Pick-a-Path: An Interactive English Storytelling Tool for Young Learners

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ABSTRACT

This paper presents an interactive reading application prototype named Pick-a-Path where learners are turned into the main characters of their own story using facial recognition. This is an application focused on young learners aged 4 to 9 years old where they can snap a photograph of their face and watch it get animated through an interactive story where children get to choose their own unique customisable path. This application aligns with contemporary pedagogical approaches that emphasise personalised reading experience and digital engagement, particularly for early childhood education. Other than using Ai based recognition tools as the main key features, this application also includes interactivity where it aims to boost reading comprehension and vocabulary. Additionally, it also focuses on personalised avatars where it increases emotional engagement and fosters ownership among young learners. Aligned with UN Sustainable Development Goal 4 (Quality Education), Pick -a Path promotes equitable access to engaging learning tools. Its accessibility features, multilingual potential, and offline functionality increase its global relevance. From a commercial standpoint, *Pick-a-Path* has strong potential to be used in schools or offered as a subscription for home learning. With the growing demand for interactive and personalised learning tools, this application meets the need for engaging, tech-driven resources that support literacy and critical thinking in young learners.

Keywords: (Digital learning, application, vocabulary, Ai face recognition)

INTRODUCTION

Early literacy involves far more than simply decoding text; it is deeply rooted in curiosity, agency, and a genuine connection to narrative. Despite this, many digital reading platforms for young children continue to mirror the passive experience of traditional print media. Text remains static, characters are remote, and the child is relegated to the role of observer rather than participant.

Contemporary early childhood pedagogy, in contrast, emphasizes the value of play, personalization, and intentional technology integration—approaches that reinforce, rather than detract from, core learning outcomes. A substantial body of research demonstrates that when digital storybooks are thoughtfully designed to align with instructional goals and incorporate interactivity, they can support vocabulary development and, under certain conditions, enhance story comprehension (Mayer, 2021; Smeets & Bus, 2012; Takacs et al., 2015).

Pick-a-Path addresses this opportunity with a child-centered design tailored for learners aged 4–9, transforming the reader into an active protagonist. Children upload a photograph of themselves, which is then

rendered as an animated avatar within the narrative. As the story progresses, readers select from branching story pathways, with each decision influencing narrative events, vocabulary exposure, and instructional scaffolds tailored to individual needs. By combining AI-based facial recognition and animation with choose-your-own-adventure interactivity, the prototype seeks to leverage self-relevance to foster increased attention, motivation, and persistence, all of which are recognized as important mediators of early literacy growth.

Importantly, the design foregrounds alignment with learning objectives. Text is supplemented with read-aloud functionality, tappable word glossaries, and timely prompts that encourage inferencing and narrative retelling. Story branches are deliberately structured to recycle target vocabulary across multiple contexts, while formative checks such as picture-choice questions and scaffolded cloze tasks adapt based on the child's selected path. The resulting experience moves beyond superficial personalization, embedding interactivity in service of comprehension, vocabulary acquisition, and narrative reasoning.

The prototype also prioritizes equity and accessibility. Multilingual story packs and offline capabilities address diverse learning environments, while accessible user interface features—such as enlarged interactive areas, high-contrast display modes, and dyslexia-friendly fonts—broaden usability. Recognizing the use of children's images, the system employs a privacy-by-design approach, incorporating on-device processing, parent or guardian consent protocols, and minimal data retention to comply with established ethical standards for educational technology. In doing so, Pick-a-Path advances the aims of UN Sustainable Development Goal 4 (Quality Education) by coupling engaging design with responsible implementation.

In summary, Pick-a-Path explores the potential for identity-based personalization and meaningful choice to make early reading both more engaging and more effective. This extended abstract outlines the design rationale, core interaction model, and implementation details of the prototype, as well as an evaluation plan to assess its impact on engagement, vocabulary development, and story comprehension among early primary learners.

Problem Statement

Despite the proliferation of children's reading apps, several significant challenges endure. First, most platforms still fail to meaningfully centre the child within the narrative, limiting opportunities for genuine personalisation. Second, engagement remains inconsistent multimedia features, while ubiquitous, are not always thoughtfully integrated to actively support learning. Finally, issues of equity and access persist: barriers related to connectivity, language support, and overall usability continue to restrict reach for many children.

Research underscores that the specific design of multimedia and interactive features is crucial: carefully selected animations, narration, and guided interactions can foster vocabulary growth and support inferential thinking, whereas excessive or poorly chosen features may actually impede learning (Mayer, 2021; Takacs et al., 2015). On a broader scale, global indicators such as SDG 4 reveal that numerous countries are not on track to achieve quality-education targets, highlighting the urgent need for scalable, high-quality early literacy solutions (United Nations, 2023).

Accordingly, the following objectives are proposed:

1. To design and prototype an interactive English storytelling app that enables personalised narratives through child-driven avatars.
2. To enhance vocabulary development and reading comprehension among learners aged 4–9 via embedded instructional strategies and formative assessment.
3. To promote equitable access through multilingual, offline-first delivery and comprehensive accessibility features.
4. To implement privacy-by-design principles for any facial image processing, with explicit consent and data minimisation in alignment with regulatory guidelines (Department for Education, 2022).

This approach seeks to address persistent gaps in children's reading technologies by combining rigorous design, evidence-based pedagogy, and a strong commitment to inclusivity and privacy.

