# Educational Apps for Young Children: Insights from Parents

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## ABSTRACT

Many parents are interested in using educational apps to supplement their children's literacy and math development at home. Research shows that well designed apps can be a tool to support children's learning, however parents might struggle to find well designed apps due to the large number that exist and their overall poor quality. The present study investigated how parents choose educational apps, including their attitudes towards teaching their children, the sources of information they use, and the features they look for in math and literacy apps. Results indicate that parents are motivated to find educational apps but may not be certain about some important instructional features that would make an educational app effective. Practical suggestions based on the findings are provided. Understanding obstacles parents face as well as how they select instructional tools is important in order to identify ways to support parents in finding high quality educational apps that have the potential to supplement education at home.

## KEYWORDS

Educational apps, math, literacy, children, parents

## Can children learn from educational apps?

As touchscreen devices become an increasingly prevalent part of many young children's lives, there has been an increase in the number of software applications (apps) advertised as 'educational' tools to support young children's learning of foundational skills such as math and literacy. Existing research suggests that children can learn from high quality educational apps. For example, greater math learning gains for four- to five-year olds who spent some instructional time playing with a math app than for the children who completed more traditional paper-based math activities are found (Outhwaite et al., 2023). Another study found similar results for literacy skills in four- to five-year-old children who

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used a literacy app compared to a non-literacy app (Arnold et al., 2021). In addition, when parents or care-providers engage in app use with their children, known as co-use, learning outcomes can be improved (Griffith & Arnold, 2018).

Importantly, these positive results for apps as learning tools reflect research studies where the instructional quality of the apps was carefully controlled. Unfortunately, app stores do not have regulations about what qualifies as an 'educational' app, and research has found that many commercially available apps are of poor quality (Dubé et al., 2019). This means that parents/care-providers are faced with an overwhelming array of apps to choose from but no formal system to discriminate well-designed, instructionally relevant apps from those of poor quality.

**What makes a 'good' educational app?**

There are some features that are supported by the science of learning that make an app effective. First, the content of an app should be developmentally appropriate. For example, literacy apps for young children should include foundational literacy skills, such as phonological awareness related to letter-sound correspondence and playing with words and sounds such as rhyming or creating word families (e.g., b – bat, m- mat). Math apps for young children should include early counting principles, such as one-to-one correspondence which refers to the knowledge that each item must be counted once and only once, stable order (knowing that the counting sequence is always the same: 1, 2, 3, 4, 5… and so on), and cardinality which refers to knowing that the last number counted represents the total number in the set.

Good apps support children by scaffolding (Vygotsky, 1978) their learning. Scaffolding refers to supports that an adult – or an app – provides to help the child go beyond their current abilities. In apps, this can include features such as difficulty levels, particularly those that respond to the child's performance on activities/tasks by automatically moving up or down to better meet the child's needs. Feedback is also important. Most apps provide feedback for correct answers but many do not provide feedback for incorrect answers (beyond a 'wrong' sound), which can leave the child guessing how to fix their mistakes (Meyer et al., 2021).

**How do parents choose educational apps?**

There is some evidence that parents have challenges identifying the best apps, with some of these challenges attributed to inconsistencies or limitations in information on app store descriptions (Montazami et al., 2022). There is also evidence that the criteria parents use to evaluate math apps is different than the criteria used by researchers/experts (Urquhart et al., 2024). However, it is not currently known how parents specifically find and select educational apps. The present study addressed this gap by examining how parents choose educational apps targeting early literacy and math skills.

## Method

**How did we test this?**

Our study included a 30-minute survey which was completed over Zoom. The survey included questions about:

- Math and Literacy: parents' ability to teach foundational math and literacy skills to their child, confidence teaching math and literacy, and self-reported number of math and literacy activities engaged with their child (e.g., baking, using a timer and reading, using magnetic letters ).
- Valued app features: parents described features they look for in apps (open-ended questions) as well as identified features from a curated list.
- Sources of information parents use: recommendations from teachers, ratings on websites (e.g., Common Sense Media), rated from strongly disagree to strongly agree.
- Parent-Child co-use of math and literacy apps, estimated from 0 to 100% of the time.
- Disuse of apps: has the parent ever chosen not to let their child use an app they had downloaded and an open-ended question about why they had made this decision.

**Who completed our study?**

In total, 65 parents of children two- to six-years-old completed the study. The average age of participants was 36.55 years and 89% were mothers whiile 11% were fathers. In terms of ethnicity, 65% identified as White, 11% South Asian, 11% Southeast Asian, and the remaining 13% included Middle Eastern, Latin American, Black, Indigenous, and West Asian. As to highest level of education competed, 71% completed an undergraduate degree, 19% completed a graduate degree, and 10% completed high school.

