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研究課題名（英文）Mobile system to monitor extensive reading

研究代表者

Ｈｏｌｓｔｅｒ　Ｔｒｅｖｏｒ（Holster, Trevor）

福岡大学・言語教育研究センター・講師

研究者番号：４０６１２４０３

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研究成果の概要（和文）：多読用英語リーダーに対する学生の主観的難易度を登録すると、ラッシュ分析により学生の能力とリーダーの難易度が比較できるシステムを開発した。
300冊のデータを検証した結果、難易度への影響は本文の長さが一番大きく、次にセンテンスの長さであった。語彙レベルの影響は小さかった。他のシステムとの比較では、「読みやすさレベル」が本研究による難易度評価に最も近く、次いでLexile Levelであり、Graded Reader Scaleとの相関は低かった。
本システムは無料でダウンロードが可能であり、ERFと協力し、Graded Reader Scaleの改善に貢献した.

研究成果の概要（英文）：We developed an internet based system to monitor extensive reading. The system collects student ratings of book difficulty and formats the data for Rasch analysis. This allows student ability and book difficulty be measured so that students can read appropriate level books.
We selected 300 books to research features related to book difficulty and compared the Yomiyasusa Levels, the Extensive Reading Foundation Levels, and the Lexile Framework. Book length strongly predicted difficulty, with sentence length a moderate predictor and vocabulary a very weak predictor. The Yomiyasusa Levels were a very strong predictor of book difficulty, with the Lexile Levels a moderate predictor. The Extensive Reading Foundation levels were a very weak predictor of book difficulty.
The monitoring system is freely available for any researcher to download and use and the methodology we used has been shared with the Extensive Reading Foundation and contributed to the revised monitoring system they produced.

研究分野：　英語教育

キーワード：　Extensive reading　Reading difficulty　Book difficulty　Lexile level　Yomiyasusa level　Kyoto level　Rasch analysis

１．研究開始当初の背景

Extensive reading (ER) requires fast comprehension of large quantities of text and students must be allowed choices about which books to read, but it is necessary to monitor students' reading to check the level of book they are reading and ensure that book purchases are targeted at an appropriate level. Two systems of rating the difficulty of books have been developed in Japan; the Yomiyasusa Levels (Furukawa, 2014) and the Kyoto Scale available from mreader.org. In first-language reading, the Lexile Levels, available from lexile.com, are used to match students to books, but these do not seem to be widely used in second-language contexts. The Kyoto Scale is used by the M-Reader monitoring system, which provides a comprehension check quiz for each book that a student reads. Monitoring ER using tests and quizzes is problematic, however, because they require slow, careful reading instead of the fast comprehension of large quantities of text that are assumed by ER.

Holster (2011) used simple paper survey forms to gather data from students about the difficulty of the books they read and used the Facets software package for many-faceted Rasch measurement (MFRM) to adjust for rater severity. However, the paper based data collection was not practical for large-scale research so an ER module was developed for the open-source MOARS audience response system (Pellowe, 2010). Students can enter data using mobile phones and the MOARS system provides data files for immediate Facets analysis. This makes it possible to monitor very large groups of students and to measure the ability of students and difficulty of books on the same scale to make sure that students read books of suitable difficulty. The MOARS database also records the time each book was read, allowing measurement of student gains through the data collection period.

２．研究の目的

The research had three purposes: to develop the MOARS ER system for operational use, to find textual features of graded readers that contribute to book difficulty, and to measure the effect of ER on student reading. The major challenge for operationalizing the MOARS ER system was in sharing the database between different users while also protecting the confidentiality of student data. The major research aim was analyzing textual features that contribute to book difficulty, with most of the work being concentrated on the development of a corpus of graded readers. Measuring the effect of ER on reading gains was a secondary research goal addressed by adding a fourth facet of "Time" to the existing Facets analysis in order to isolate gains in reading ability.

