able to weave in personal feelings and reactions, creating characters with depth and a range of emotions. However AI doesn't actually "feel" anything and can only simulate emotional content based on data patterns. This often results in stories that feel flat or fail to convey the emotional nuance that human readers connect with.

Personal Experience and Judgment

Humans draw on their own experiences and knowledge when writing, allowing them to add context, personality, and perspective to their stories. This gives human-written content a more authentic and grounded feel. AI lacks personal experiences, and therefore its stories may come across as generic or lacking the subtlety that comes from real-life insight.

Ethical Understanding

Human writers have the ability to understand and evaluate the ethical implications of their stories. They can think through the consequences of the actions of their characters or the message the story sends. AI, however, doesn't understand ethics or moral values. It follows the instructions given to it without considering the ethical weight of the content it produces.

Adaptability and Problem-Solving

Human writers can adapt their writing style or narrative approach based on the audience or the situation. They can pivot if a story needs to take a new direction or if a particular challenge arises in the writing process. AI, on the other hand, follows a set pattern based on its training data and has limited ability to creatively solve problems or adapt to unexpected story developments.

Image Generation

AI image generation refers to the process of creating images using artificial neural networks, which are trained to produce visuals from scratch based on text input provided in natural language. These AI systems have the capability to generate original, realistic images by interpreting descriptions and combining various styles, concepts, and attributes into a cohesive output. This process is part of Generative AI, a branch of artificial intelligence that focuses on content creation.

These generators are trained on large datasets containing a vast array of images. During this training, the algorithms learn the features, styles, and patterns within the images. As a result, they become capable of generating new images that resemble the

characteristics of the data they were trained on. These systems use different techniques to produce visuals, with the most common being:

Neural Style Transfer:

This method allows the AI to apply the style of one image onto another. It's useful for blending the aesthetic of different images or artistic styles into new content.

Generative Adversarial Networks (GANs)

GANs consist of two neural networks—a generator and a discriminator—that work together. The generator creates new images, while the discriminator evaluates them against real images from the training data. Over time, the generator improves its ability to create highly realistic images.

Diffusion Models

These models work by simulating a process similar to the diffusion of particles, where an image starts as random noise and gradually transforms into a structured, recognizable visual. The result is a clear, realistic image.

How AI Image Generators Work

AI image generators rely on two key technologies: Natural Language Processing (NLP) and Generative Adversarial Networks (GANs).

Text Understanding Using NLP

AI image generators start by processing text prompts using NLP models like CLIP. These models translate the text into numerical data called vectors, which capture the meaning and relationships of the words. For instance, if the prompt is "a red apple on a tree," the AI encodes "red," "apple," and "tree" and uses this data to generate an accurate image where the apple is positioned on the tree.

Generative Adversarial Networks (GANs)

GANs involve two neural networks: a generator that creates images and a discriminator that judges their realism. These networks compete, with the generator improving its ability to produce lifelike images over time. GANs are a widely used model in AI image generation, known for their ability to create highly realistic visuals.

Limitations and capabilities

While AI image generators have shown impressive capabilities in creating visually stunning and often overly realistic images, there are several limitations and controversies surrounding their use. These challenges primarily relate to issues of quality, authenticity, and bias in the images produced.

Quality and Authenticity Issues

AI-generated images often exhibit imperfections, especially when it comes to producing realistic human faces or objects. For example, models like StyleGAN and DALL-E have struggled with small details such as unnatural facial features, misaligned teeth, or distorted hands. Common errors include hands with extra fingers or other odd

proportions. These visual inconsistencies reduce the authenticity of the generated content, despite the AI’s overall ability to create lifelike images.

Dependency on Pre-Trained Images and Bias

The quality of AI-generated images depends heavily on the datasets used to train the models. These pre-trained datasets may carry inherent biases, which can lead to skewed or inaccurate representations of certain groups or concepts. A well-known study, the Gender Shades project, revealed significant bias in commercial AI systems, particularly in their accuracy across different skin tones and genders. The research showed that AI models performed better for lighter-skinned males and were less accurate for darker-skinned females. This highlights the need for more diverse training data to improve fairness and reduce bias in AI-generated imagery.