## Results

Overall 80% of parents said they had downloaded a math app and 86% had downloaded a literacy app. When parents were asked to spontaneously report the top features they look for in an app, the content (e.g., counting, songs), fun, and ease of use appeared for both math and literacy apps. When provided with a list of possible features, parents chose ease of use, quality of educational content, and fun for both math and literacy apps. Parents estimated that on average, they co-used math apps with their child 31.93%, and 35.61% of the time for literacy apps, though responses were highly variable in both cases.

### What sources of information did parents use to choose apps?

The sources of information used were the same for selecting math and literacy apps. The six sources endorsed from most to least included:

- Recommendations from teachers
- Recommendations from parents
- Parents' own exploration of the app
- Online ratings
- App store description
- Child's request

Parents also reported often exploring apps before giving it to their child.

### Did parental knowledge of and attitudes towards foundational math and literacy concepts influence their app decisions?

Overall, parents were the least certain about the cardinality principle of counting for math (e.g., generating the correct number of items to match a number) and phonological awareness skills (e.g., clapping syllables in words) for literacy. There was no clear pattern for how parental knowledge affected app choices. Parents who had downloaded an educational app before (either math or literacy) had more positive attitudes towards teaching their child foundational concepts at home than parents who had not downloaded an educational app before. Parents who said they explored apps before giving them to their child reported their child's math and literacy knowledge as higher than parents who said they had not explored apps before giving them to their child.

### How often did parents disuse apps and why?

Less than half of parents (44.9% for literacy, 42.9% for math) had disused an educational app before. Of those who had, the top three reasons for both literacy and math app disuse were lack of interest, lack of challenge, and cost.

## Interpretations

### What do our findings tell us about how parents think about educational apps?

Since the majority of our participants had downloaded both a math and literacy app before, it appears that this is an instructional aid parents are interested in using. In addition, the finding that parents who had downloaded educational apps before rated their attitudes about teaching their child foundational skills as more important than parents who had not downloaded an educational app before further suggests that parents do consider educational apps to be a tool to teach their children. Parents also indicated that of all the sources of information they might consider when choosing apps, a teacher's opinion was the most important and their child's opinion was the least important. This suggests that parents are looking for apps that can support their children's education and that teachers are a valued source for determining what apps to try.

**What do parents value in educational apps?**

The features parents said they looked for in apps were similar for math and literacy apps, with the functionality of the app (ease of use) and fun as two of the three most important features. This might reflect the previously mentioned overall poor quality of apps available for download – perhaps parents have to look for these basic features because many apps do not meet these criteria. When choosing from a list of features, the quality of the educational content in the app made top three, however, specific features that would make it high quality (e.g., levels and feedback) were not highly endorsed. This suggests that although parents might be looking for educational content, they may not know instructional features that could better support learning for their child.

## Recommendations

Three key recommendations from the present study include the role of teachers for guiding parents, and parental exploration and co-use of apps. Specifically, teachers may consider providing app suggestions since they have training in how children learn math and literacy, and parents indicate that they highly value teachers' suggestions. Also, it may be important to encourage parents to explore apps first to identify apps that will or will not work for their child. In addition, co-using the app with their child is known to promote learning (Griffith & Arnold, 2019) and can lead to the parents identifying features in apps more readily. Many of the reasons for disuse mentioned by our participants are things that could be identified by exploring the app and/or co-using the app with their child. These recommendations can support parents to find apps that are developmentally appropriate and engaging for their child.

**Scaffolding Skills**

Our findings also suggest that parents may need assistance in identifying instructionally relevant design features in apps. Specifically, parents should be encouraged to seek out apps that have levels of difficulty built into the app design. This could include levels that the user can select themselves, or that the app automatically adjusts based on the child's performance. Automatic levels are often preferable.

Parents should also be encouraged to look for feedback in apps. High quality feedback for incorrect responses will allow users to work toward an answer by providing increasing levels of guidance. Medium quality feedback for incorrect responses will include explanations. Poor quality feedback for incorrect responses will simply be a 'wrong' sound.

**Math Skills**

The specific skills should be tailored to the child; however, there are foundational math skills specifically the counting principles to look for:
One-to-one correspondence: activities that enforce the idea that each item is counted once and only once.

- Stable order: activities that enforce the idea that the counting sequence is always the same (1, 2, 3, 4, 5… and so on).
- Cardinality: activities that enforce the idea that IF the first two concepts are applied, the last number counted represents the total number in the set.
- Activities that support this skill could include a scale with different quantities on each side, finding the total number, and voiceovers that reinforce the emphasis on the last number.

**Literacy Skills**

Phonological awareness is an important predictor of reading. Activities that target phonological awareness might include:

- Discriminating between sounds, particularly sounds letters represent.
- Identifying syllables in words.
- Manipulating the sounds in words, such as changing the starting, middle, or ending sound (e.g., bat mat map mop).
- Rhyming activities.

## Conclusion

As more educational apps are developed each year, and parents face pressures to educate their

children without being explicitly trained to choose between available educational tools, it is important for researchers to continue to find ways to support this process. Our results highlight parents' motivations to find educational apps and aspects where they can use extra support to do so effectively.

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