International Journal of Social Science and Business, Vol. 4 No 2; June 2019
ISSN: 2519-9161(Online), ISSN: 2519-9153(Print)
Published by Center for Academic Research (CAR)

Special Education Typography: fonts, fonts, fonts, fonts

Dr. Larry Beard
Jacksonville State University
United States of America

Dr. Joesph Akpan
Jacksonville State University
United States of America

Dr. Charles E. Notar (Emeritus)
Jacksonville State University
United States of America

Abstract

Around 13% special education children in public schools have problems with their ability to read and write. There is evidence that the presentation of the text has a significant effect on a text's accessibility for these students. The article discusses those fonts that may be useful for special needs students.

Keywords: Dyslexia, font types, typography, readability, legibility, text layout, text presentation, typefaces, special education

Introduction

The number of special education children in public schools grew from 4.7 million to 6.7 million in the last three decades and account for 13% of students nationwide. Why design fonts for special needs students? Fonts designed for special needs students makes it easier for them to: Recognize characters (improve legibility) Comprehend what they read better (improve readability) Practice their initial handwriting Avoid common reading and writing mistakes (8).

It's not uncommon for special education students to struggle with reading and writing. Has your child been diagnosed with Autism, Downs Syndrome, Cerebral Palsy, Dyslexia, dysgraphia, or various kinds of language-based disorders make themselves very pronounced when children are learning to read and write.

While these suggestions are ideal for classroom settings, parents of students with special needs can also implement these principles. Helping children with learning disabilities both in and out of the classroom is the best way to help your students with special needs achieve success.

The question of a 'font' specially designed for people who have a learning or developmental difficulty is a difficult one to answer (1). You might think that a passage of text that can be read easily by someone who has difficulty reading passages of text, would point to a clear-to-read and perfect typeface. But no one has found it yet, and they won't, it's a crazy thing to want to do (1).

When the “h” looks so much like an “n” that your student with Autism then refuses to read because that IS an “n” no matter what you say (2). While incidences like this are what makes our job so different day to day and absolutely worth it, after that happens once or twice, you stop thinking so much about making it “cute” and more about making it functional (2).

Types of Special Needs Students

The different types of special education students include those with physical, emotional, mental, behavioral, learning, developmental, and communication challenges. Students are placed into special education classes if they have disabilities or disorders that interfere with learning in a traditional classroom. Special education classrooms and resource rooms are generally equipped with specialized learning devices and a smaller student to teacher ratio (9, 11).

Some special education students have physical disabilities. Blind or deaf students often require special learning devices not offered by the conventional classroom. Students who have physical disabilities that impair speech or movements required for writing or speaking may be placed in special education classes where they can receive more specialized attention from teachers (11).

The category of special education students includes those with mental health issues and brain injury. A student who has suffered a traumatic brain injury often requires a different teaching approach, specialized instructional tools, and personalized attention. Mentally delayed students, in general, study in special environments that allow for a slower pace, content repetition, and greater supervision (11).

Some autistic students are placed in special education classrooms. The challenges that come with this disorder vary across individuals. Many autistic children experience delays in language development and social skills. Some experience no reaction to sounds, while others are highly sensitive to noise and physical contact. The placement of some autistic children in special education classrooms often creates greater comfort for the student and facilitates a more focused approach to learning (11).

Behavioral disorders are also reasons behind placing students in special education classes. A child with a conduct disorder, for example, might be placed in a special education classroom because he is continually disruptive and needs a greater amount of attention from teaching staff. Students with attention-deficit disorders are considered special education students in instances where their learning needs cannot be met in a traditional classroom. A child lacking in impulse control may require an adapted teaching environment and specialized attention as well.
Some special education students suffer from mental and emotional health issues such as depression, anxieties, or phobias. In these situations, the condition keeps the student from participating in classroom activities, inhibiting learning. A special education resource room that allows for greater individualized attention is sometimes helpful in these cases. These placements are sometimes debated by parents who believe that the special education label might harm their child, especially if they feel that the condition is temporary and can be treated outside of school (11).

Definitions of Typefaces

Typography is the practical art of arranging how the printed word appears on the page. Typography was born when print was born. Early types were based on the letterforms of scribes, and the letters cut into Trajan's Column ("monumental inscriptions"). Later, gradually, type designs were based on the special needs of books, pamphlets, newspapers and advertisements.

Typography includes not only letters, but all the set of symbols in a font, and it includes the overall design of a page or document. It applies to any medium which may be read; therefore it includes text on computer screens. A typographer may design type, select fonts, and design the layout of pages and books. The term does not cover the act of printing itself, though many of the early printers were themselves typographers (10).

