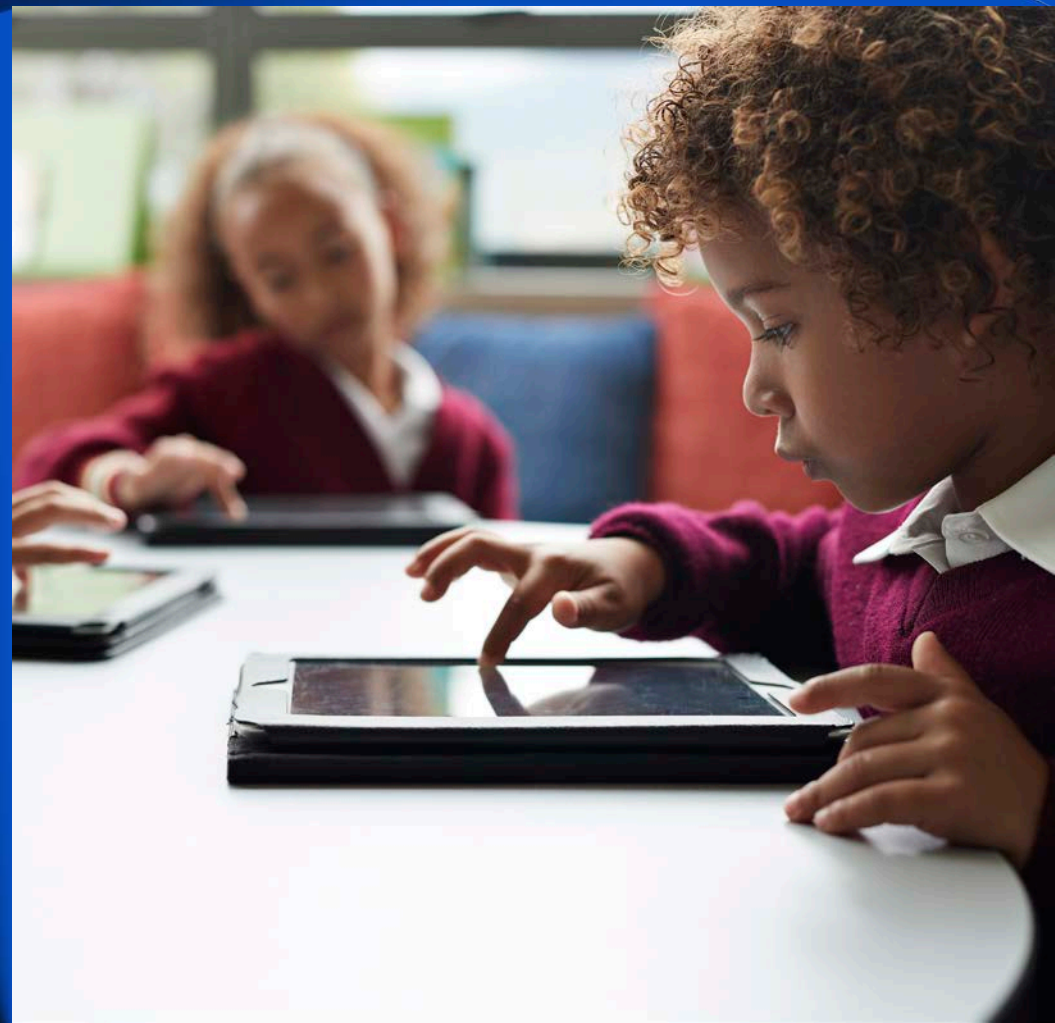




An AI Tool to Detect Educational YouTube Content for Kids

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SRI Education



The Problem



80% of children under 11 years old watch YouTube



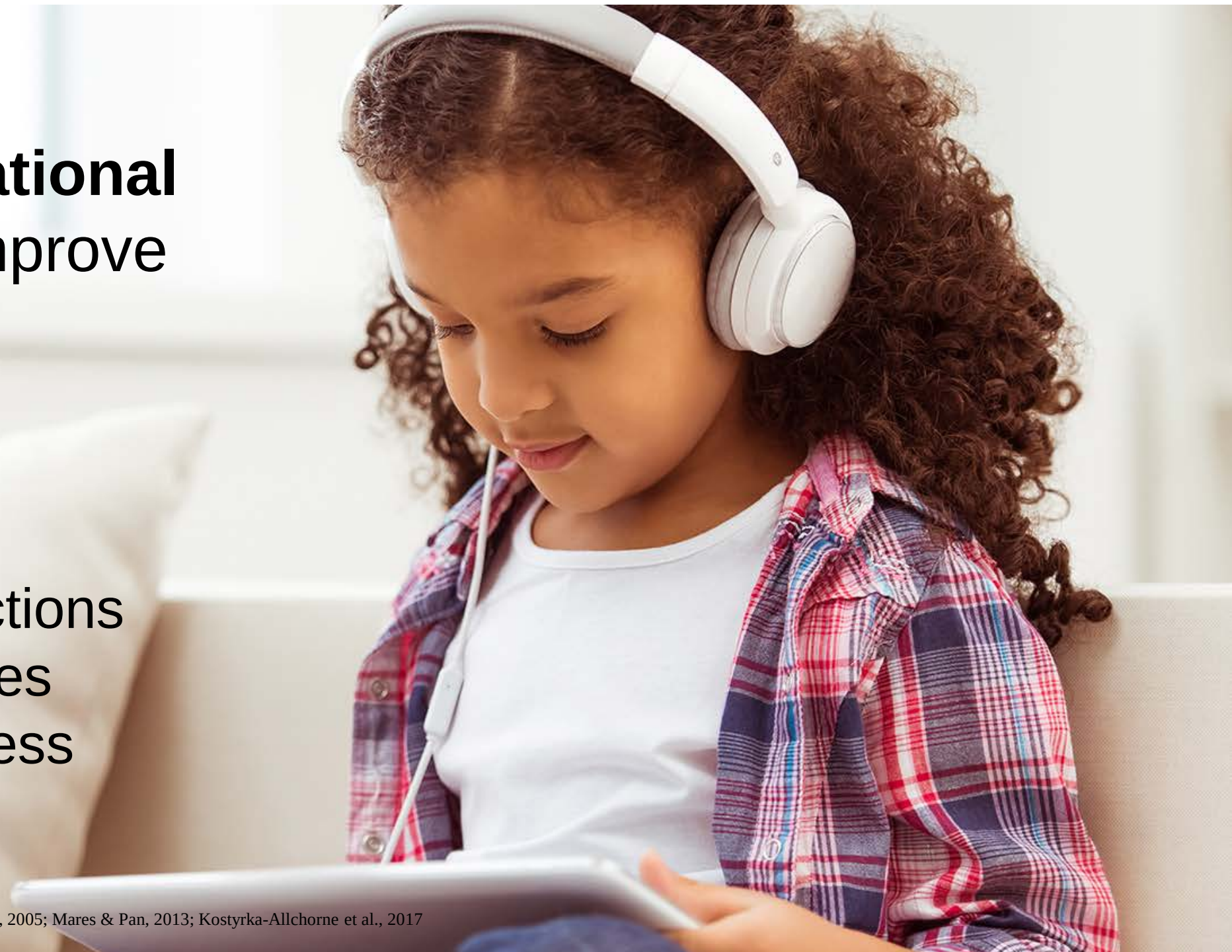
