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研究課題名(和文) Inclusive Practices to Improve Fairness and Performance on EFL Exams

研究課題名(英文) Inclusive Practices to Improve Fairness and Performance on EFL Exams

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研究成果の概要(和文)：工業高等専門学校において、内容の半分は段落ごとにブロック形式で提示し、あとの半分は一文ずつ改行する形式で提示したテストを実施し、後者が1.9%高い得点を得た。事後アンケートでは83%の学生が一文形式を好むと回答した。ブロック形式を好むと解答した17%の学生の内、英語能力の高い学生の中にはこの形式に慣れていることを理由に挙げた者もいたが、このテストからはブロック形式がこれらの学生に有益であるという数字的な示唆は得られなかった。また、時間制限をかけ、眼球運動調査のために行った同内容のテストで、6名の高得点者間では一文形式部分の得点が平均5%高かったが、そのうちの2名はブロック形式への偏向を示した。

研究成果の学術的意義や社会的意義

The measures of inclusive practice applied in this research have proven to be helpful to many and harmful to no one. However, a lack of these inclusive practices has shown the potential for crowded content on a language test to hinder the performance of some students on such tests.

研究成果の概要(英文)：When technical college students in Japan were given a mid-term English exam with half of the content formatted in block paragraph sections and the other half in sections that were written in a one-sentence-per-line format, the students scored 1.9% higher on the latter. In a survey that followed the test, 83% of the students stated a preference for the one-sentence-per-line format. Among the 17% who declared a preference for the block format, there were some highly proficient students of English who admitted that they prefer block paragraphs because that is what they have become familiar with. However, there was no numerical evidence from these paper exams to suggest that the block format would benefit these students. Likewise, on a more strictly timed test recreated with the same content for an eye-tracking study, the six most proficient readers scored 5% higher on average where they could read one sentence per line, even though two of them also preferred the block format.

研究分野：English as a Foreign Language

キーワード：Inclusive practices one-sentence-per-line EFL exams SpLDs

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1. 研究開始当初の背景 (Background)

In many high schools and technical colleges across Japan, teachers have often been asked to make the content of their tests fit onto very limited amounts of space on limited sheets of paper. Reasons given for such mandates have ranged from “We need to save paper.” to “We need to keep things in the familiar. You might confuse the students if you do not stick to the norm of one question sheet and one answer sheet per mid-term exam.”

Our research team was made up of several technical college English teachers, who were accustomed to trying to make their test questions fit into the parameters set by their respective school administrators. However, strict adherence to the administrators’ requests was likely to result in crowded text on their exams, particularly on those that included English reading passages. Crowded text on any test or classroom materials distributed to second language learners is believed to be neglectful of the needs of students with specific learning difficulties (SpLDs), as can be seen in *The Basics of Inclusive Practices* (IP&SEN, 2017). Therefore, the research team wanted to propose looser parameters for printing their tests that would be more inclusive of students’ needs and would promote a new “familiar” for all students to embrace.

2. 研究の目的 (Purpose)

A key phrase to remember from the “Background” in this report is “looser parameters.” The purpose of this research has never been to say that any school should adopt one particular format or test layout prescribed by the research results herein. However, we have sought results to better understand the effects that crowded text on English reading exams may have, so that teachers and school administrators can be better informed about how best to implement inclusive practices in test designs.

In addition to text crowdedness, another concern of advocates for inclusive practices in test design and materials writing is background color, or paper color. One reason is that light pastel or off-white colored paper can provide readers with and without dyslexia a more comfortable reading experience than pure white or glossy pages (Hird, 2016). Therefore, different colors of paper were chosen in order to check if the color of paper used in technical colleges in Japan was as much of a deterrent to a student’s best test performance as crowded text could be.

The effort to make the tests inclusive was not just to serve the needs of students who might have SpLDs, but also to include any student who might be suffering from stress, fatigue, poor eyesight, or any other distraction that could impede their ability to take the test successfully other than a failure to study. In this way, every student would have a greater chance to show their true English competence based on their knowledge of English without interference from a test design that could adversely affect performance based on factors other than a student’s competence in English.

3. 研究の方法 (Methods)

In order to demonstrate the demerits of tightening the text of a reading passage on an English test and the benefits of loosening the prescribed parameters for printing it, a test with

four 250-word reading passages was created. All four passages were written in a 12 point Arial font. This choice was made based on a report by Rello and Baeza-Yates (2013) that described the Arial font, excluding Arial italics, as one of five “good fonts for people with dyslexia.” Two of the passages were written in block paragraphs with a relatively tight 13 point line spacing, while the other two only contained one sentence per line with line spacing set for 1.5 (one line and a half). Considerations like these were suggested by Jon Hird (2016), who claimed that the use of one-sentence-per-line, extra spacing, and cream or off-white colored paper would have immediate and positive effects for the research participants.

