Access for All

Adapted Literacy Through Low-Tech Assistive Technology

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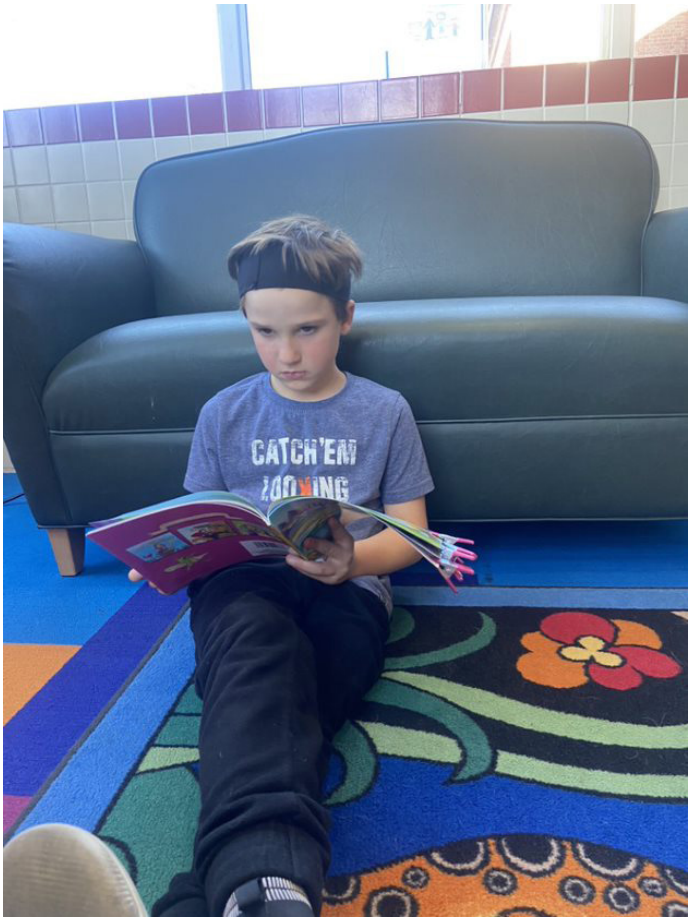

Just chillin' out with a book.

Ms. Nesbitt is the librarian in a small town, where she hosts a popular children's storytime. While families enjoy it, three children have difficulty listening to the stories and do not choose books to check out. There are other children she would like to engage more who have little interest in, and experience with, books. Some of the children are hard to engage, while others need extra support.

Nesbitt would like to develop or further the love of books and literacy skills of all the children, and she would like to create a children's area on the principle of universal design for learning (UDL). Because of budget restraints, however, she has little additional money. Below is a description of the children she is most concerned about.

Three-year-old Kasey has cerebral palsy (CP) with seizures. He often pushes books away, putting his head down instead. Kasey is learning preliteracy skills and enjoys manipulating objects but has great difficulty with fine motor abilities.

Kasey's twin, Kolby, also has CP. He enjoys having books read to him. He will often seek out books during check-out time, but he cannot interact with them on his own because of fine motor

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difficulties. His strengths include enjoying the computer with an adaptive switch, and he has the ability to understand key concepts in a story.

Chandler is an active four-year-old with language delay, who often engages in imaginary play where he fights with ninjas during storytime. He seldom initiates looking at books, and when he does, he folds the pages, bends the corners of the book, or even tears the pages. During sensory activities such as playing in sand, finger painting, and playing with play dough, he is very attentive and will not leave that area. His strengths include his sustained attention to the sensory area and manipulatives table, his imagination, and his understanding of simple plots.

Nesbitt begins the next storytime by reading Eric Carle's *The Very Hungry Caterpillar*; the children appear eager and ready to listen to one of their favorite books. She begins by asking for someone to help her turn the pages. Kolby indicates he would like to help, but given his motor challenges, he is unable to turn the pages. He is discouraged and begins to disengage.

