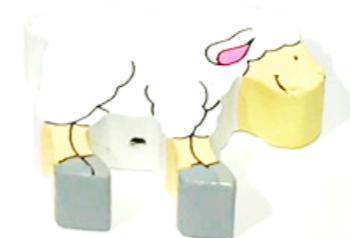


Talki



Learning Languages through play
in early childhood



Caterine Apruzzese

Master of Advanced Studies in Interaction Design

Research questions

- How might we create an engaging multi-sensory experience that allows for maximum movement and free play in language learning?
- How might we create an engaging and playful interactive alternative to touch screen based solutions for training spoken language?



Interviews to Montessori Kindergarten Teachers

I've interviewed experienced teachers and headmasters to gather domain knowledge from the point of view of the users, who are primarily children but also parents. We want to learn more about what toys or things kindergarten and pre-school children play with to support learning, how, where and who with.



Barbara Weiss

Head of Kindergarten in Zug



Anna Flückiger

Owner at Montessori Schule Lenzburg



Silvana Giunta

Director at Casa dell'Infanzia

Fogazzaro Lugano

Interview Insights & Educator Quotes

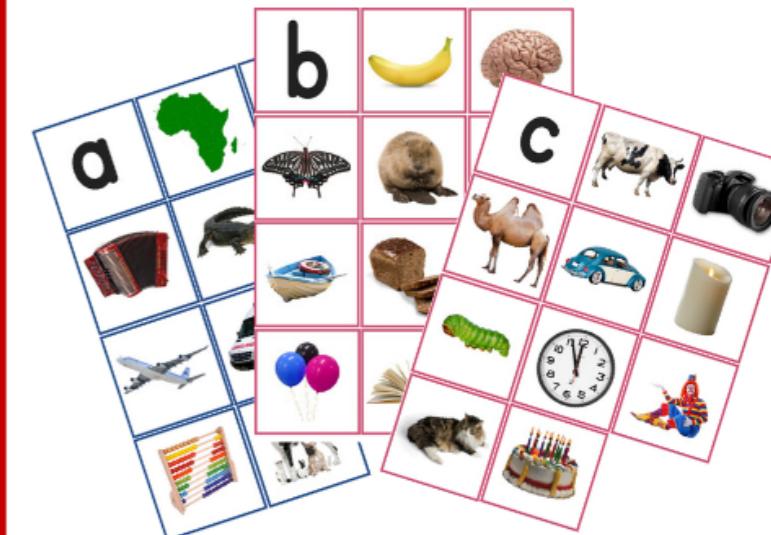


"Children can learn complex topics at the age of 3 or 4. They can learn complex concepts such as trigonometry and meditation."

"Material used to support learning: Cards with printed illustrations and text. 3D wood figurines, puzzles, world globe, maps, shapes to teach them different ways to hold a pen with both hands. Children love to play with small things"



Montessori Phonics Initial Sound Cards



"No rewards, no praise...The motivation must be intrinsic... children are naturally curious to learn new things and the motivation must come from them, or the child has psychological problems"

"No pressure. Let them take their time to finish the exercise and figure out for themselves if the exercise is correct"

