In this content analysis of picture books from the A. B. Combs Magnet Elementary School library about technology, I analyzed and coded 20 books. The goal was to analyze the amount of authentic diverse characters in these picture books that would influence students positively in their use of technology for fun or learning. Results showed a gap in publishing “Mirrors”, as Rudine Sims Bishop defined them, in picture books about technology for students of color.
ANALYZING DIVERSITY IN PICTURE BOOKS ABOUT TECHNOLOGY

by
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Introduction

This case study aimed to look at many technology related picture books from the A. B. Combs Magnet Elementary School Library. During the coding process I looked for the tone in which technology is discussed, and the characters in the picture books. Specifically, I looked for diverse main characters (characters portrayed as belonging to one or more marginalized groups), or diverse characters that are featured heavily in the books. The goal is to acknowledge the gap in publishing that happens with diverse characters, and to highlight that this applies to books involving topics around technology. This may inform libraries and publishers to make an effort to include diverse voices about technology in their future acquisitions.
Literature Review

**Picture Books as Engaging Materials**

Picture books are an engaging material to start off a lesson in almost any subject for elementary schoolers. Picture books help students visualize and understand topics as well as how to interact with each other or solve a problem. There are endless uses for picture books in elementary classrooms and youth library services. While these read alouds are happening, students aren’t just learning about the subject of the book, they are also learning how to build culture with each other in the classroom and people beyond the class. There are opportunities to enhance social skills and vocabulary too (Leung, et al. 2018). This emphasis on picture books means that there should be more emphasis on inclusion in the stories read to students each day.

**Mirrors and Windows**

Before asking questions about why and how technology is presented in children’s literature, ask who is in children’s literature, holding the technology. Overall picture books are known for underrepresenting minority populations. As seen in the statistics released by Cooperative Children’s Book Center every year, there is a trend of keeping minority representation low in picture book publishing. The highest category listed for 2020 was books written by Asian authors, at 12%, or 403 books published out of the 3,299 books sent to them. In close second were books written about Black characters, at
12% and 400 books published (CCBC 2021). With this lack of diversity in children’s literature, the question must be asked of how to present mirrors, windows and sliding glass doors to young children.

In Bishop’s (1990) work, Mirrors, Windows, and Sliding Glass Doors, she describes the importance in seeing someone who looks like yourself represented in the literature and entertainment you consume, especially as a young person. This is called seeing a mirror. A window is when a book helps the reader see what another person’s life is like who is doesn’t look like them. The last phrase introduced, a sliding glass door, is when the reader feels like they have stepped into another perspective, and it has changed their own in some way.

In Gultekin and May’s (2020) article, they describe some other ways that diverse representation in books can impact students. While Bishop focused on the positive impacts, Gultekin and May bring up the ways that misrepresentation can harm students’ sense of worth and identity. They propose three new phrases that are an interesting contrast to Bishop’s: fun-house mirrors, blind spots and curtains. A fun-house mirror representation would look like a main character of color that might be written and drawn stereotypically and not given depth and meaning as a character outside of those stereotypes. A blind spot is when a main character of color is meant to represent their entire community; it magnifies one type of story for that character and creates a single story around that group of people. Curtains refer to the stories from communities who don’t use written word to tell their tales. If they have a religious or otherwise sacred rules to not depict or write down certain stories, publishers and authors should not depict or write them.
Considering this idea from blind spots of telling a single story about a community, turn to Chimamanda Ngozi Adichie’s TED talk from October 2009 titled “The danger of a single story”. During this talk Adichie describes how growing up in Nigeria but reading stories from American and British authors accidentally taught her at a young age that stories were written about white people, since that was what she saw and read about. Later she realized that there were African stories, but that they were not told as broadly, as often, or from many perspectives outside of Nigeria and Africa. In the U.S. and in herself she has recognized how people believe a single story and the dangerous power imbalance it maintains (Adichie 2009). This is still the same problem we are facing over a decade after this talk was posted. For years as a child Adichie had no mirror in the literature she was exposed to, and her talk expresses the ways these limited stories can lead to harmful ideas of stereotype and exclusivity.