Nesbitt keeps an eye for other opportunities for him. She passes out felt representations of the food the caterpillar eats in the story to everyone in the class and reminds the children to shake their item when she reads about it. However, Kasey cannot grip the felt and shake in time with the reading of the story. He now joins his brother in focusing on items around the room rather than the story being read. The read-aloud continues with several children now watching Chandler as he is making funny faces and not listening at all. Nesbitt becomes frustrated and reads the book more quickly than she planned.

Due to a lack of exposure to books, many children in the storytime still need the pre-literacy skills of reading, writing, talking, singing, and playing. Nesbitt believes in the concept of UDL and wants to use the concept to provide multiple means of engagement, and she has heard that books can be adapted or modified so that children can turn the pages of a book or be more interested in the content. She is eager to try to make literacy more accessible to all children.

This article will offer readers easy-to-adapt, low-cost, low-tech strategies to create books that all children can access. These simple strategies can enhance the written words and allow children who have difficulties interacting with books to interact with them more.

Most importantly, students gain access to books, which is the first step to improving preliteracy and early literacy skills. Using these strategies can increase the amount and types of books in a typical classroom.

Universal Design for Learning

Adapting books can support a universally designed learning (UDL) environment. UDL includes three principles to prepare a library for all readers:

- multiple and flexible means of representation of content
- multiple ways to engage students
- multiple ways for students to express what they know[1]

For example, a child with visual impairments—who might miss the pictorial or visual cues—might have difficulties understanding the story. Therefore different versions of a book will be beneficial to typical children as well as children with disabilities. In the scenario above, the books can be adapted to have multiple means of representation, the students can engage in multiple ways, and Ms. Nesbitt can use the materials to assess the children's knowledge in ways that are meaningful to them.

Developing Literacy

"There is no such thing as a child who hates to read; there are only children who have not found the right book."[2] The vignette above is a familiar story for many librarians. How do you get children interested in books? Interaction with books during early childhood enhances the development of social and neurological development,[3] and early literacy skills have a high correlation with a child's achievement in middle and high school.[4] A lack of literacy development with preschoolers often leads to disparity in educational achievement in all school subject areas later in life.[5] Adolescents who struggle with reading often lack the foundational skills of literacy (e.g., vocabulary, grammar) that are often acquired through engagement with books at an early age.[6] Developing literacy skills with young children both with and without disabilities may be challenging but can become easier using the UDL principle to adapt books in a variety of ways. If a child is unable to interact with books or literacy activities, librarians can create needed modifications and adaptations. In the scenario above, if page-turners (e.g., tongue depressors) had been added to the book, when Kolby wanted to be the page turner, he could have used the tongue depressors to turn the pages, experienced success, and remained engaged in the literacy activity.

Some children with disabilities have deficits in reading comprehension and vocabulary that require ongoing support and instruction.[7] Young children gain more expressive and receptive language skills when their interests were considered when choosing toys and books.[8] It is important that children can find books that align with their interests.

However, finding an appropriate book for *any* student, regardless of ability, can be challenging. For example, lack of engagement with materials is often a challenge for children with autism,[9] and adapted books can make reading more pleasurable for them, as well as for other readers who do not engage with traditional books. Such engagement is the initial step for students of all ages to acquire pre-literacy and literacy skills.[10]

Children with physical disabilities may not be able to turn pages to access a book independently or may not have access to books in special formats (e.g., books with interactive elements, e-books).

This animated book was created with PowerPoint.

In this case, an adapted book would support the child's ability to interact independently with a book. Further, children with autism might have aversions to traditional books or may not interact with written text in traditional ways needed to promote pre/literacy skills,[11] thereby making it even more important to have books available in a variety of formats.[12] Further, children with and without disabilities simply may not relate to printed material and have no interest in engaging with traditional books.