Competitive analyses of trending AI image generators

Overview

DALL-E is known for its high-resolution images and flexibility in generating diverse styles, including pixel art, oil paintings, and abstract imagery. Built on an advanced diffusion model, DALL-E combines CLIP with the GPT-3 model to accurately interpret text prompts and generate images. It also features out painting, allowing users to expand on existing images.

Midjourney leans heavily toward artistic and painterly styles, focusing on creating visually striking images with balanced compositions and vibrant colors. Users generate images by inputting prompts into a Discord bot, making it a unique social experience. Midjourney is known for its preference for aesthetically appealing and symmetrical images, but it currently offers lower resolution images compared to competitors.

Competitive Analysis AI IMAGE GENERATORS				
Competitors	Strengths	Weaknesses	Pricing	Suitable
Dall-E	<ul style="list-style-type: none">• High resolution, diverse styles, outpainting	<ul style="list-style-type: none">• Expensive credit system, inconsistencies with human details	<ul style="list-style-type: none">• \$15/115 credits	<ul style="list-style-type: none">• Professional artists, high-quality images
Midjourney	<ul style="list-style-type: none">• Artistically appealing images, strong community	<ul style="list-style-type: none">• Lower resolution, Discord-based usage	<ul style="list-style-type: none">• \$10-\$120/month	<ul style="list-style-type: none">• Artists, designers, community-driven creation
Stable Diffusion	<ul style="list-style-type: none">• Open-source, affordable, detailed generation	<ul style="list-style-type: none">• Less user-friendly, occasional server issues	<ul style="list-style-type: none">• \$0.0023 per image, free trial	<ul style="list-style-type: none">• Developers, hobbyists, open-source enthusiasts

Stable Diffusion is an open-source text-to-image model known for its flexibility and detail-oriented image generation. It utilizes a Latent Diffusion Model (LDM) and supports features like inpainting, outpainting and image-to-image transformations. As an open-source tool, it is highly customizable and accessible, allowing users to run it on consumer-grade hardware.

Conclusion

Each AI image generator has its strengths depending on what users are looking for. Dalle-E is great for producing high-quality, professional visuals with lots of flexibility, though it can be more expensive. Midjourney shines for those who want visually creative and artistic images, especially in a collaborative, community-based setting. However, its lower resolution might be limiting for more polished, professional work. Stable Diffusion stands out for being more affordable and flexible, offering an open-source platform that's perfect for developers and people who want to customize their experience.

In short, the best platform really depends on what you need whether it's professional-quality images, a more artistic approach, or the flexibility of open-source customization.

Sources:

- Myers, E. (2023, 8 september). *AI's Impact on Storytelling: Can It Replicate Human Experiences?* GP Strategies. <https://www.gpstrategies.com/blog/ais-impact-on-storytelling-can-it-replicate-human-experiences/>
- Editor. (2023, 10 juli). *AI Image Generation Explained: Techniques, Applications, and Limitations.* AltexSoft. <https://www.altexsoft.com/blog/ai-image-generation/>

Research Target audience Accessibility

This research is about the main question “How do we make use of AI to read out fairytales to children between the age of 2-8 years old, so they can generate personalized fairy tales/stories for children between the age of 2 – 8, which are also educative by default?”

Introduction

In this research report I investigate how storytelling can benefit people with disabilities and how it can help them.

Secondary question:

“How can we adapt our product to be accessible to people with different disabilities, such as epilepsy and autism spectrum disorders?”

Benefits of reading aloud to children with disabilities in general

Reading aloud will stimulate children with disabilities and special needs drastically it will encourage them to develop early literacy skills. Research indicates that reading aloud in small groups will be valuable to them, children with LD (Learning disability) who received reading instruction in smaller groups had more increase in skill than the children that had individual instruction.

Children with Autism that had co-occurring learning disability are capable of reading fluently yet they'll have difficulty understanding what they read, but these children also saw improvement when they received reading aloud instruction in smaller groups.

Benefits of reading aloud in family groups

Research shows that when assigning one family member as a leader of the reading group they should be responsible to stay close to child with the disability and share the book while pointing to pictures, while other members take turns to read out loud, This method requires 2 of the same books, due to one member is reading while the other is sharing it.