According to multiple surveys and studies, the most readable fonts tend to be the fonts that are known as sans serif or “without serif.” The word “serif” is French and signifies the little tail attached to the end of a stroke in writing some letters. Many of us don’t notice these little add-on flourishes, but they can make it difficult for struggling readers to know where letters and words start and end. Any font that is “sans serif” is therefore, already a cut above when choosing the ideal font for readability. Some refer to sans serif fonts as “Grotesque” or “Gothic” and serif fonts as “Roman.” (Dr. Beard, 2019).

Examples of sans serif fonts include Helvetica, Courier, Arial, Calibri, Tahoma, Trebuchet MS, Verdana, CenturyGothic, and Comic Sans. Of these fonts, Comic Sans is judged to be the most readable. Unfortunately, Comic Sans doesn't look very professional—in fact, it was invented to be used in comic strips. Lexia Readable was meant to address this problem of professionalism: it has the good readability of Comic Sans but doesn't look quite so, well, comic. A good font alternative for business or academic purposes is Trebuchet MS (Dr. Beard, 2019).

But then you read on and see that they say that serifs are 'found in traditional print fonts such as Georgia or Times New Roman', and you think, oh dear, those aren't traditional print fonts, but Microsoft fonts. It's the old story, someone has got a new computer and they think it's really shiny (1).

(And this is one of the reasons that I can confidently say that www.dyslexic.com:80/fonts is full of nonsense) (1).

Typography for children, is interesting in this respect, it found that there is no evidence that says that either serif or sans serif typefaces are intrinsically more legible, but teacher opinion, generally, favors sans-serif typefaces because of the 'simplicity of the letter shapes', by which they presumably mean the similarity of the letter shapes to those that the teacher uses when presenting handwritten words to their pupils. [For as you can quickly establish from a look at, say, Myfonts.com, there is no specific letter shape that is exclusive to a sans-serif font, except perhaps for the absence of serifs, which might be considered to make the letter shapes a bit more simple, possibly, sometimes.] (1).

There is a set of more accessible fonts for people with dyslexia (4). Those four fonts are: Sylexiad [12], Dyslexie [21], Read Regular,2 and OpenDyslexic.3 The four fonts have in common that the letters are more differentiated compared to regular fonts. For example, the shape of the letter 'b' is not a mirror image of 'd'. From these fonts, we choose to study Open Dyslexic (both roman and italic styles), because it is the only open sourced and hence free. This font has been already integrated in various tools (4).

Overall, the reading time of the italic fonts was always worse than its roman counterpart, confirming the commonly established fact that cursive letters are harder to read for people with dyslexia. Although sans serif, monospaced and roman fonts lead to significant shorter fixation durations, we did not find a significant difference in reading time. Hence, our conclusions towards these characteristics are weaker (4).

Although Arial is highly recommended in literature [2, 10, 22] and had the shortest reading time, we cannot conclude that this font type leads to better readability because we only found significant differences with respect to OpenDys It. and Arial It. However, Arial It. did lead to significant longer reading times than Helvetica, Arial, and CMU and significant longer fixation durations than most of the fonts. Hence, we recommend to avoid using Arial It. Moreover, participants significantly preferred Arial to Arial It (4).

The two fonts that lead to shorter fixation durations than other fonts were Courier and Helvetica. Hence the use of these fonts might help people with dyslexia to read faster. This is consistent with the recommendation of [1] to use Courier and with [22] to use sans serif fonts in the case of Helvetica. Also, Helvetica was the second most significantly preferred font by our participants after Verdana (4).

The fonts designed specifically for dyslexia, OpenDys and OpenDys It., did not lead to a better or worse readability. As in [21], OpenDys did not lead to a faster reading. However, we did not performed a reading out loud test with words, which is what might improve with the use of specially designed fonts [21]. In addition, our participants significantly preferred Verdana or Helvetica for reading than OpenDys and OpenDys It (4).

One way to understand these results is to build the partial order obtained by considering all the order relations that are valid for the average values in Reading Time and the Preference Ratings. The result is given in Figure 6 (a), where the fonts can be grouped in four different levels. However, not all of these order relations are significant. Hence, the partial orders at the right, (b) and (c), show the significant relations for Reading Time and Preference Ratings, respectively. In the case of (b), the wider relations show the fact that those are also significant for Fixation Duration. From these partial orders, the only three fonts that are not dominated in both partial orders, (b) and (c), are Helvetica, CMU, and Arial. These can be considered good fonts for dyslexia when we also consider the subjective preferences of the participants. The next two in importance are Verdana and Times (4).

These findings can have impact on systems that rely on text as the main information medium, such as browsers, PDF viewers, or eBook readers. We plan to integrate these findings in the IDEAL eBook Reader6 [19], and in the web service Text4All.7 The last two tools modify text layout for people with dyslexia.

Using fonts that are good for people with dyslexia improves the accessibility for a large percentage of the population and should not impact other people. Hence, the fonts we propose should be used in practice (4).