Each passage was printed separately on one side of a sheet of paper. Therefore, the test required two sheets of paper per student. One sheet was the standard 70% recycled white paper that technical colleges in Japan are encouraged to use for tests. The other sheet was an ivory colored paper. Upon printing and stapling the pages together, the final product was a test that had a conventional, block text reading on the front page with a white background. On the backside of that sheet and on the front page of the second sheet, there were readings that only had one sentence per line. However, the third reading was on ivory paper, and on the backside of that ivory paper was the fourth reading, which was also presented in a conventional, block text format. This layout was the same for every test. However, the order of the presentation of each reading was mixed in eight different test forms to offset any effects of variances in test item difficulty across each reading. In addition, this created an opportunity to look at each reading as a separate test administered in four separate formats.

4. 研究成果 (Results)

The 329 students who took the tests on paper were in nine different classes at two technical colleges, which were over 1,400 kilometers apart. The task that the students had to complete on the paper test was an error correction activity. For each reading they had to find and correct ten English mistakes that they had been studying intently for six weeks with the knowledge that these particular types of mistakes would be embedded in the text of the readings on the test. The students were well prepared, and their test average overall cleared 85 out of 100 points. However, although every student found 45 minutes to be ample time to finish the test, there were still many mistakes that were overlooked. For every reading, the students performed 1% to 5.5% better on the task of finding the mistakes when the text was formatted to display one sentence per line. The smaller end of that range occurred on a reading in which many of the students found 100% of the mistakes, while the larger occurred on a reading where mistakes were overlooked more frequently.

For the four part exam as a whole, the Wilcoxon signed-rank test was used to determine the statistical significance of the different test scores seen between each format and each background color. The Wilcoxon signed-rank test was chosen because there was not a normal distribution in test scores since so many students scored at the upper-end of the distribution (i.e., many students had near-perfect scores). As seen in Table 1, the resulting data showed a statistically significant gain of 1.9% when applying the one-sentence-per-line format to the test design. However, using the same statistical analysis, the differences in averages between the

two background colors were so small that no significant difference could be reported, as shown in Table 2.

Table 1. Wilcoxon signed-rank test on block paragraphs versus one-sentence-per-line

n=292	Mistakes found (/20)	Mistakes found (/20)	Gain
p<.001	in block paragraphs	in the 1 Sentence/Line format	(+1.9%)
Mean	18.18	18.56	(+0.38)
SD	1.764	1.584	
SE	0.103	0.093	

Table 2. Wilcoxon signed-rank test on white versus ivory backgrounds

n=292	Mistakes found (/20)	Mistakes found (/20)	Loss
p<.999	on white paper	on ivory colored paper	(-0.1%)
Mean	18.38	18.36	(-0.02)
SD	1.624	1.800	
SE	0.095	0.105	

After the paper tests were completed, the students were asked which format they would prefer to have on a future test of the same kind. As seen in Figure 1, out of 304 responses, white paper was favored over ivory by a ratio 68% to 32%, and the one-sentence-per-line format was favored over the conventional format 83% to 17%. Likewise, as seen in Figure 2, further support for the one-sentence-per-line format was given when the students were asked if it was the easier format to use. Out of 304 responses, 88% of the students agreed that one sentence per line made reading easier.