Parents say their kids watch YouTube videos to **learn.**



Only **1 in 20 videos** a child watches online has **strong educational content**

Watching
**quality educational
videos** can improve
children's:

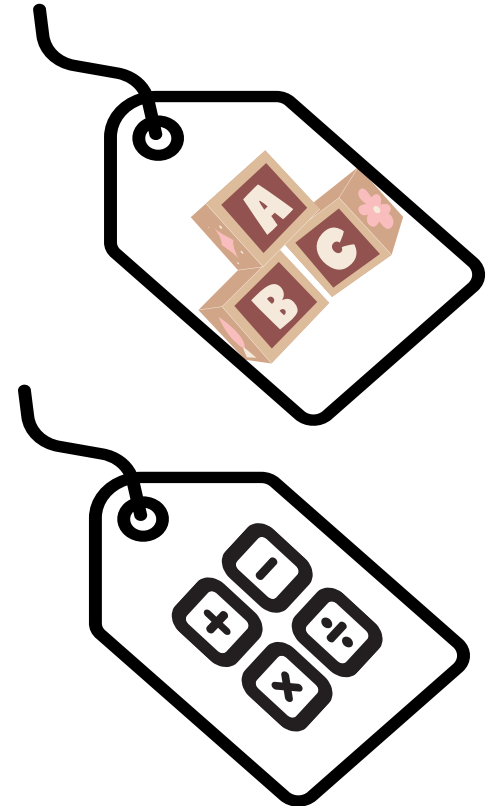
- Literacy
- Numeracy
- Social interactions
- Racial attitudes
- Imaginativeness