３．研究の方法

Students were assigned extensive reading as homework for reading classes and asked to rate the difficulty of books by entering data into the internet based MOARS ER module. This used a six-item quiz that included three items addressing book difficulty and three items addressing interest. Only the three difficulty items were analyzed for this research. The MOARS system provided data formatted for many-faceted Rasch analysis using Facets and also a Facets specification file. This makes it possible for novice users to conduct Facets analysis without extensive training in the details of MFRM and specification file design. A four-faceted analysis was specified to isolate the facets of student reading ability, book difficulty, gains over time, and quiz item difficulty. Rasch measurement is very robust with missing data, provided there is sufficient connectivity within the dataset, so students did not have to read the same books in order to be measured on the same scale of ability and difficulty. Results from 668 students and 1016 books were used to identify 309 popular fiction books for detailed textual analysis. Text samples from these were scanned and converted to editable text for analysis. Microsoft Word was used to generate statistics such as average sentence length and Flesch-Kinkaid reading level. The free

Lexile analyzer provided by lexile.com was used to determine Lexile levels and vocabulary level. These were then compared with the published Yomiyasusa Levels and Kyoto Levels to identify the best predictors of book difficulty. The measurement of reading gains was done by coding each quiz response by how many books the individual student had read up to that point, in bands of 10 books. Facets automatically adjusted the measurements for books, students, and quiz items to compensate for time and produced tables of gains by time.

４．研究成果

The first research goal, operationalizing the MOARS ER system was the easiest to achieve. Advances in mobile internet access and cloud-based data storage made it unnecessary for each administrator to maintain a local database and then to merge the multiple databases. Although this is still an option when students do not have access to the internet, nearly all students preferred to access the MOARS system through mobile phones, so development focused on a centralized database accessed through the internet. Classroom teachers have read-only access to the MOARS ER database, with student privacy protected because this does not contain any personal identifying information. Student identities are stored as non-identifying numeric codes so the identities of individual students are known only to their teacher or the MOARS administrator. This allows teachers to monitor their students while allowing for a shared database of book difficulty.

The second research goal, analyzing textual features that contribute to book difficulty, has been reported in detail in a research article submitted to *Reading in a Foreign Language*. This report is currently in the review stage of publication. The major factor contributing to book difficulty was found to be book length, with the word count of the books accounting for 61% of variance. Average sentence length accounted for 40% of variance, while vocabulary frequency accounted for only 6% of variance. Three established scales of book difficulty were compared with measures of book difficulty derived from the MOARS ER system: The Yomiyasusa Levels, the Lexile Levels, and the Kyoto Scale. The Yomiyasusa Levels are largely based on the word count of books and accounted for 68% of variance, making this scale the most useful tool for students to base book selection on. The Lexile levels combine both average sentence length and vocabulary frequency and accounted for 34% of variance. Although this is a useful measure of book difficulty, it accounts for less variance than average sentence length alone so teachers and researchers are advised to ignore vocabulary frequency and use sentence length alone when considering book difficulty. The Kyoto Scale is based on publishers' vocabulary levels and accounted for 13% of variance, while the Lexile Word Frequency measure accounted for 6%. These vocabulary based measures do not provide useful prediction of the difficulty of books and teachers and students are advised to ignore them.

The measurement of gains from ER was achieved by adding a fourth facet of "Time" to the analysis. Students showed a statistically significant gain of 0.34 logits after reading 30 books, increasing to 0.59 logits after reading 80 or more books. Although these are substantive gains, they show that students must read very large numbers of books to benefit from ER. This supports the principles of ER that students should read large quantities of easy, interesting material.

５．主な発表論文等

（研究代表者、研究分担者及び連携研究者には下線）

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〔図書〕（計　　件）

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〔その他〕

ホームページ等

６．研究組織

(1)研究代表者

ホルスター，トレヴァー（HOLSTER, Trevor）

福岡大学・言語教育研究センター・外国語講師

研究者番号：40612403

(2)研究分担者

ペロウ，ウィリアム ロバート（PELLOW, William Robert）

近畿大学・工学部・講師

研究者番号：30330327

レイク，ジェイ（LAKE, J.）

福岡女学院大学・英語教育研究センター・講師

研究者番号：60610235

(3)連携研究者

徳永　美紀（TOKUNAGA, Miki）

福岡大学・言語教育研究センター・外国
語講師

研究者番号：30461479