PRODUCT DESCRIPTION & METHODOLOGY

Pick-a-Path operates by allowing users to take a single facial snapshot, which is then used to create a stylized avatar for use within interactive, branching narrative scenes. The stories are specifically designed for children, presenting developmentally appropriate choices throughout ("paths"). Target vocabulary is supported with strategically placed glosses and pictorial aids, and short interactive questions are embedded to provide immediate feedback, supporting both comprehension and engagement. The design of Pick-a-Path aligns with established research indicating that well-chosen multimedia elements such as animation and narration can enhance attention and learning, provided they focus on essential content and avoid unnecessary cognitive load (Mayer, 2021; Takacs et al., 2015).

Regarding safety and privacy, any biometric features are strictly governed by parental consent with a clear opt-in process. There are always non-biometric avatar options available. If facial data is used, processing occurs on-device or data is stored only temporarily, with robust access controls in place, following best practices for child biometric data (Department for Education, 2022).

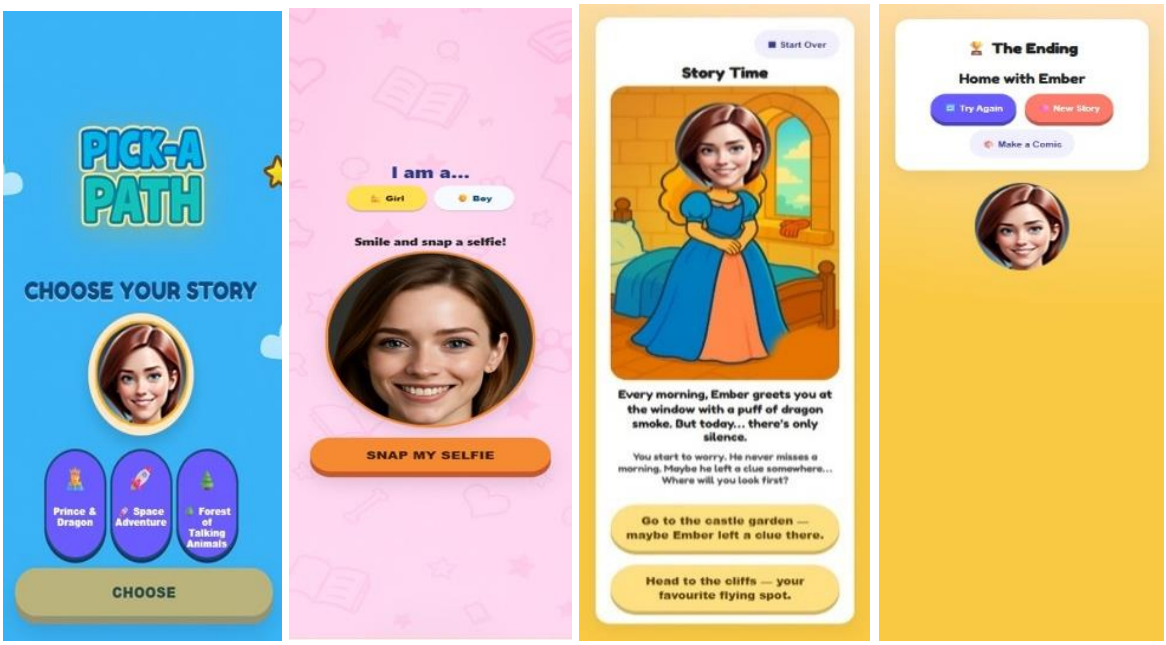
To evaluate Pick-a-Path's effectiveness, a 6–8-week pilot study is planned, involving approximately 500 children aged 4–9. The study will compare outcomes for children using Pick-a-Path with those engaged in standard reading activities. The evaluation will focus on three main outcomes: (a) vocabulary growth, based on curriculum-aligned word lists; (b) story comprehension, assessed through both literal and inferential questions; and engagement, measured via telemetry data such as choice completion rates and time-on-task. Prior research on e-books and interactive storybooks suggests that this approach should yield measurable gains in vocabulary and content comprehension (Bus et al., 2015; Smeets & Bus, 2012).

POTENTIAL FINDINGS AND COMMERCIALISATION

Pedagogical impact seems clear interactive storybooks and guided comprehension prompts tend to boost young learners' vocabulary and understanding, especially when those features are thoughtfully integrated, as previous research suggests (Bus et al., 2015; Smeets & Bus, 2012; Takacs et al., 2015).

Market and deployment-wise, there's a notable surge in demand for tailored literacy solutions for both home and school settings. Subscription and institutional licensing models look sustainable. Plus, incorporating offline functionality and diverse language packs ensures broader accessibility, supporting efforts to align with SDG 4 (United Nations, 2023).

Figure 1: Snapshots from the application



NOVELTY AND RECOMMENDATIONS

Pick-a-Path introduces several notable advancements. First, it centres children's identities within narratives, allowing young readers to recognize themselves in the stories—an approach that can significantly boost engagement and personal investment. Secondly, it adopts a hybrid pedagogical model, merging branching storylines with explicit prompts for vocabulary development and comprehension strategies. Additionally, Pick-a-Path demonstrates thoughtful, age-appropriate use of biometrics in early childhood contexts. Future directions should include broadening the range of multilingual story offerings and rigorously investigating whether the platform fosters lasting gains in independent reading skills.

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