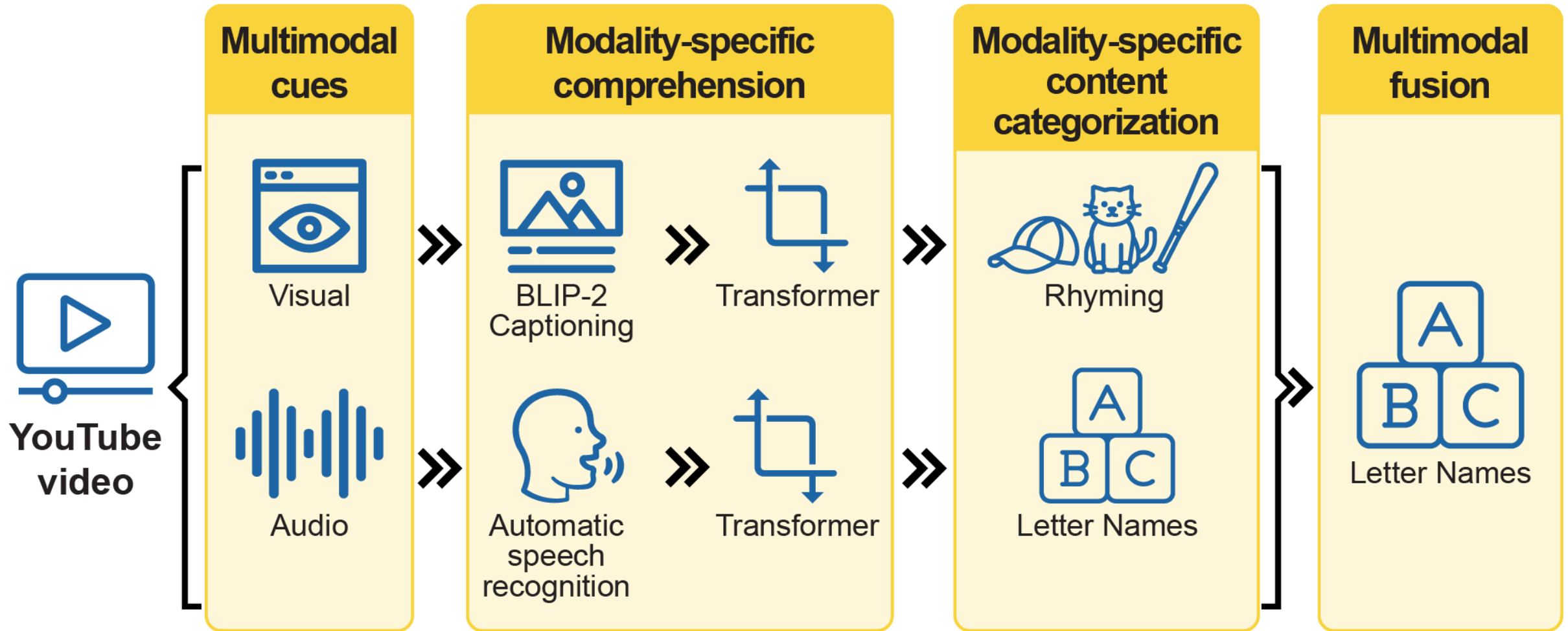
The Solution



- APPROVE is an AI tool to tag educational content in videos.
- It tags PreK and K math and literacy content in YouTube videos.
- We are building its ability to detect persuasive design features.



Multimodal content understanding framework



APPROVE applies 3 types of tags

Based on Common Core State Standards &
Head Start Outcomes

Early Literacy Content	Early Math Content	Quality Indicators
• 7 literacy topics • Differentiated for PreK and K • For example:  Letter names  Sight words	• 13 literacy topics • Differentiated for PreK and K • For example:  Subitizing  Sorting	• Primarily educational • Concrete examples • Involved characters • Addressing the audience • Narrative integration

Research Questions



1. What is APPROVE's accuracy for detecting early math and literacy content? How does it compare to chance?
2. To what extent does APPROVE's accuracy differ in a curated dataset of educational videos vs. a novel dataset of videos watched by children?