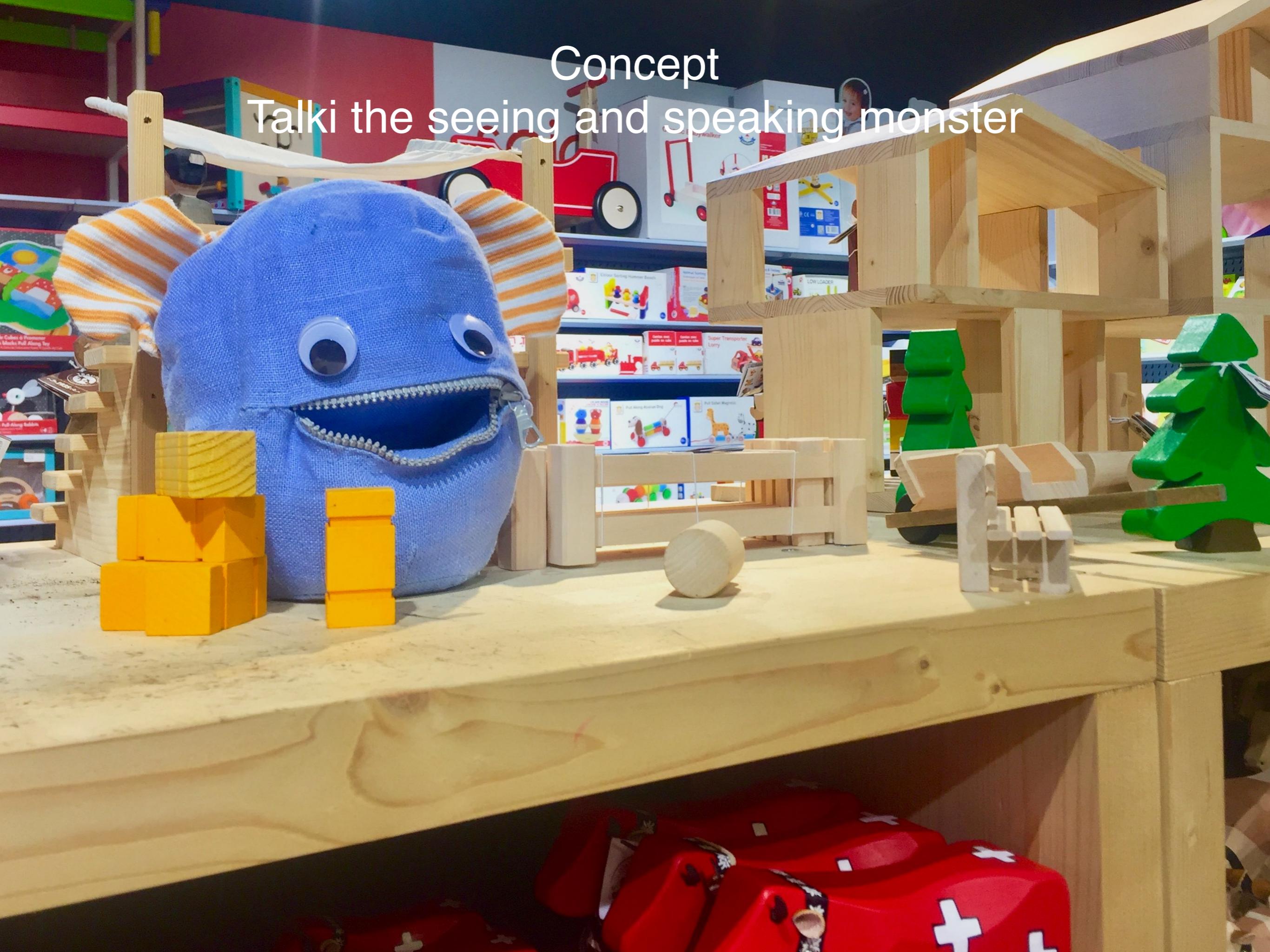
"We don't correct mistakes. We just record that the lesson needs to be repeated so the child learns the right answer."

"Children learn better if they have something in front of them that they can physically feel and touch. Using many senses makes learning to be more effective and meaningful"

"Every child is different...Children grow and develop at different rates in different areas. They develop at their own pace and in their own way"

"Children start listening before they start speaking. Language is about communication and children will know when is the right time for them to use the words they have encountered or speak in full sentences. No pressure, it will come naturally"

Concept Talki the seeing and speaking monster



Who is Talki?

- Talki is an interactive educational toy that teaches children aged 3-6 years old an additional language.
- Talki speaks in full sentences, just like a mother speaks to a toddler
- It can see but it can't hear and speaks to a child based on the known objects it sees and the child shows it
- Talki encourages multi-sensory learning by engaging the child in auditory, visual and kinaesthetic play



Talki is the only seeing and speaking smart educational toy

That uses totally invisible technology

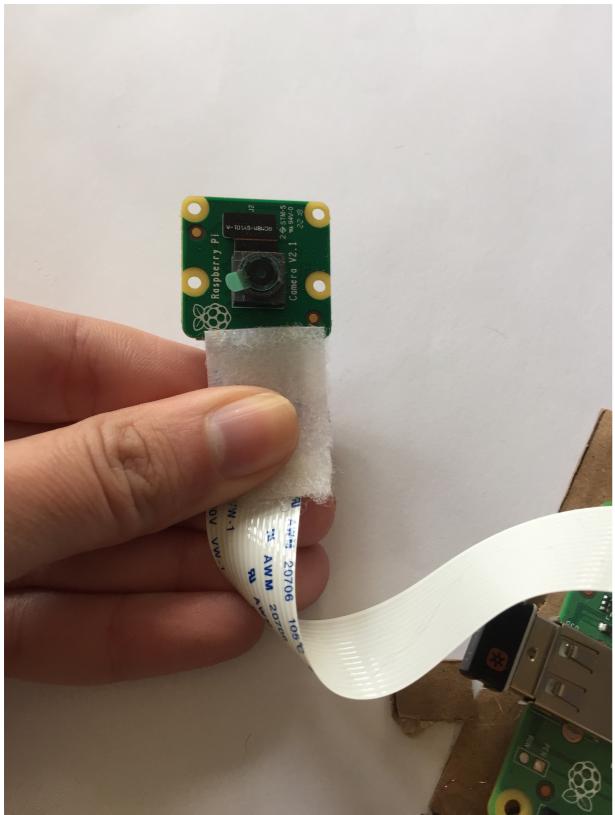
to enable language learning

through open-ended physical play alone or with other children

What is Talki made of?