Anyone is excited to see themselves reflected accurately and positively in the literature or entertainment they consume. Children of color especially need to see people like them doing a variety of things to understand that they can be whoever they want to be. Secondarily, white children should be exposed to a multitude of perspectives so there is less of a danger of a single story.

**Diverse Characters**

After understanding the importance of students seeing themselves and other perspectives in books, turning to the current state of diverse books and authors is the next logical step. As already discussed, the Cooperative Children’s Book Center does yearly statistics on the number of books published by BIPOC authors, and how many books
feature main BIPOC characters. They define picture books “about” Black, Indigenous, and/or Person of Color as a book that features a BIPOC character significantly throughout the book (CCBC 2018).

Comparing statistics two years apart, from 2018 to 2020, shows that not much has changed in the numbers of books about BIPOC characters. 2020 saw 3,299 books entered to the center, and 2018 saw 3,682. It’s important to look at this older data to compare because they had fewer submissions for 2020 due to the global pandemic. In 2018 with higher submissions, they had more BIPOC books, however, the difference is only by 91 books across all “About” categories. There were also hundreds of other books added, meaning that the percentages were still all very close from 2018 compared to 2020 (CCBC 2020). All of this is to say that there is a serious underrepresentation of BIPOC characters that is documented yearly, from around the world.

Clearly, there is a lack of diverse characters in books, and a need for diverse characters in children’s picture books. However, there is still the worry that diverse characters should be authentic to their culture, and not stereotypes or inaccurate portrayals. A team of researchers came up with criteria on how to evaluate materials to see if they are accurate. They decided that “cultural authenticity comprises not only the absence of stereotypes but also the presence of values consistent with a particular culture and the accuracy of cultural details in text and illustrations” (Yoo-Lee, et.al 2014). They used this definition for their work in analyzing cultural accuracy in picture books and found that only insiders can decide if a portrayal is accurate. No one person can authenticate all cultural identities and therefore can’t know without the perspective of someone else in that cultural group if it is accurate.
Having a wide variety of authentic, diverse stories in our picture book collections will help students learn about other cultures, learn to understand multiple perspectives, and see themselves in the literature they read. There should be a conscious effort to avoid a single story about places, people, and communities. For the sake of this study, diverse main characters will be any non-white characters that have a major role in the events or lesson of the book in a positive manner.

Technology in Picture Books

One of the fastest growing and successful industries right now is technology. If you know more about coding or development than the average person, it seems like you’re set for life. In such a white male dominated field, how do we spark the interest in young students (U.S. Equal Employment 2021)? It can start with something as simple as picture books, depicting someone who looks like the student excelling or problem solving in that field. It could even be a character who is their age just starting out on a computer or other device and learning how it works safely. The sooner kids can be introduced to safe and productive learning on computers the easier it will be to introduce more complicated technologies. The first hurdle in entering or thinking about such an inhospitable field for those who aren’t white males, is to be able to see themselves or someone like themselves succeeding in that same field. It may seem small to start with a picture book in elementary school, but every other subject in school starts young too, why not this one?
Research Questions and Hypotheses

The purpose of this study is to explore the presentation of diverse characters in technology themed picture books. As a third-grade teacher at a rural school with 96% minority enrollment and similar classroom demographics, I was constantly looking for books with diverse main characters. However, most of our library and classroom libraries were made up of outdated books that were basically shelf fillers or the most popular graphic novels of the year. While I was more than happy to foster a love of reading through graphic novels, I wanted to be sure they were gaining interests in all types of books, from picture books to beginning chapter books. While on the hunt for affordable picture books or books in the school library, I found a lack of picture books with diverse characters. Even more specifically, I could not find books that talked about technology positively with diverse main characters. The books I did find were cautionary tales that warned children that too much technology time was bad, without providing any positive ways to use it, and were more than likely majority white characters. If there were human characters of another race, they weren’t a major part of the storyline and didn’t affect the plot.

I hoped to find at the A. B. Combs Magnet Elementary School Library a slightly better selection, since it is in a more urban, affluent area with a higher population. The school serves a diverse population from all over Wake County and has a librarian who
constantly seeks to expand the collection with updated materials featuring relevant topics and diverse characters.