Research has found that children can increase literacy skills with adapted books. Broemmel, et al. found that animated electronic books (e.g., e-books, Wonderbooks, Tumblebooks) could positively increase the literacy development of preschoolers.[13] Additionally, a moderate, but not a high level, of visual stimuli in animated books scaffold imagery for young children can increase the language network in a young child's brain comparable to the effects of traditional children's books with illustrations.[14] Studies found that adaptations to books, such as adding picture symbols and tactile objects, improved the reading comprehension of students.[15]

Two studies found that many children today do not engage with actual books effectively, preferring digital media.[16] Another study found that dialogic reading using technology-enhanced books increased the vocabulary of preschoolers with an autism spectrum disorder.[17] Dialogic reading is a method of shared interaction with the student and librarian while reading a book. In this method, the adult asks questions about the plot, pictures on the page, etc.[18]

Further, the Council for Exceptional Children-Division for Early Childhood (DEC) and the National Association for the Education of Young Children (NAEYC) drafted a Joint Position Statement of Early Childhood Inclusion in 2009. Both organizations value inclusive activities and suggest that all children should have access to developmentally and individually appropriate materials, use a range of activities that promote engagement of all children, and provide the necessary supports that all children need to thrive in reading activities.[19] Developmentally appropriate children's books are multicultural, have engaging illustrations, have interesting words and wordplay, and are generally visual.[20] Therefore adapted books must be developmentally appropriate as well, and librarians can design or adapt books that are developmentally, individually, and culturally appropriate.

In the vignette above, even though Nesbitt has a solid grasp of the needs of those who regularly participate, she is hampered by what she can purchase and her ability to modify existing books because of limited experience.

Here we will examine three ways to create, modify, and adapt children's materials so all children in a library setting can learn from the same story, albeit in unique and developmentally guided formats and in low-cost formats (e.g., digital, adapted, squishy).

Low-Cost Alternatives

Adapting books is not a new concept; around 1854, the American Printing House for the Blind began adapting books for individuals who were visually impaired.[21]

Librarians can adapt an existing book for alternative formats such as digital, adapted, or squishy books. Some librarians may worry about copyright infringement; however, the following disclaimer can be used: "This book was adapted under the United States Copyright Act of 1976 and may contain copyrighted content not authorized for use by the owner. Section 107 of this act states, "Allowance is made for "fair use" for purposes such as . . . education."[22] Additionally, these adapted books can be circulated in a local library.[23] Therefore, provided the library owns a copy of the book to be adapted, these modifications do not constitute copyright infringement and are permissible for educational purposes. Once the librarian determines the necessary adaptations to an existing traditional children's book, the librarian may print or copy the book (if needed), create adaptations to the existing book, create a digital book, and/or create a squishy book so all children can have access to the same story in a format at their ability level.

Adapted Storybooks

One low-cost option is to use the book in its traditional format but with added interactive elements on each page. The key is that an adapted book should be more engaging than a traditional storybook and include meaningful interactions on the page for the child. For example, if a character walks across the page in the traditional storybook, in the adapted book, a cutout of the person may either be moved across the page by pulling a string or using Velcro to move the person from one side of the page (following a line) to the other—or animation can be used in PowerPoint to make the character move across the page. The interactive elements are endless, but again should be meaningful and not superfluous.

Interactions can include flaps over pictures that the child moves to see the illustration, movement of pertinent items on the page of the story, texture on objects in the story, selection between items in a story, and the use of Velcro to aid movement and selection.

Also, librarians could add page fluffers (e.g., items like puff paint added to keep the pages apart to assist a child in opening the book

and turning the pages) or page turners (e.g., items like Popsicle sticks or clothespins placed on each page to assist in turning the pages) for children who cannot physically turn a page easily.

Ms. Nesbitt asks Kasey to help create some adaptations for a book. He had many ideas; he wanted to feel the animals' texture (e.g., fur, whiskers, etc.). and wanted to do something with the animals. Ms. Nesbitt first adapted the book with page fluffers and used Velcro to make some animals move and hide behind the felt cloth that could be lifted with a strip of Velcro. For the first time, Kasey showed interest in books during independent reading time. Happy with that success, she decided to adapt a book for Kolby by making it digital.