- Talki uses computer vision/machine learning to recognise objects it sees
- It uses no screens, or any other interfaces associated to digital devices

Camera



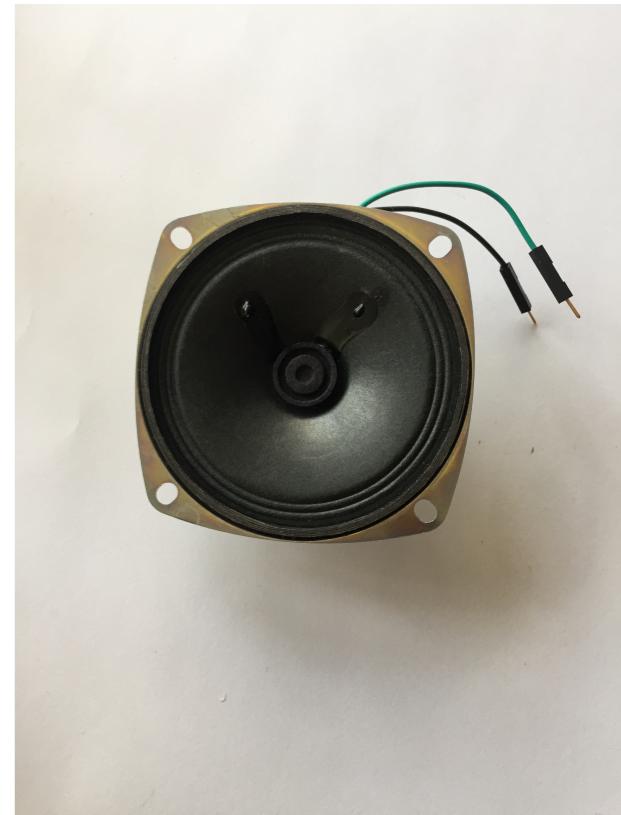
Raspberry Pi 3A +



Battery

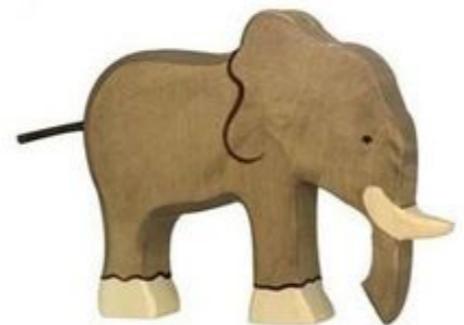


Loudspeaker



What things does it recognise?

It recognises wooden and figurine toys that are part of a toy set for teaching everyday vocabulary related to different topics such as food, animals, public transport, things in nature, etc. It also recognises colors e.g a green apple and shapes



What skills does Talki train?

The goal of Talki is not that the child becomes fluent in a language. It trains **phonological awareness**, the ability to hear and recognise the sounds within words. It trains the child's ears to the sounds, rhythm, flow and pronunciation of words in a spoken language.

It's a listening and pre-reading skill (before children can read and write)

Chhh or choc



bbbbbb



Shhhh



What is the main benefit of Talki?

Listening to the correct pronunciation of words from a secondary language.

Listening to the sounds within words

Most grown ups never achieve to speak a second language with a native accent, although they may be fluent. In most cases that's because we were told to memorise lists of words, without sound practice...

After the age 8 years old is too late to train towards fluent listening and speaking