Developing APPROVE



1

Created a codebook

- Based on the Common Core State Standards and Head Start Early Learning Outcomes Framework

National Governors Association, Council of Chief State School Officers, 2010; Office of Head Start, 2015

2

Annotated videos to train the model

- Trained annotators curated the APPROVE video dataset by searching keywords for each code.
- They recorded videos' content in Qualtrics.

3

Developed a machine learning model

- We used a multimodal content understanding framework to combine videos' visual and audio cues.
- It extracts visual and audio information, classifies videos based on each modality, and combines them into multimodal classifications.

4

Trained and tested the model

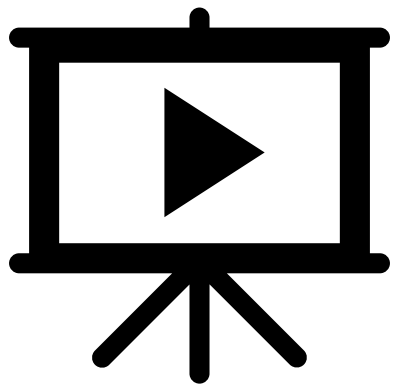
- We randomly assigned 75% of the APPROVE dataset for model training and 25% for testing.
- We tested the model as compared to human annotations in the APPROVE and 2019-NV datasets.

**Interrater
reliability for
the APPROVE
PreK & K-
Literacy
codebook**

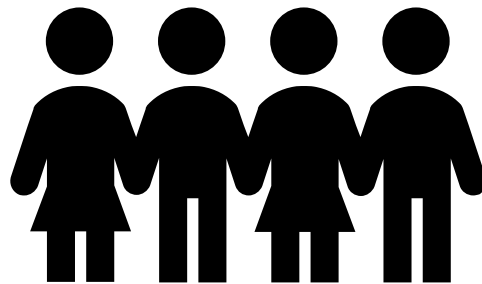
ANNOTATION ROUND	VIDEOS ANNOTATED	% AGREEMENT ^A	KAPPA
Annotator training ^b	20	90%–94%	.80–.89
Interrater reliability with another annotator	138	91%–92%	.77–.78

^a Percent agreement and kappa values for literacy content categories were calculated for content rather than for the individual indicators used to calculate the presence or absence of literacy content categories. ^b Annotators received feedback on their agreement with the expert annotator and were allowed to revise their annotations during training. Reported percent agreement and kappa values reflect final revised annotations.