Digital Books

Digital books are omnipresent, and as technology has changed, formats have also changed (the ability to highlight the words as the book is read, graphics that can be manipulated by the student). Developmentally-appropriate use of digital books should include co-viewing with adults and/or peers.[24]

One study found that children could learn vocabulary through digital storybooks on a tablet paired with developmentally-appropriate activities.[25] Recall of events in a story is better on a digital platform than in a traditional book, and animation improved recall, with further improvement if the book included a child's voice reading the digital book.[26]

To create a digital storybook, the first step is to create a storyboard, which plans out each page by outlining the plot or themes of the book while deciding what images to place on each page. The storyboard allows the creator to individualize the experience either by simplifying text, using targeted words, or even creating more challenging text for gifted students. By creating the storyboard first, the librarian can be selective of the text and images that will appear with the final product using a PowerPoint presentation. If assistance is needed to work in PowerPoint, there are numerous tutorials online to learn the features discussed below. The user only needs to know the version of PowerPoint to be used.

Use of PowerPoint

PowerPoint is an excellent program to transform an existing storybook into a digital storybook.

Typically, one page of the book is on one slide, and the book continues in this format. However, if there is more than one concept on the page, the librarian might decide to split the page into two pages.

Additionally, it is easy to use the "sounds" feature of PowerPoint to read the story. Another nice touch is to have a child's voice reading the book, since it improves recall.[27] As the story is being read, the words on the PowerPoint can be highlighted so that the reader can see the words as they hear them. Page animations in

A page from a squishy book using a toy cupcake and candy sprinkles.

PowerPoint may be a way to encourage engagement when a person is not reading the story. Animations should be consistent with the story events or characters associated with that given page of the story; for example, a page that indicates a child walking to a given location might incorporate movement of left-to-right animation. Additionally, sounds can be included (e.g., a car honking a horn).

For ease of use, the digital story should incorporate continuous play to support the student's independence to interact with the entire story. Once started, the pages should advance without the need to press any key. However, if the child is able *and* librarian would prefer, the story could be set to manually advance for students to use adapted switches or the Enter key to advance the story. Narration on each page is essential so that the student can hear the story while viewing the pages and the text. The text should appear on each page and as a page is narrated, each word should be highlighted sequentially to link the spoken and written word.

Creating a Squishy Book

In 2008, Dr. Patricia Pierce first wrote about the concept of "squishy books,"[28] and the concept has been included in newsletters for parents and practitioners and is a project in the Connect Modules,[29] where they are shown to create books for children who prefer a sensory experience. Pierce found that

preschool children were as engaged in similar amounts of time with squishy books as they were with traditional children's books.[30]

Squishy books are a great low-cost way to adapt books for young children in inclusive environments that may be needing more foundational literacy concepts (e.g., vocabulary, concept, memory). Research shows that English language learners can learn vocabulary through visual and tactile modalities.[31]

Squishy books are books that are adapted using tactile materials enclosed in a re-sealable plastic bag. Initially, most squishy books were created with non-toxic gel or other semi-liquid substances, thus giving them the name "squishy books." Now, many other tactile substances are used for the "filling" in the book such as beans, small pebbles, and Orbeez.

In addition to the main texture of the book, other items are added to the bag to create the meaning of the "story" of the book. Each page of the created book typically has one concept per page. *(Note: Don't fill the bags too full or the book will be more apt to bust and be more difficult to create a manageable-sized book).*

The squishy book also needs a binding and the words on each page. Going back to the storyboard and creating a one-sentence text for each page (i.e., one filled bag with manipulative) will decide what items, fillers, and text will be used. Many professionals use many colors of duct tape to add additional seals to the bags and to bind the pages together. Or, instead of binding the book with duct tape, it can be placed in a binder. After the book pages are sealed, each page can be hole punched before the seal (i.e., so there is not a hole in the page of the book) and placed in a ringed binder. Creators can use a permanent marker or use labels to write the text of the story on the outside of the bag.

Librarians who work with young children—both those with and without disabilities—want them to be interested and engaged in books. Creating adapted books ensures that more children can visit the library to enjoy books and learn from them. &

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