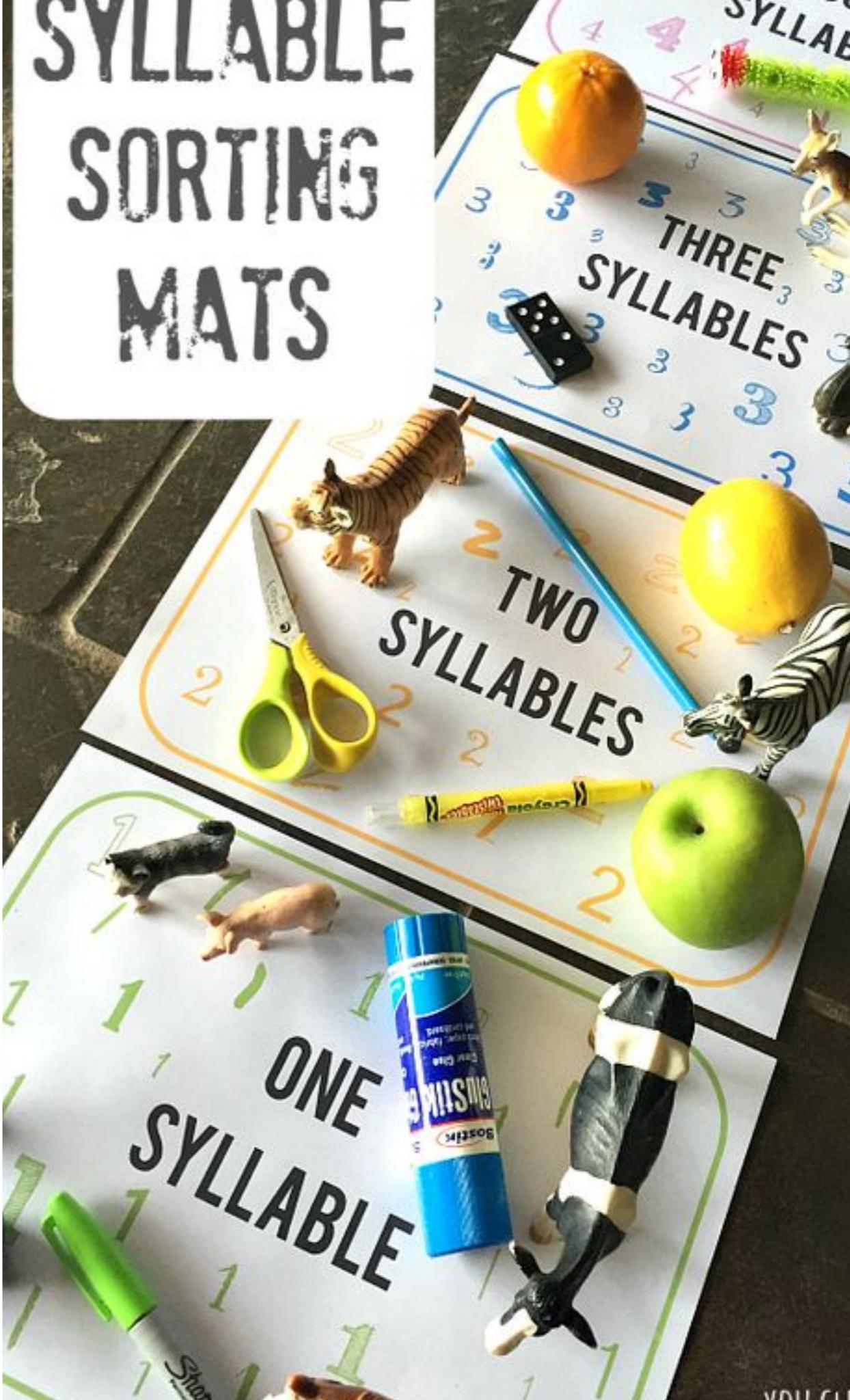
Talki's Learning Goals

To teach vocabulary:

- 34 animals and things in nature
- 17 food items

To teach phonological awareness

- Rhyming
- Identifying syllables
- Intonation
- Recognition and pronunciation of 28 phonemes. There are approx 44 sounds in English language