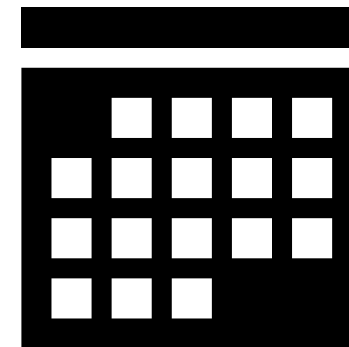
Novel dataset



Dataset of
6,258 unique
YouTube
videos

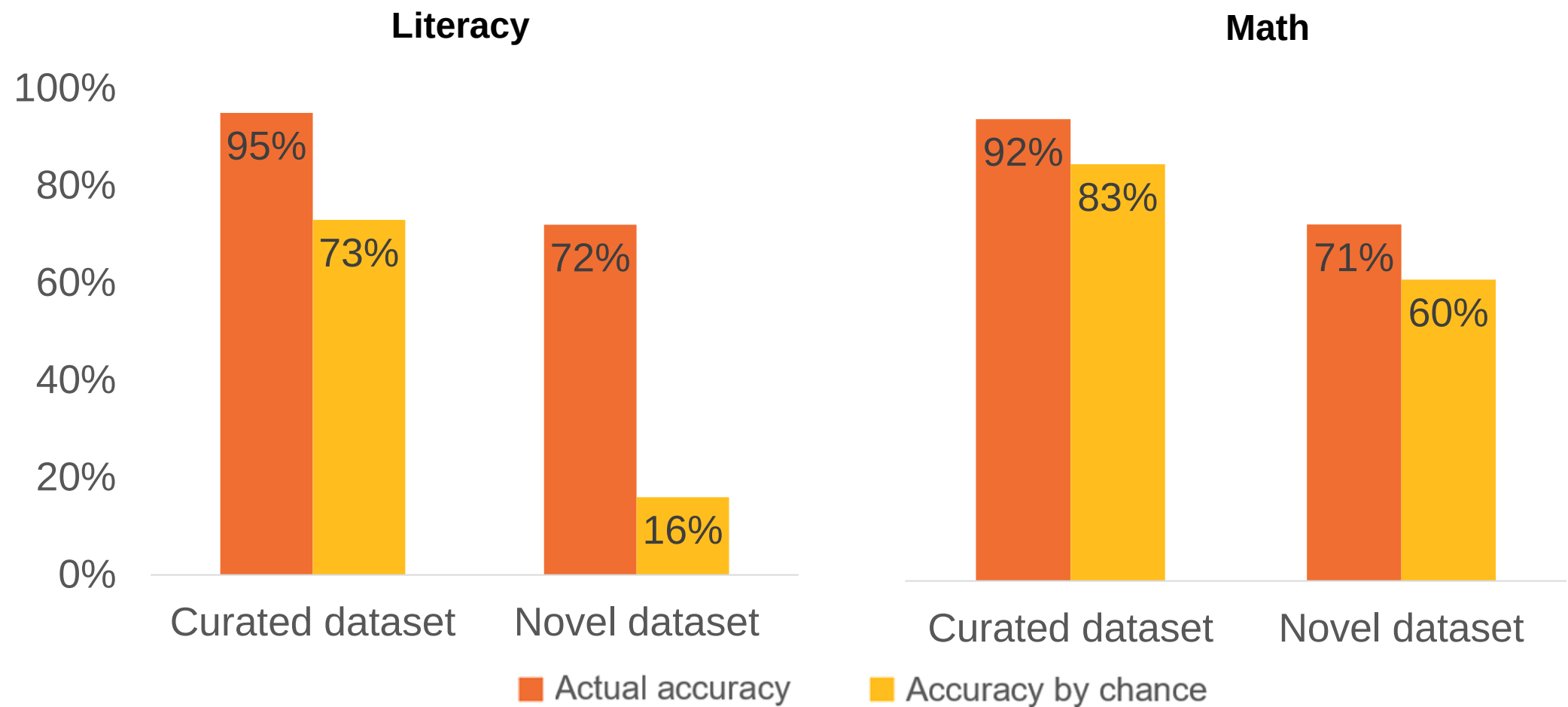


Watched by 55
children ages 4
to 5

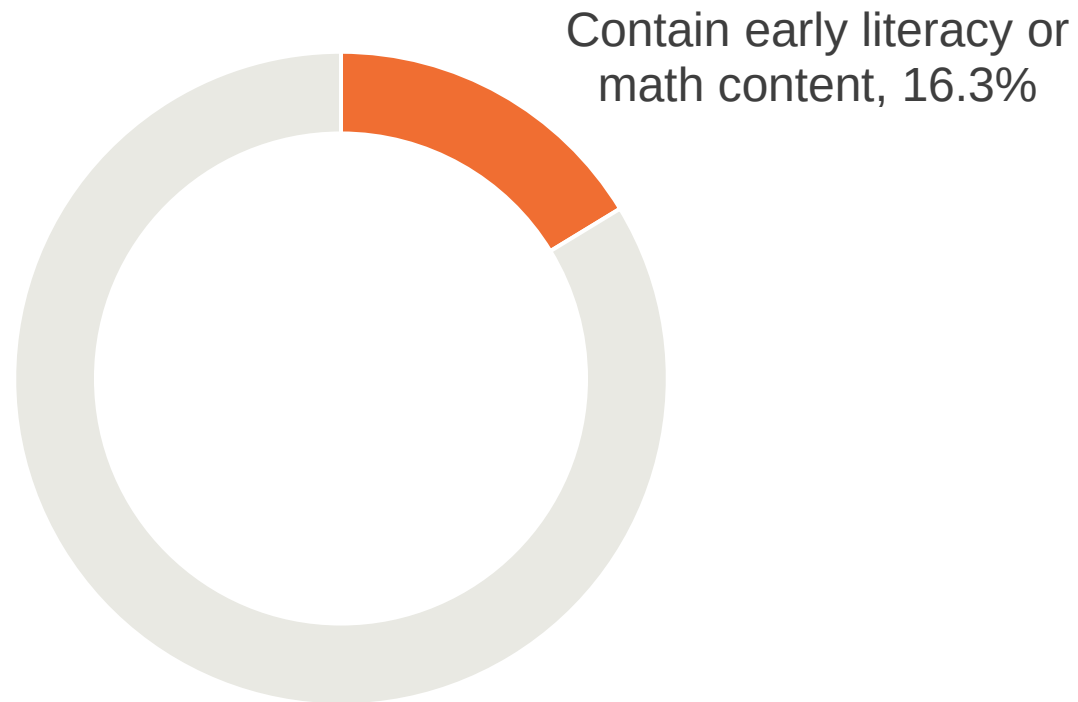


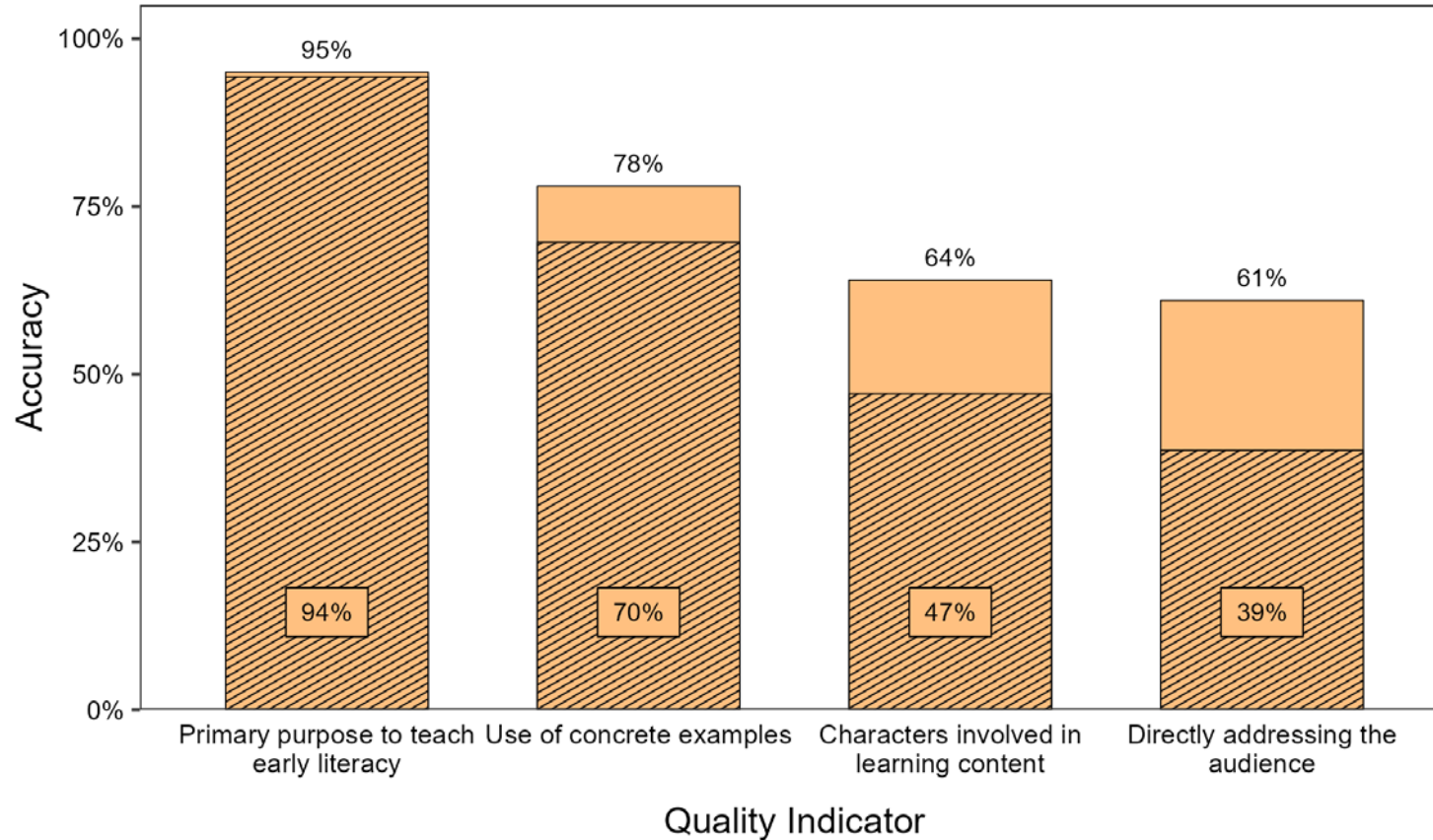
Over an 8
week period in
2019