Conclusion

Storytelling, particularly through reading aloud, can have significant benefits for children with disabilities, supporting the development of crucial literacy skills.

Research shows that reading aloud in small groups can enhance learning outcomes for children with learning disabilities (LD), with group instruction proving more effective than individual instruction. Similarly, children with autism spectrum disorder (ASD) and co-occurring learning disabilities may read fluently but struggle with comprehension. However, group-based reading aloud exercises have been shown to improve their understanding. Additionally, incorporating family members into the reading process, with a designated leader and the use of shared books, fosters an inclusive learning environment that further encourages engagement and development. These insights can guide the development of tools within our application to better support children with disabilities, using storytelling as an effective medium.

Sources:

Fahim, D. (2024, May 3). *Value of Reading to Children with Special Needs*. Donia Fahim. <https://doniafahim.com/value-of-reading-to-children-with-special-needs/>

Competitors

I started to investigate similar products, if there are already some existing ones. I divided this into two groups, Direct competitors and Indirect competitors. The direct competitors are products that are/have almost the same idea that we want to create. The indirect competitors are products that in some way have similarities but are not as close as the direct competitors.

Direct competitors

There are lots of direct competitors, I focused on 8 different products that are in some way almost the same.

Products: Wonder tales, DreamKid, Storyleo, Wendy StoryTeller, StoryBooks, Storyspark, Oscar stories, Milo.

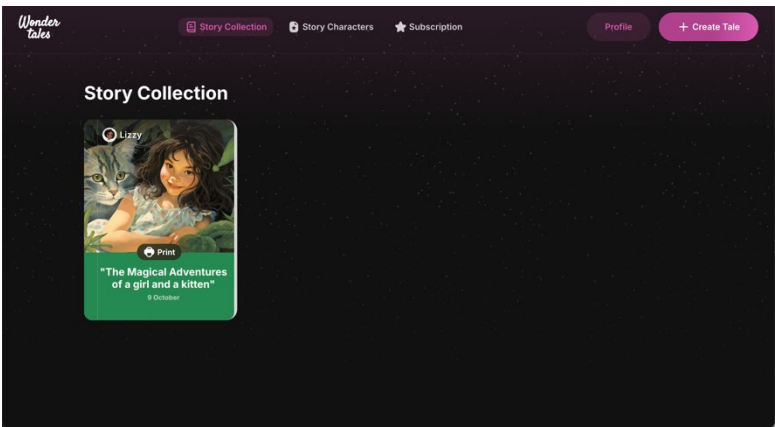
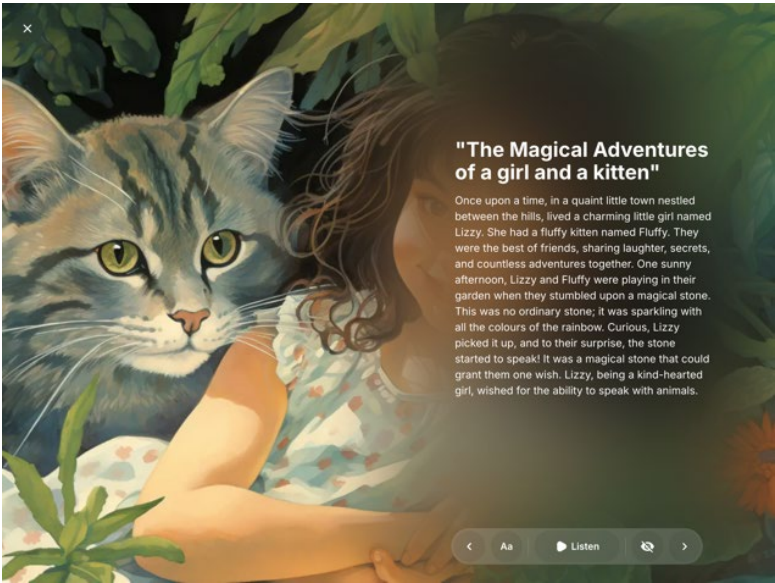
What all the products have in common, are generation of stories, audio function, and some customizability.

[illegible]

Wonder tales

Wonder tales is a website, simple design, and for the story line you can choose your character and add other characters. The choices for customization are not much.

The story comes out as a picture as the background and the story above the picture.



On the main page you can see the story