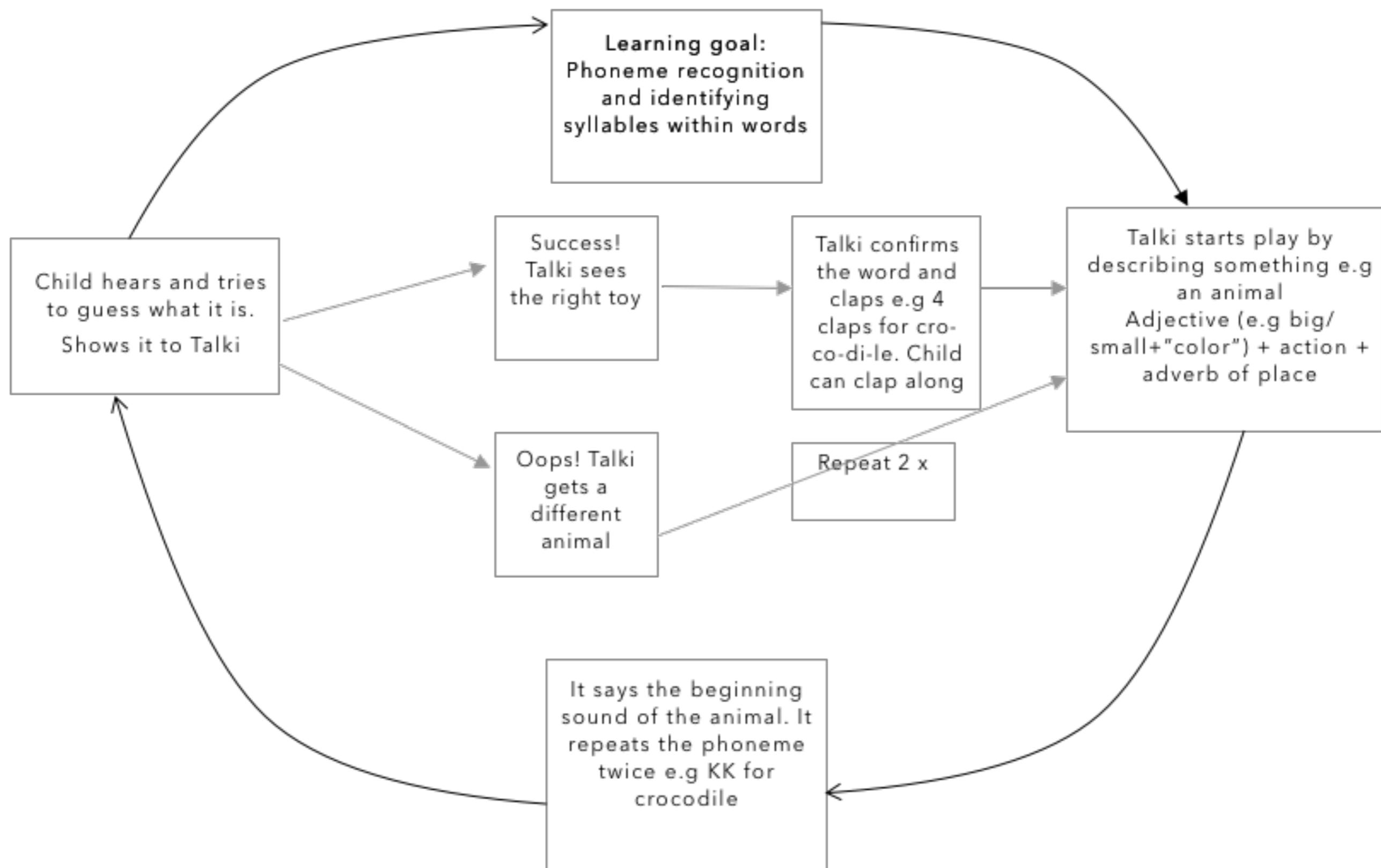


How?

- Talki teaches vocabulary by requesting toys. It tracks the response to the requests. How often was it correct/incorrect. Thereby it's possible to deduct what has been learned.
- Talki teaches phonological awareness by speaking slowly & clearly, breaking words down and emphasising central phonemes and repeating them. There is no good way of tracking the progress of learning in this area.