During this study I will analyze diversity in picture books, which will be defined as the presence of 3 or more illustrated identities (gender, race, ethnicity, or disability) in the characters of the picture books. Technology will be defined as personal devices such as smartphones, tablets, gaming consoles or computers. A picture book is defined in the context of this study as a book consisting of pictures or drawings on each page, with either a written story or just pictures to tell a story. The reading level of this story will be at a 3rd grade level or lower.

The main questions I aim to answer are: how diverse are children’s picture books that are themed around technology and how do these books present lessons about technology?
Methodology

I chose a content analysis because I am interested in representation in picture books. My analysis focused on pictures within picture book scenes that depict characters with technology. A content analysis is the right approach to data collection because of these artifacts.

Positionality / Researcher Role

My relation to this topic is secondary. In my experience as a 3rd grade teacher, I was constantly trying to find diverse and interesting picture books to introduce topics to my students. Often the curriculum called for outdated books either in topic or subject. My classes each year were primarily students of color, and it was important for them to see characters who looked like themselves being successful in their adventures and learning. It was difficult a lot of the time to be able to find those in our school library or to have the funding to get new books that fit the description. This has brought me to this question of how many diverse technology-themed picture books are there?

While doing this study I kept in mind my own identities, as a white, cisgender neurodivergent woman. Meaning, I can only confirm identities that I am a part of as accurate in their depictions. As I continued my study, I revisited this fact to ground my coding and other analysis of the picture books. If I was uncertain if a representation of a character with an identity different from my own is accurate, I researched the confusion and if possible, discussed with a person within that community. However, no one person
can represent a whole identity of people, therefore some may disagree with how I code the books. To ensure the credibility of this research I reflected on the methods I used during the coding process and adjusted as needed for a reliable and valid study to occur.

Sample / Research Participants

I convenience sampled from the A. B. Combs Magnet Elementary School Library. Books were selected using in their catalog and by shelf reading. I also collaborated with the Librarians on site for their knowledge of the collection for more obscure or harder to find books that still met the criteria. Selected books had technology pictured in the books with a named character or as a topic in the book. I excluded elementary-aged graphic novels and focused only on traditional picture books. This sample was based on what was available at times that I entered the library. Even with this limitation, it was agreed that I found and coded all books that could be found that met criteria within the collection.

Data Collection Methods

I collected a few books at a time from the library. Before entering the space for the first search I knew some books from my experience with children’s literature. After I found those to start, I used their catalog system, Destiny. Search terms used in the catalog included library, school, technology, coding, computer, TV, cell phone, social media, and television. I found at least one book using each search term. I found that television was the least useful search term because it also brought up any book that had characters from a television show, as it was described in their records. While in the library space I also browsed the shelves to find books that may not have mentioned
technology in the records, but still pictured it with a named character. The goal was to find twenty or more fiction picture books relating to technology or where technology is used by a named character.

Each group of books were read two times and coded for the kind of technology presented (TV, Computer, Tablet, Video Games, Cell Phone), where the technology is used (home, school, public space) and diverse characters shown (by perceived race, ethnicity, gender and disabilities). Other categories I looked at included the message surrounding the technology, if there was one (positive, neutral, negative, cautionary). A positive message meant the book encouraged technology use. Neutral in this case meant the message had nothing to do with technology use, though technology was used during the plot of the story. Negative meant that at the end of the book the character was no longer using technology by the end of the story. Cautionary was added to each of these tags as needed. Positive-Cautionary meant that the story was telling the readers to use less technology, but not cut it out altogether. Negative-Cautionary meant that the character was encouraged to cut out all technology use in favor for other activities. Neutral-Cautionary meant that their technology use didn’t change based on the story plot, even if the message was about using technology. Some stories weren’t cautionary at all, and instead fully positive, negative or neutral towards technology.

Data Analysis Methods

I input the information into a database on AirTable. This let me analyze and rearrange data easily to understand and find significance present in the data. I analyzed the data by using the filtering features in AirTable to filter by type of technology, message of book, and human/non-human characters.
Findings and Results

Observations of Books

From the library’s collection of 14,091 books, with 3,208 picture books, I was able to find 20 books that emphasized technology, or a named character used to further the plot. With the size of the collection, I had originally thought that there would be plenty of books to choose from, however in practice it was harder to find books than I thought. Using the keyword and subjects searches as well as the knowledge of the school’s librarian and assistant who are very familiar with the whole collection, it took multiple trips and quite a bit of shelf reading to find the minimum number of books I wanted to look at. However, I did find that some of the books I read were ones I had not heard of or read yet, which did help me reach my goal of getting to know more picture books about technology.