Future challenges involve studying the effect of the font types on the comprehension and in different contexts and devices. We also want to do the same analysis with people (4). For any student with dyslexia, reading can be very difficult. Fortunately, designers have created several fonts to aid students when reading online, saving them from trying to flip, swap or reverse letters. (Currently, Arial, Courier, Helvetica and Verdana are easiest for dyslexics to read.) Here are 4 fonts you can load on your school's computers: Dyslexie, Open Dyslexic, Lexia Readable, and Sylexiad (6).

Dyslexia fonts are an example hereof. Designing letter fonts for people with Dyslexia makes a lot of sense if you know that a subgroup of dyslexics complain about dancing letters, and difficulty tracking lines, etc. In the last couple of years two fonts have been specifically produced: Dyslexie (Boer, 2008, as cited in 9) and OpenDyslexic (Gonzales, 2012 as cited in 9).

In the last couple of years two fonts have been specifically produced: Dyslexie (Boer, 2008) and OpenDyslexic (Gonzales, 2012, as cited in 9). The former is a commercially marketed font, and the latter is Open Source (9).

Does designing fonts help? Anyone involved in this venture will always approach this question with great caution. No two people are the same. One on Boer's Dyslexia font at Twenthe University in The Netherlands (Special Font For Dyslexia? Renske de Leeuw, December 2010), and one on OpenDyslexic at Elon University in the USA (The effect of a specialized dyslexia font, OpenDyslexic, on reading rate and accuracy. Jessica J. Wery, Jennifer A. Diliberto. Annals of Dyslexia, March 2016). This research indicates that working with specific fonts makes no significant difference and does not improve reading. This is not surprizing, as Dyslexia is primarily not vision-related but rather a neurological issue, with a common core in Phonological Decoding Deficit. However, a subpopulation of dyslexics do report vision-related issues (9).

In that context, there is only one way to find out: Try it. Some weak readers may actually quite enjoy the special fonts and derive benefit from them. Will these fonts help a near-illiterate child with severe dyslexia learn to read? Absolutely not. Will these fonts completely solve your reading struggles? No. Both are adequately scientifically proven to be a false hope. But may you benefit from these fonts? Possibly. Try them and see if one works for you or your struggling reader friend. I applaud Christian Boer (Dyslexie font) and Gonzales (OpenDyslexic) for developing these fonts. It takes hard work and determination to try to make a difference. Both fonts are appreciated by thousands of users. And if it benefits them... it might help you too (9).

Consideration in Addition to Font

Alternative ways that can help me to ensure that materials are appropriately adapted to accommodate students with low vision use a Roman type standard serif or sans-serif font, size 16- or 18-point. These fonts tend to have more space between letters (i.e., noncondensed); print text using the highest contrast possible. Light or white letters printed on a dark background are usually more readable than dark letters on a white background. High contrast can be difficult to achieve with colored type on a colored background. It is important to check with the student to see what type of contrast he or she prefers; allow extra line space between the lines of text. The spacing should be at least 25-30 percent of the point size. For example, when using a 16-point font, there should be at least four spaces between the lines of text; ensure extra-wide margins and the ability to open a printed document flat are helpful if the document is bound; and use paper with a matte finish, which is easier to read than a glossy finish (5).

Minimum size of any typeface and the standard font for large print

The minimum size of any typeface to be used on most documents is 12 points. Most large print is 18 points.

- 12 pt. = regular print
- 14-16 pt. = "enlarged" print (not considered large print)
- 18 and larger = large print
- 18 and larger, with other formatting changes = enhanced print

Note: Students who need print 28 points or larger should probably be considered as candidates for alternative forms of education (i.e., Braille education/instruction) (5).

Specific issues when selecting a font for use by persons with low vision

Several things to think about when selecting a font for use by persons with low vision are:

- The upper case "I" and Roman numeral I, the numeral 1, and the lower case l, should all look different from one another.
- The font should be wide-bodied with space between each letter. Letters which have a bubble inside them, such as o, d, g, and others should have plenty of space inside the bubble.
- Punctuation should be rounded, large and very visible.
- Font strokes should be solid and without gaps in them (5).

The use of white space

Ample white space makes a page more readable and useful because it provides contrast to the print and creates luminance around the text. The primary ways to create white space on the page are to use generous margins, e.g., margins of at least one inch for letters and other business documents. Another way to provide white space is to provide ample spacing, leading and kerning to text (5).

Writer should be encouraged to:

- Indent 1 inch at margins
- Justify left margin, unjustify right margin
- Use a wide, san-serif font for ample kerning
- Space 1.25 between lines, especially on forms where underscores and boxes are used to provide space for writing
- Double space (30-34 pt) between paragraphs or other bodies of text
- Use block paragraph style, no indents (5).