Talki's Guessing/ I spy Exercise



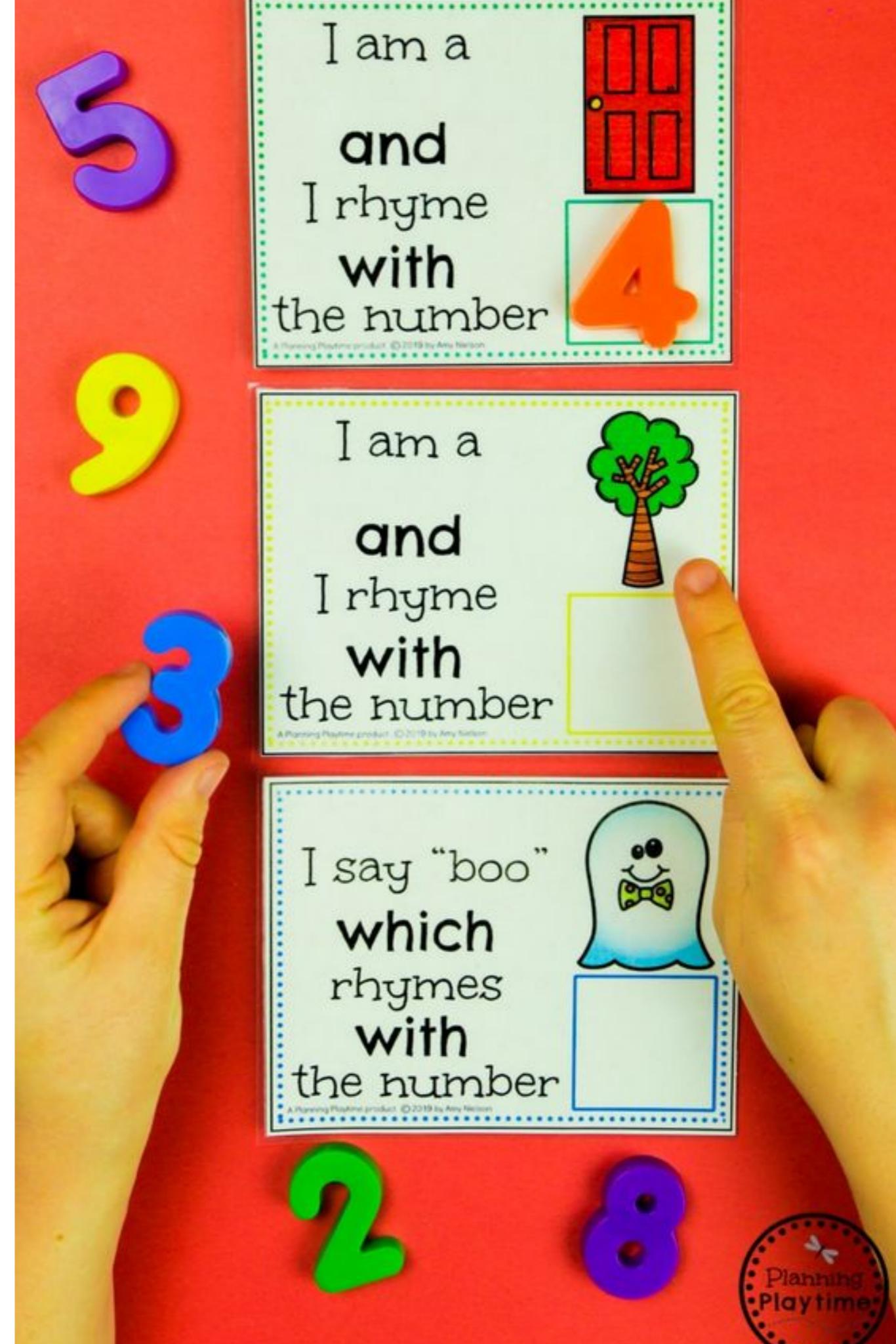
What teaching principles does Talki use?

Rhyming (learning that some words end with the same sound) e.g knock knock, it's play o'clock or Ding-Dong let's sing a song!!!



What teaching principle does Talki use?

Rhyming (learning that some words end with the same sound) e.g knock knock, it's play o'clock or Ding-Dong let's sing a song!!!



What teaching principles does Talki use?

Repeating the beginning sounds of a word e.g FFFF for fish or SSSSS for snake

FFFF



SSSS



What teaching principles does Talki use?

Reinforcing sound recognition by repeating same sounds in different parts of the sentence e.g when Talki confirms what the toy is makes sentences with that sound “the **snake** is in the **grass** and it says **SSSS**” or “**f**lip your **f**in **f**unny **f**ish”

FFFF



SSSSS



What teaching principles does Talki use?

Learning that words can be broken apart into syllables. Children can hear clapping out the syllables within a word and can clap together e.g **three** claps for **e-le-phant** , **three** claps for **ba-na-na**, **1** clap for **tree** or **four** claps for **crocodile**

4 claps for cro-co-di-le



1 clap for tree



What teaching principles does it use?

Associating sounds to words, things or actions e.g **Moooo Mooo** is associated with a cow, **bzzz bzzz** to a bee, **vroom vroom** to a car, **woo woo** to a train etc

Bzzzzzzz



Woof woof



What teaching principles does it use?

Using voice pitch and exaggeration to describe things and concepts e.g A **biiiiiiiiig** elephant or a **taaaaalll** giraffe



What teaching principles does it use?