Greater-than-chance accuracy for literacy and math



16% of videos in the naturalistic dataset contain early literacy or math content

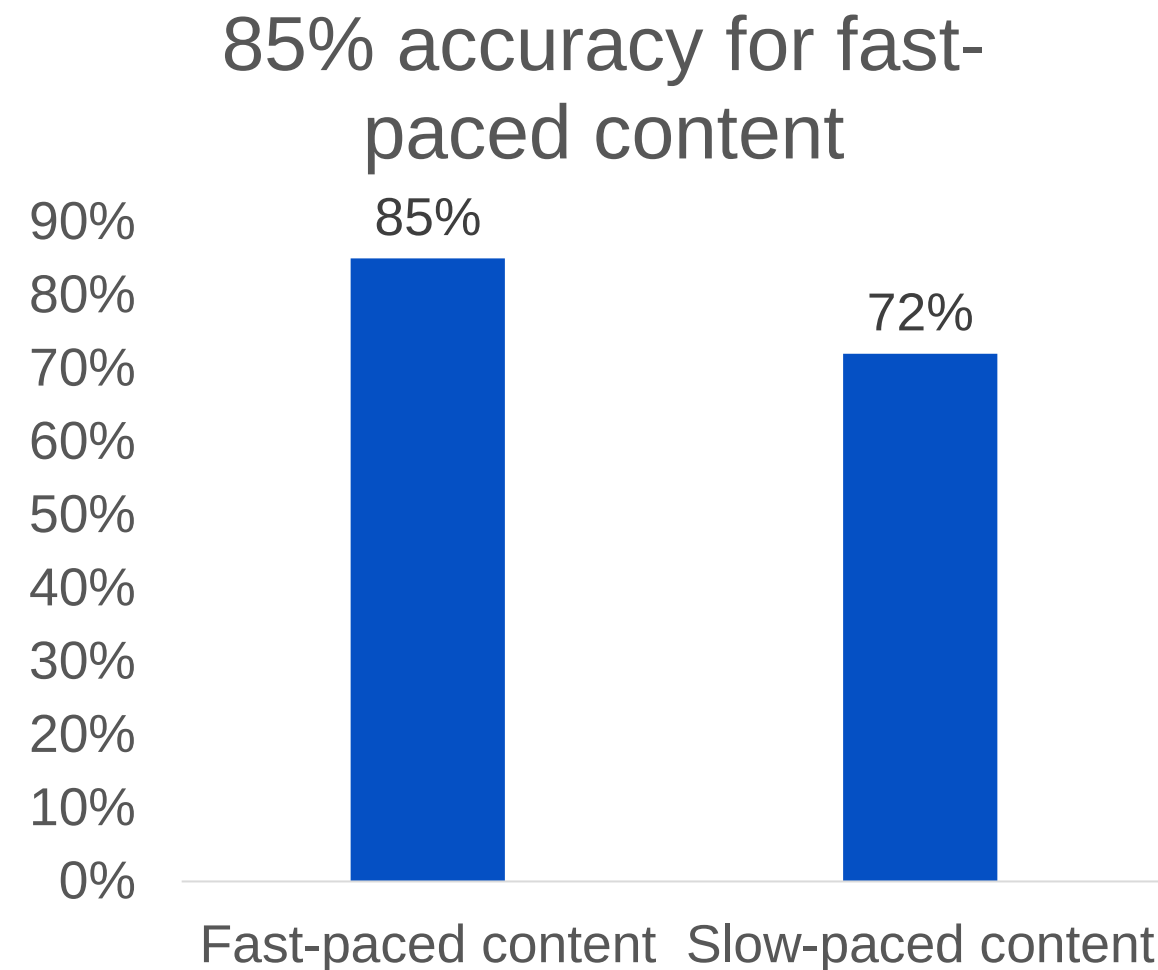




Model accuracy – pedagogical quality

Diagonal patterns indicate model accuracy by chance

APPROVE can accurately detect fast pace



Future Directions



Expand the model to other subjects and age ranges



Expand the model to persuasive design



Improve accuracy with larger, more diverse datasets



Develop tools for parents, educators, and platforms



Enable large-scale research on children's media exposure



Thank you!

Connect with me or learn more about APPROVE:

