Reading Ability and Academic Achievement

Leonell L. Esleta, De La Salle University Integrated School-Laguna Campus, Philippines
Imelda O. Onquit, De La Salle University Integrated School-Laguna Campus, Philippines
Ahl G. Balitaon, De La Salle University Integrated School-Laguna Campus, Philippines
Aera Ruth V. Aguila, De La Salle University Integrated School-Laguna Campus, Philippines

The Asian Conference on Education & International Development 2024
Official Conference Proceedings

Abstract
This study aims to respond to the United Nation's sustainable development goal to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all through the development of reading comprehension. This study investigated the significant relationship between reading ability and academic success in English, Math, and Science. Reading ability is identified using Lexile reading scores as measured by ReadTheory.org, a free online software. The 149 participants in an online learning setup were tasked to take the quizzes in ReadTheory.org to find their Lexile reading scores. The academic achievement is measured by the participants' first trimester final grades in English, Science, and Math. This quantitative study used Pearson R correlation coefficient to find the relationship between variables. The results show that reading ability has a significant relationship with academic achievement. When students receive a low Lexile reading score, they seem to get lower grades, but when they receive a high Lexile reading score, they seem to get higher grades in their academics English, Math, and Science. Although there may be other factors that can contribute to obtaining higher grades, this study shows that reading ability may be a contributing element.

Keywords: Reading Ability, Lexile Scores, Academic Achievement, ReadTheory

iafor
The International Academic Forum
www.iafor.org

Introduction

The Department of Education (DepEd) in the Philippines focuses on addressing the gaps in the reading literacy of students (Hernando-Malipot, 2020) following the report of the 2018 Programme for International Student Assessment (PISA) that the Philippines scored the lowest in reading comprehension among 79 participating countries and economies (San Juan, 2019), and second lowest in both Math and Science literacy (Reysio-Cruz, 2019). Reading Comprehension plays an important role in education (Purvis, 2016). Students need to understand the texts they read to grasp the meaning of what they read. With excellent reading comprehension, students can perform successfully in class (Rutzler, 2020).

Reading programs in schools are established to achieve reading success. There are available reading programs that measure students' reading comprehension or text difficulty in the form of Lexile level (Purvis, 2016; Doman, 2020). ReadTheory.org provides a free assessment to identify students' Lexile scores. Lexile reading measure ranges from below 0L for beginning readers to above 2000L for advanced readers (MetaMetrics, 2020). Lexile text measures are assigned to reading materials such as books and articles measured by Lexile Analyzer developed by MetaMetrics (MetaMetrics, 2020) as shown in the table below.

Grade	Reader Measures 25^{th}-75^{th} Percentile	Text Demand Study 25^{th}-75^{th} Percentile
1	Up to 300L	230-420L
2	140-500L	450-570L
3	330-700L	600-730L
4	445-810L	640-780L
5	565-910L	730-850L
6	665-1000L	860-920L
7	735-1065L	880-960L
8	805-1100L	900-1010L
9	855-1165L	960-1110L
10	905-1195L	920-1120L
11 and 12	940-1210L	1070-1220L

Table 1: Typical Reader and Text Measures

Table 1 shows typical reader measures - grade level and typical Lexile scores, and the typical text measures in which readers and texts are matched appropriately to develop reading comprehension.

The inclusion of the Lexile measure for reading comprehension did not diminish the strong positive relationship between reading fluency and reading comprehension (Purvis, 2016).

Through Lexile measures, teachers can identify their students' reading levels, which can be a tool to predict students' academic achievement.

In PISA results, Filipino participants got low Reading, Science, and Math rankings. This entails the question of the effect of students' reading levels on their performance in English, Math, and Science.

According to a study by Churchwell (2009), there is a significant relationship between reading scores and academic achievement. In addition, the results of Caruthers' (2013)

quantitative data analysis showed moderate positive relationships between reading level and all subdomains of standards-based mathematics achievement, while the qualitative data identified reading ability as a contributing factor to standards-based mathematics achievement. Even pleasure reading has been perceived by educators of teenagers who self-choose their literature to read on their own time to improve academic performance (Whittein, Labby, Sullivan, 2016). In a reading intervention program, Harrel (2014), on the other hand, did not find a significant difference in academic gains in English, Math, Science, and Social Studies. However, students perceived that the reading program impacted them academically and motivationally. This may have been supported by the results presented by Blaabaek (2020), which show that reading scores positively affect reading but not math performance. Moreover, the results point out that reading has a positive effect on skills that principally affect reading performance, but still needs to be determined on the performance on the Math tests.

These studies claim that reading scores affect academic gains in English. However, the contrasting results of the studies above left inconclusive findings on whether reading scores affect academic gains in Math and Science. Hence, additional studies are needed. It is also worth noting that these studies are measured on a large scale and use different tools to identify students' reading scores. There may be other factors that may contribute to the results of these findings. It is of interest that this paper seeks to utilize the Lexile measure in finding the relationship between reading levels and achievement in English, Math, and Science on a small scale, such as at one grade level, to identify somehow its potential effect on reading programs in small schools, and in a classroom setting. There are instances that students get lower Lexile reader scores than their current grade level. In reading programs that use the Lexile reader measures and Lexile text measure, students are tasked to read materials 50-100 Lexile measure lower their current levels and 50-100 Lexile scores above their current levels to ensure the development of reading comprehension. The question now lies if students with high Lexile reading scores get high academic grades, or students with low Lexile reading scores get low academic grades, or Lexile reader scores do not affect their academic achievement. Thus, this paper aimed to determine their relationship.

Theoretical Framework

The framework of this study is based on the information processing theory. It is a theory that views humans as information processing systems in which humans, instead of responding to stimuli, process the information they receive (Oxford Reference, 2020). The principle of Information Processing Theory is that building a long-term memory occurs in stages (Lawless, 2019). The brains filter information, process it in the short-term or working memory, and then store it into the long-term memory (Hatague & Nabua, 2019). According to Miller (2011), information processing theory is a cognitive method learners apply to information and how they convert, employ, and use it. This relates to understanding texts that students read and develop reading comprehension. Reading comprehension is improved through reading strategies teachers and parents may provide at school and home (Scholastic.com, 2020). By providing students with books, other reading materials, and supplementary activities, they acquire knowledge stored in their memory that helps them develop other skills and eventually aids them in performing successfully in class.

Methods

This study utilized ReadTheory.org to identify students' reading Lexile scores. ReadTheory.org is a free online platform focused on reading comprehension activities for K-12 teachers and students. The objective is to increase reading ability and comprehension by reading short passages and taking short quizzes (Tempest, 2018). Users may register, or teachers will register their students. After registration, a pretest of 8 passages with comprehension questions will be taken. The reading level of the passages begins with grade three level, then increases or decreases depending on the takers' answers. After the test, users are assigned an appropriate reading grade and Lexile score based on the result. Users can now start participating in reading passages and taking tests. The length of the reading passages depends on the reading grade level of the participants, which may get higher or lower depending on their performance on each quiz. Pearson R correlation coefficient was used to determine if there was a correlation between the student's Lexile scores and their first-trimester final grades in Math, Science, and English.

Results and Discussions

There were one hundred forty-nine participants in this study. Table 2 shows the mean of the participants' Lexile scores, and their first trimester final grades in English, Math, and Science.

	Lexile Score	English	Math	Science
MEAN	891.95	91.66	90.99	94.41
SD	129.13	4.85	4.14	3.21

Table 2: Mean and Standard Deviation of Lexile Scores and First Trimester Final Grades in English, Math, and Science

The grade 10 participants had a mean Lexile Score of 891.95 with a standard deviation of 129.13. This means that the average reading grade level of the participants is in grades 8 to 9 with a range of Lexile scores of 805-1100L (Grade 8) to 855-1165L (Grade 9). The students' mean grade in English is 91.66, with a standard deviation of 4.85. Their mean grade in Math is 90.99 with a standard deviation of 4.14, and 94.41 mean grade in science with a standard deviation of 3.21.

This paper evaluated the relationship between students' Lexile reading scores as measured by ReadTheory.org and academic achievement in English, Math, and Science as measured by the first trimester final grades of the participants. The hypothesis that there was no statistically significant relationship between Lexile reading scores as measured by ReadTheory.org and achievement scores as measured by final grades in English, Math, and Science in the first trimester was tested using inferential statistics at a .05 level of significance.

If the p-value was greater than the alpha of 0.05, the hypothesis was retained. If the p-value was less than the pre-determined alpha of 0.05 the hypothesis was rejected.

To test this question, participants' Lexile reading scores were the predictor variable while the response variables were the first trimester final grades in English, Math, and Science. Pearson R was used to test the hypothesis.

Table 3 illustrates the results of the relationship between Lexile reading scores and academic achievement in English, Math, and Science. One hundred forty-nine grade 10 students were included as indicated by n. The table presents the degree of relationship with r. A low or weak relationship is designated by 0 to.3, a moderate relationship by .30 to.70, and a strong or high relationship by over 0.70. A result of 0.0 would indicate no significant relationship.

Group	N	R	p
English	149	0.27	0.0005
Math		0.19	0.01
Science		0.27	0.0006

Table 3: Relationship Between Lexile Reading Scores and Academic Achievement in English, Math, and Science

As shown in Table 3, there was a statistically significant relationship between the students' Lexile reading scores and English achievement as shown by r = 0.27, and a p-value of 0.0005. Reading achievement and Mathematics achievement have a significant relationship as shown by r = 0.19 and a p-value of 0.01. Furthermore, there was a statistically significant relationship between reading achievement and science achievement as shown by r = 0.27, and a p-value of 0.0006. The data suggested that there was a low positive relationship between reading achievement and English achievement, reading achievement and Mathematics achievement, and reading achievement and Science achievement having a p-value less than the pre-determined alpha of 0.05, thus, rejecting the hypothesis that they have no significant relationship.