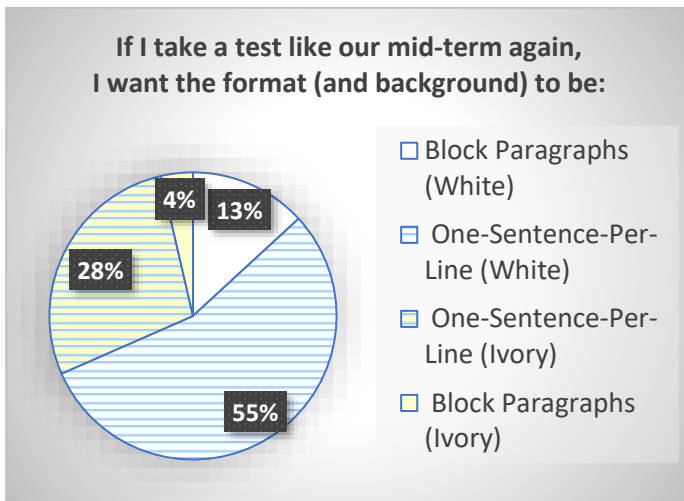


Figure 1. Format and background color preferences

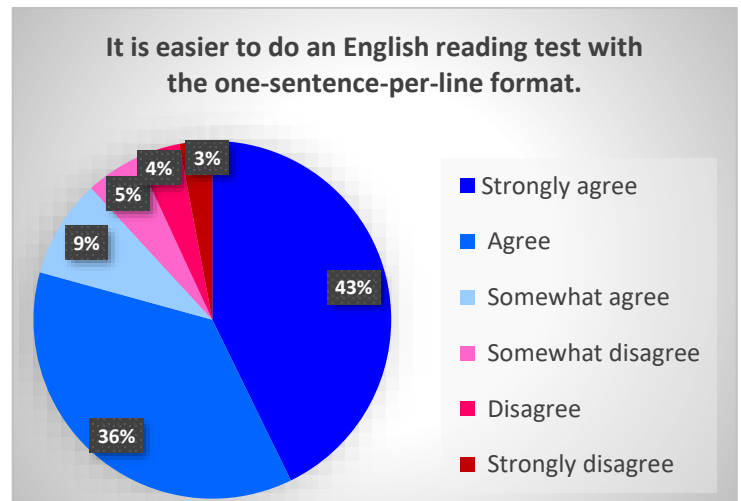


Figure 2. Lickert scale responses on format difficulty

In order to further understand what was happening when the students overlooked English mistakes that they had been trained to find, the same tests were presented to 45 research

participants at three other technical colleges that were also hundreds of kilometers apart. This time, the tests were displayed on computers that were connected to eye-tracking equipment to capture the participants' eye movement patterns as they scanned each text for mistakes. Instead of having 45 minutes to find and correct mistakes in four sections of the test, the eye-tracking participants were timed for 90 seconds per section to identify ten mistakes with left mouse clicks for each of the four readings. Again, there were a couple of high-scoring participants in the eye-tracking study who also said that they preferred the familiar block paragraphs. This time, these two performed better on the block sections as well. However, of the top six highest scoring participants, including these two, the overall average difference in scores was 5% higher for the one-sentence-per-line format.

With the growing availability of e-books and other digital formats for reading, it has become very easy for readers themselves to adjust the font and the layout of the text they are reading. This makes the information in the reading more accessible for everyone who is trying to read no matter what challenges they may otherwise face with reading. However, when a test is delivered on paper, the layout is obviously fixed. This study has shown that when that fixed layout is even just a little crowded, it can affect one's ability to show their true competencies regarding the test items because the answer they are looking for is hidden by layout design rather than by its verbal context. However, with the use of inclusive practices, such as a one-sentence-per-line format and little extra whitespace, more students will be able to identify test answers more quickly and accurately. This is something that every language teacher and every school administrator should remember when it comes to setting the parameters for the printing of tests.

< 引用文献 (References) >

Hird, J. (2016, April 13). *Reaching every student in the classroom*. Paper presented at the IATEFL Conference in Birmingham, England.

IP&SEN (2017, August 16). *The Basics of Inclusive Practices*. Last retrieved on May 31, 2020 from <https://ipsen.iatefl.org/archives/3888>.

Rello, L. & Baeza-Yates, R. (2013, October). Good fonts for dyslexia. Paper presented at ASSETS 2013, Bellevue, Washington, USA. Last retrieved on May 31, 2020 from http://dyslexiahelp.umich.edu/sites/default/files/good_fonts_for_dyslexia_study.pdf.

5. 主な発表論文等

〔雑誌論文〕 計5件（うち査読付論文 4件/うち国際共著 3件/うちオープンアクセス 0件）

1. 著者名 John C. Herbert, Anis Ur Rehman, and David Taquet	4. 巻 53
2. 論文標題 Inclusive Practices to Improve Fairness and Performance on EFL Exams	5. 発行年 2020年
3. 雑誌名 IATEFL 2019 Liverpool Conference Selections	6. 最初と最後の頁 203-205
掲載論文のDOI（デジタルオブジェクト識別子） 978-1-912588-29-9	査読の有無 有
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1. 著者名 M. K. Higa and J. C. Herbert	4. 巻 13
2. 論文標題 Using Eye-Tracking Equipment to Improve Reading Strategies on Standardized Tests	5. 発行年 2019年
3. 雑誌名 Transactions of ISATE 2019 - The 13th International Symposium on Advances in Technology Education: Engineering Education for Sustainable Development in the 21st Century	6. 最初と最後の頁 95-98
掲載論文のDOI（デジタルオブジェクト識別子） 978-4-9911159-0-5	査読の有無 有
オープンアクセス オープンアクセスではない、又はオープンアクセスが困難	国際共著 該当する