As I was reading some of the books from my final list, there were a few exceptions to this “named character” rule that I found. Specifically in *Blackout* by John Rocco, which followed a community in a city who were all very plugged into their phones, TVs, and computers until there was a city or block-wide blackout. Faced with nothing to distract them, they spent time with their families and then outside in the street as a collective. It captured the excitement of special circumstances like those and showed how it sparked the family pictured to spend time doing family game night. In the end the family decided to keep playing board games together when the lights turned back on. The
characters were unnamed, but the book still had technology that furthered the plot and was a part of the central message. All the characters followed in the book used technology at some point, which made me decide to include it despite the lack of names.

Another book I’d like to highlight, for a different reason, is *Nerdy Bird Tweets* by Aaron Reynolds and illustrated by Matt Davies. The message in this book was well balanced between teaching how to use technology properly as well as encouraging fostering in person friendships off of technology. In the book Nerdy Bird really enjoys sharing funny moments and her thoughts on a twitter-esque social media. She shares something about her friend Vulture on there that Vulture finds and doesn’t appreciate. Through this conflict Nerdy Bird learns about respecting other people’s boundaries for sharing online. While she and Vulture aren’t hanging out, she tries to reach out to her online followers and finds that they don’t understand her as well. Nerdy Bird learns to prioritize in-person friendships and to find good balance between on and offline entertainment. This also includes technology and uses of technology that young students could be exposed to personally or through their friends and families. It’s important for them to understand what it means to share things online, about yourself and others.

Another exemplar in picture books about technology is *Our Librarian Won’t Tell Us Anything!* by Tony Buzzeo and illustrated by Sachiko Yoshikawa. In this book the main character, Robert, visits the school library at his new school with his class. He hears from the other students about how the librarian, Mrs. Skorupski, doesn’t answer questions or help them. He’s nervous until he finds out that she just teaches them how to use the catalog and search engines to find answers for themselves, instead of giving answers. This book’s message isn’t directly about technology like the last, but their use is
productive in answering their questions and finding books that they will enjoy in the library. This is a great resource for showing how to use technology for educational purposes, outside of the entertainment aspects of computer use.

There was one book in particular that I found did not seem to send a great message and included technology in the story: *Monsters Eat Whiny Children* by Bruce Eric Kaplan. In this book the two kids whine to their parent about wanting their phones, wanting certain foods, or wanting to go outside. Their “kindly father” warned them of the monsters who eat whiny children, and soon they are taken by those monsters. In the end they escape and whine less, leaving the reader with no real message except that if children whine, someone will steal them to try and eat them, and they’ll have to save themselves. It was an odd fear tactic and came across as the author venting about their own frustrations with parenting. I included it because of the whining about technology included in the beginning, but I would not suggest it for future collections.

Findings by the Numbers

The compiled list of books includes 20 picture book titles for elementary schoolers with publishing date ranges from 1995-2021. The range of number of characters was 1-7 characters using technology, with an average of 2.9 characters per book. Within the 20 books there were 48 characters, and 5 instances of series where characters were used in multiple books. Those series were *Arthur, The Berenstain Bears, Nerdy Birdy, From the Black Lagoon,* and *Mrs. Skorupski Stories.* Each series had 2 books that were included in the study. Counting the characters as new for each book, the character total would be 61 characters.
The six main categories I want to highlight from my data are:
technology used, space technology was used in, the message about technology, human
and non-human characters, perceived race and perceived gender identity. Other
categories I looked at but didn’t find any results were: perceived disabilities and age.
There weren’t any clear indications of disability in named characters of the books I
found. In terms of age, there were a variety of ages portrayed, but for the most part main
characters were all in middle or elementary school range, and age didn’t contribute very
much to their storylines.