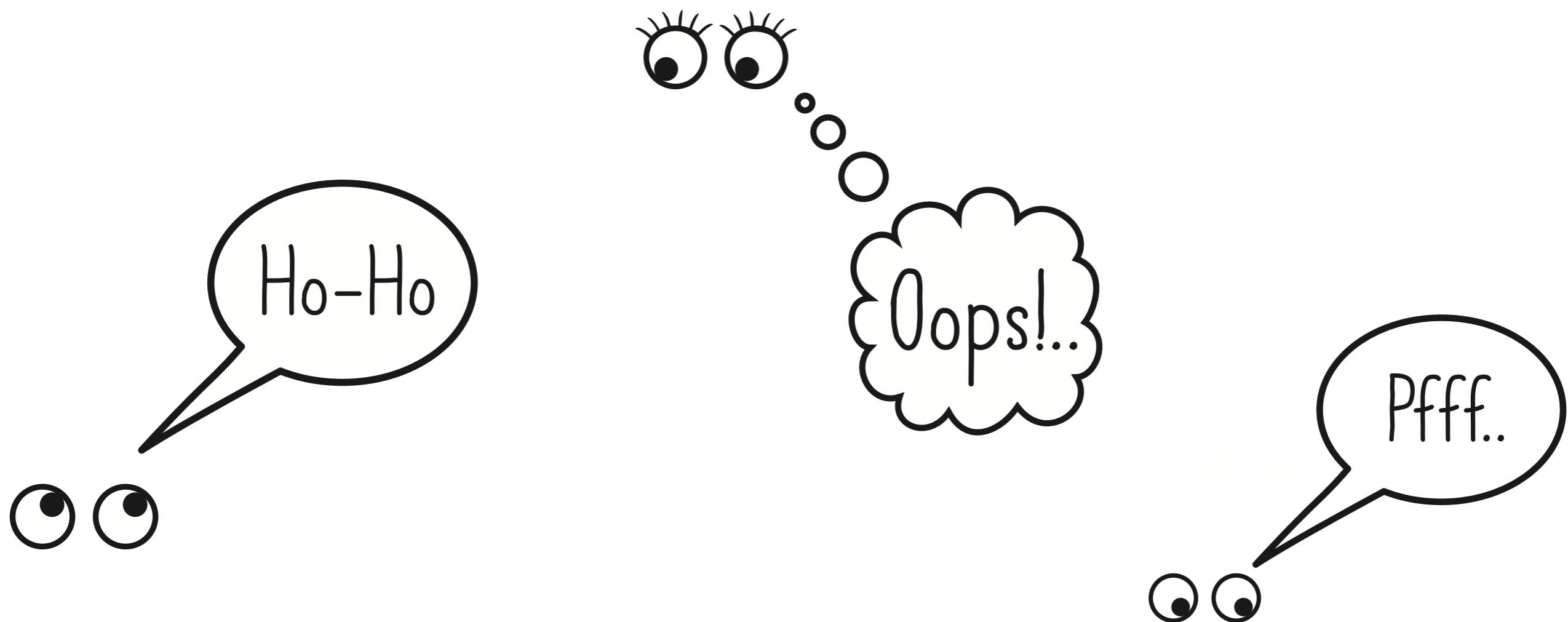
Putting things in context

Giving clues about color, location, sounds or actions. As children start to understand and recognise isolated words, they can associate characteristics to toys e.g "I spy with my little eye something swimming in the pond. It's a FFFF" or "I spy with my little eye something singing tweet tweet on the tree...It's a BBB"



How does Talki give feedback?

- Talki doesn't reward children or says they are wrong. It doesn't penalise children from making mistakes
- Children get as many chances as they need to find the right answer
- Talki gives feedback using **interjections** which are expressions to show emotion, surprise or excite e.g when a child brings the wrong object it says "**uh-oh**" or "**oops**" in a way that doesn't express disappointment or sadness but emotional enough to be clear.



What activities can be played with Talki?

Exercises are based on traditional classroom activities for training listening, vocabulary recognition and phonological awareness

Talki's methodology encourages exploratory play by:

- Giving the child as many chances as they need to find the right answer
- No time pressure



Exercise one

Feed me!! I am a monster I eat anything, like food, bugs and shapes

Learning goals: Reinforce phonological awareness through listening and recognising sounds within words

Talki asks: I'm hungry!!! I want a chhh chhh chocolate! Can you bring a chocolate?

Talki confirms: Thank you!!! chhh chhh chocolate is yummiii

Talki denies: uh-oh that's a banana! Can you give me a chhh chhh chocolate?



Exercise two

Guessing exercise.... I spy with my little eye/help me find something + clapping out the syllables

Learning goals: Reinforce phonological awareness through listening and recognising sounds + syllables within words



**Talki says: I spy with my little eye
something biiiiig from long ago!
Can you see it? It's a DDD
dinosaur. Di-no-ssaur (3 claps).
Where are you dinosaur?**