1. 著者名 S. Kanda, AU Rehman, & JC. Herbert	4. 巻 1
2. 論文標題 Effective Inclusive Interfaces: Visual Processing during Reading	5. 発行年 2019年
3. 雑誌名 Proceedings of the UTP-KOSEN International Symposium on Innovative Engineering	6. 最初と最後の頁 33-35
掲載論文のDOI（デジタルオブジェクト識別子） なし	査読の有無 無
オープンアクセス オープンアクセスではない、又はオープンアクセスが困難	国際共著 -

1. 著者名 M. K. Higa and J. C. Herbert	4. 巻 11
2. 論文標題 Inclusive Practices in EFL Testing Protocol at Technical Colleges in Japan	5. 発行年 2017年
3. 雑誌名 Transactions of ISATE: The 11th International Symposium on Advances in Technology Education	6. 最初と最後の頁 528-532
掲載論文のDOI（デジタルオブジェクト識別子） なし	査読の有無 有
オープンアクセス オープンアクセスではない、又はオープンアクセスが困難	国際共著 該当する

1. 著者名 John C. Herbert, Anis Ur Rehman, Marshall Higa, Mark Pileggi, David Taquet, and Tomek Ziemia	4. 巻 37
2. 論文標題 Altering English Test Layouts to Cater to All Students	5. 発行年 2018年
3. 雑誌名 全国高等専門学校英語教育学会 研究論集	6. 最初と最後の頁 205-214
掲載論文のDOI (デジタルオブジェクト識別子) なし	査読の有無 有
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〔学会発表〕 計8件 (うち招待講演 0件 / うち国際学会 6件)

1. 発表者名 John C. Herbert, Anis Ur Rehman, and David Taquet
2. 発表標題 Inclusive Practices to Improve Fairness and Performance on EFL Exams
3. 学会等名 IATEFL 2019 Liverpool (国際学会)
4. 発表年 2019年

1. 発表者名 John C. Herbert and David Taquet
2. 発表標題 Inclusive practices workshop for designing classroom materials and tests
3. 学会等名 The 16th Annual CamTESOL Conference (国際学会)
4. 発表年 2020年

1. 発表者名 M. K. Higa
2. 発表標題 Using Eye-Tracking Equipment to Improve Reading Strategies on Standardized Tests
3. 学会等名 ISATE 2019: The 13th International Symposium on Advances in Technology Education (国際学会)
4. 発表年 2019年

1 . 発表者名 Mark Pileggi, John C. Herbert, and Anis Ur Rehman
2 . 発表標題 Cognitive effects of inclusive interfaces in written tests
3 . 学会等名 European Conference on Visual Perception 2018 (国際学会)
4 . 発表年 2018年

1 . 発表者名 S. Kanda, AU Rehman, & JC. Herbert
2 . 発表標題 Effective Inclusive Interfaces: Visual Processing during Reading
3 . 学会等名 The UTP-KOSEN International Symposium on Innovative Engineering
4 . 発表年 2018年

1 . 発表者名 John C. Herbert
2 . 発表標題 Altering English Test Layouts to Cater to All Students
3 . 学会等名 COCET 2017: 第37回全国高等専門学校英語教育学会
4 . 発表年 2017年

1 . 発表者名 Marshall K. Higa
2 . 発表標題 Inclusive Practices in EFL Testing Protocol at Technical Colleges in Japan
3 . 学会等名 ISATE 2017: The 11th International Symposium on Advances in Technology Education (国際学会)
4 . 発表年 2017年

1. 発表者名 Marshall K. Higa
2. 発表標題 A Case Study on Test Formatting to Improve Assessment in EFL Classrooms
3. 学会等名 14th Annual CamTESOL Conference on English Language Teaching (国際学会)
4. 発表年 2018年

〔図書〕 計0件

〔産業財産権〕

〔その他〕

<p>Common English Errors that Japanese Students Make https://showcase.moodlejapan.org/course/view.php?id=94 The Moodle course that was developed for this project was edited by John C. Herbert and Mark A. Pileggi. Then, it was made available to the public through the courseware showcase linked here. (Login required.)</p>
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6. 研究組織

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