Throughout the study there were many examples of technology used by
characters, with computers in the lead for number of times pictured (Figure 1). This was a
bit surprising since many of the books were placed at home and it might be expected that
TV, cell phones or tablets would be higher for that reason (Figure 2). After analyzing the

![Technology Pictured](image1.png)

*Figure 1. Times technology was pictured in the sample.*

![Where Technology Was Used](image2.png)

*Figure 2. Where technology was used in the sample.*
data found in the sample it’s clear that most of the books took place at home (Figure 2), which means a lot of the books were about technology use for entertainment. Going into this project I expected more books with examples of books used at school, however it was hard to find those as examples. There were a few books that I looked at but couldn’t use because they were in a school setting and had a computer pictured, but it was in the background and unused for the plot of the story. There were of course at least 1,000 books with school in the subject or keyword for my searches, but few used computers. Since the majority of the books in the sample were placed at home, most of the messages were in regard to entertainment use of technology and tended to be more negative or neutral (Figure 3). The majority had some sort of cautionary message to them,

![Message About Technology]

*Figure 3. Messages about technology in the sample.*

as well as another majority of the books being neutral or negative towards the use of technology. Some of those negative-cautionary books were especially extreme cases of discouraging all technology use instead of advocating for a balance of entertainment online and offline.
Of the 61 characters (48 unique) a majority were human characters, the rest were animals except one, which was a potato (Figure 4). This wasn’t surprising based on the publishing statistics from the Cooperative Children’s Book Center. The sizeable percentage (39%) of non-human characters is higher than the overall publishing standard of 27% non-human characters. Of the human characters there are consistent statistics based on perceived race and gender compared to the CCBC yearly statistics (Figure 5 & 6). The majority of characters were white with few minority groups represented. It was
surprising that there were 2 more female characters than male in the overall group of characters. Even with the character counted twice that were in multiple books, there are more female characters. The context of the female characters using technology might tell a different story, but the overall count remains.
Impact, Limitations, and Conclusions

Impact

From the selection of technology themed picture books I found, most had a lack of diverse characters, were a cautionary or negative tale and showed technology as entertainment. I propose that there is a gap in publishing of books that have diverse characters who use technology in educational and engaging ways, that encourage exploration and learning. There is a small movement towards publishing more books like that, as seen with the book *Hello Ruby: Adventures in Coding* by Linda Liukas. This book combined story and coding instructions together to engage the reader in the main functions and ideas of coding. Not all books should explicitly instruct how to use technology in this way, but there are steps to be taken towards genuine engagement with how students can use technology positively.

From my time in the library casually observing the reading choices of all grades, I noticed a huge interest in video games and technology related non-fiction books in the younger grades. In older grades there were many options for short or long chapter books that had a connection to their interests in technology, but the picture book section has been lacking for stories to pair with non-fiction texts. Making strong stacks is an important concept of elementary library instruction, but there aren’t the options available fiction picture books to pair with the non-fiction counterparts.
Limitations

There are a few limitations to this study that are important to note. Though a content analysis is best for the questions asked, I can’t answer the “why” questions, for example: why certain characters are given technology or why the author chose to depict the identities they did.

I am of course limited by the collection in A. B. Combs Magnet Elementary School, which is an extensive collection but does not include every picture book published. The head librarian does a great job of finding diverse and interesting new books for her collection but is limited by budget and what is published.

Other limitations include my own identity, because I cannot as a white, cisgender, neurodivergent woman accurately say if a person of another identity is correctly portrayed. I can use my research and continually ask questions of the text for accuracy in facts and lack of stereotypes to do my best. Finally, there is a time and resource constraint in this project, having limited time to complete it and other responsibilities to focus on outside of schoolwork. It is my belief that limiting the sample to the A. B. Combs Magnet Elementary School library meant I could fully analyze a collection without missing books.

Conclusions

Picture books engage provide new perspectives and opportunities for growth for young readers. If those books are genuinely trying to meet students in subjects that interest them, there should be more integration of technology in plot structures. There are many avenues left unexplored, with few positive examples of how to balance technology
use for entertainment and education, as well as taking time offline to be present with reality.
References


Appendix A. Books in Study


Thaler, Mike & Lee, Jared. The Librarian from the Black Lagoon. 2011. ABDO Group.
Appendix B. Links to Data

Book List

Characters List