Other ways to include white space are: supply headings and subheadings; enumerate items in separate paragraphs; and create subparagraphs or bulleted lists (5). White space is especially important on forms. Lots of horizontal lines or grids with horizontal and vertical lines can be very difficult for some people with visual impairments to follow across the page. These difficulties can be minimized through the use of pastel, colored background for every alternate line. Example below:

State	Year	Auto Sales	Home Sales	Boat Sales
Alabama	2010	309,436	99,307	27,397
Delaware	2010	214,556	78,477	39,765
Virginia	2010	349, 887	125,095	33,482
Washington	2009	272,299	69,433	30,442

Crowded text detracts from readability and usability because contrast is limited by too much black text. In studies, persons with normal vision who filled-out crowded forms often lost focus before they reached the end of the task. Persons with vision impairments struggled more than their typically-sighted peers with forms and text (5).

Cursive as Alternative

But it's less common for teachers to make this counter-intuitive move: Try cursive (7).
Generally considered to be more difficult for children than writing in manuscript (block letters) and losing ground in the battle for productive class time, script is finding a late-career resurgence with the special-ed crowd. Not only are there benefits to cursive writing that bleed into other skills (for example, the fine-motor workout of cursive writing has salutary effects on similar finger work), some scientists believe that children who can write neatly in script are better at math and other analysis (7).
Why You Should Consider Cursive

If handwriting is a struggle, give cursive writing a shot. Don't worry that handwriting (and reading handwriting) is becoming something of a lost art—all students, especially special ed kids, benefit from successes. Here are some reasons you may want to flip the script in your classroom:

1. The letters flow much more easily, and usually only one movement is necessary. Children often struggle with the many fine movements required to print. For children with motor-planning issues, remembering where to put the "circles and sticks," crossing t's and dotting i's, and remembering the orientation of each letter is no easy task. How often have you seen these children confuse b's and d's and put the circles on p's on the wrong side?
2. Spaces separate words in cursive, while the letters are joined. Therefore, phonetics are joined together. Many students find that script writing is conceptually easier to grasp in this regard.
3. Rarely will you see reversals in cursive writing, unlike printing. Children respond well to the left-to-right flow of writing.
4. Teaching cursive saves time. Why spend time to learn printing first, when children will learn it through reading? It's simply not essential to have students print and learn cursive at the same time.
5. Most teachers report that children who learn handwriting exclusively show no difficulties reading print.

That's not always the case when children learn printing first. In fact, many teachers moving to cursive writing instead of print report that it was the best move for their students (7).

Some Advice for Teaching Cursive

- Stick with it.
- Begin with the letters without loops (t, i, d, p, m, n, r).
- Show the child how to slant the paper to make writing more natural.
- Begin with lowercase letters.
- Remember that motor skills of children with learning disabilities are often weak, provide dotted cursive writing paper for ease and guide the child's hand. Direct teaching is recommended.

Remember to be patient, in the long run you're saving teaching time! (7).

Discussion

Font types have an impact on readability of people with dyslexia. Good fonts for people with dyslexia are Helvetica, Courier, Arial, Verdana and CMU, taking into consideration both, reading performance and subjective preferences. Also, sans serif, monospaced, and roman font types increased significantly the reading performance, while italic fonts decreased reading performance. In particular, Arial It. should be avoided since it significantly decreases readability (4).

Caution is necessary because technology can be a powerful tool to assist students with special needs or any sort of learning challenge. In particular the Chrome web browser allows users to install a wide variety of web extensions that provide tools that can help all learners, regardless of ability level. ... This extension replaces the fonts on a web page with either ...

In today’s digital world, script typefaces are plentiful and fun to use. Although script designs are easy to use, they can just as easily be misused (3).

Conclusion

The student is the best source of information about preferred text characteristics (5). However, to the best of the author’s knowledge, there are no experiments that objectively measure the impact of the font type on reading performance (4).

References

1 retrieved from typoface.blogspot.com/2009/11/typefaces-for-disabilities.html
2 retrieved from https://www.mrsdscorner.com/fonts-for-special-educators
3 retrieved from https://www.fonts.com/content/learning/fyti

4 retrieved from file:///C:/Users/Charles%20Notar/Desktop/good_fonts_for_dyslexia_study.pdf
5 retrieved from www.p12.nysed.gov/specialed/aim/largeprint-QA.htm
6 retrieved from mediaspecialistsguide.blogspot.com/2015/10/4-fonts-designed-for...
7 retrieved from https://www.thoughtco.com/writing-help-for-special-ed-kids-3111067
8 retrieved from https://www.pinterest.com/pin/240590805068103093
9 retrieved from https://dynaread.com/dyslexia-fonts-do-they-help
10 retrieved from https://kids.kiddle.co/Typography
11 retrieved from https://www.wisegeek.com/what-are-the-different-types-of-special-education-students.htm