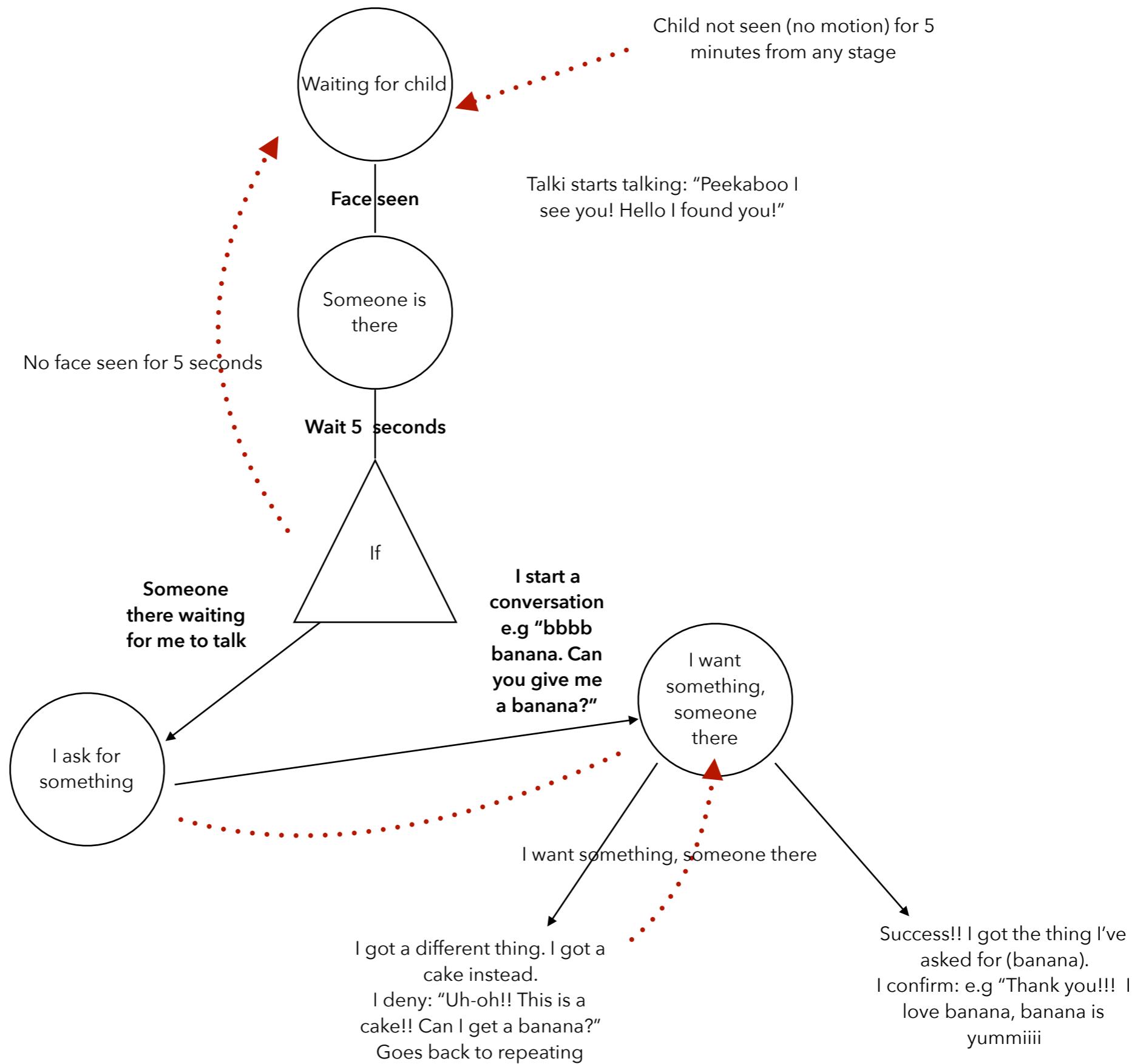
**Talki says: I spy with my little eye
something pink in the lake with
very looooong legs. Can you see
it? It's a FFF flamingo. Where are
you flamingo?**



**Talki says: I spy with my little eye
something in the pond that says
quack quack! What is it?**

**Confirming: Yeyyy, it's a DDD
Duck. Duck (1 clap)**

Talki's State Machine Diagram



Learnings and User Testing Summary

Participants

Kindergardeners and preschoolers aged 3-6. They are all currently learning a second language or come from bilingual families

Research techniques

Field studies
Expert reviews



Learnings and User Testing Summary

| Hypothesis | Findings |
|--|--|
| <ul style="list-style-type: none">• Children will be very physical with Talki (pull ears, hug it etc)• Will be curious after learning the toy speaks• Will not know how to show Talki an object, unless told how to by an adult• Will repeat attempts to pick the right object 10+ times (patient/persistent) | <ul style="list-style-type: none">• Children were very physical with Talki. First reaction was to pull the ears.• Tried to be creative with the mouth, by putting other things e.g a full arm• Were attentively listening to the toy speaking• Picked different toys to see a reaction from Talki.• Did not understand full sentence but could understand isolated words e.g understood black but picked different animal• Showing Talki a toy wasn't intuitive but when told toy could see, associated |

Promotional Video

University of Applied Sciences and Arts of Southern Switzerland
Department for Environment Constructions and Design
Laboratory of visual culture

SUPSI

**Master of Advanced Studies
in Interaction Design**

See

Speak

Play



Talki

Thank you!