The results showed a low positive relationship between Lexile reading scores, as measured by ReadTheory.org reading tests, and achievement in English, Science, and Math. Other factors may contribute to students' academic achievement; however, the results of this study show that reading ability may be one of the factors. This means that when students receive a higher Lexile reading score, they are more likely to get higher grades in English, Math, and Science, as supported by Churchwell's research findings (2009). Since the response variables are academic achievements in English, Math, and Science, other contributing factors may cause students to receive higher grades because of the components in grading them. These components are not limited to written assessments that may require reading comprehension.

In basic education, there are also graded performance tasks, which may be done individually or by group. However, the importance of getting high scores in reading ability can never be discarded as a substantial factor in receiving higher scores in academics, as shown in this study.

Conclusion

This study concludes that when students receive a low Lexile reading score, they get lower grades, but when they receive a high Lexile reading score, they get higher grades in their academics: English, Math, and Science. Although other factors may contribute to obtaining higher grades, this study shows that reading ability can be a contributing element.

Training may be provided for teachers to promote reading culture in their institutions, which will eventually lead to their students' reading comprehension development. One that educational institutions can use in classrooms is the free online application ReadTheory.org. This may be included in their English class to improve their students' reading ability. Administrators should strengthen their schools' reading programs by exploring innovations that technology can offer and by encouraging research in this field. For future studies, interested researchers may include other grade levels. They may increase the population and correlate to other academic subjects. Researchers can also consider focusing on the achievement in the students' written assessments.

References

Blaabaek, E. H. (2020). Reading when the sun does not shine: The effect of reading on children's academic performance. *Research in Social Stratification and Mobility, 67*, 100485. doi:10.1016/j.rssm.2020.100485

Caruthers, T. P. (2013). *The relationship between reading level and sixth grade students' acquisition of mathematics standards* (Order No. 3559186). Available from ProQuest Dissertations & Theses A&I. (1353399426). Retrieved from https://search-proquest-com.dlsu.idm.oclc.org/dissertations-theses/relationship-between-reading-level-sixth-grade/docview/1353399426/se-2?accountid=190474

Churchwell, D. E. (2009). *The impact of reading achievement on overall academic achievement* (Order No. 3389306). Available from ProQuest Dissertations & Theses A&I. (305123926). Retrieved from https://search-proquest-com.dlsu.idm.oclc.org/dissertations-theses/impact-reading-achievement-on-overall-academic/docview/305123926/se-2?accountid=190474

Doman, M. (2020). Lexile Levels: What parents need to know. Retrieved December 23, 2020 from https://www.scholastic.com/parents/books-and-reading/reading-resources/book-selection-tips/lexile-levels-made-easy.html#:~:text=The%20Lexile%20level%20will%20always,highest%20possible%20measure%20is%202000L

Harrell, M. A. (2014). *Reading for success: The effectiveness of literacy interventions for increasing student achievement in core academic classes* (Order No. 3614872). Available from ProQuest Dissertations & Theses A&I. (1518731861). Retrieved from https://search-proquest-com.dlsu.idm.oclc.org/dissertations-theses/reading-success-effectiveness-literacy/docview/1518731861/se-2?accountid=190474

Hatague, Ann & Nabua, Edna. (2019). Information-processing theory: implication to mathematics education. Retrieved from https://www.researchgate.net/publication/338132660_information-processing_theory_implication_to_mathematics_education

Hernando-Malipot, M. (2020). DepEd to focus on reading literacy of students. Retrieved December 23, 2020 from https://mb.com.ph/2020/02/27/deped-to-focus-on-reading-literacy-of-students/

Lawless, C. (2019). What is Information Processing Theory?: Using it in Your Corporate Training. Retrieved from https://www.learnupon.com/blog/what-is-information-processing-theory/

MetaMetrics. (2020). Understanding your child's lexile measure. Retrieved December 22, 2020 from https://lexile.com/parents-students/understanding-your-lexile-measure/how-to-get-a-lexile-measure/

Miller, P. (2011). Theories of developmental psychology (5th ed.). San Francisco: W.H. Freeman.

Oxford Reference. Information Processing Theory. Retrieved 26 Dec. 2020, from https://www-oxfordreference-com.dlsu.idm.oclc.org/view/10.1093/oi/authority.20110803100003560

Purvis, J. S. (2017). *The relationship between reading fluency and lexile measures* (Order No. 10259026). Available from ProQuest Dissertations & Theses A&I. (1881865927). Retrieved from https://search-proquest-com.dlsu.idm.oclc.org/dissertations-theses/relationship-between-reading-fluency-lexile/docview/1881865927/se-2?accountid=190474

Reysio-Cruz, M. (2019). Worst PH ranking in math, science, reading prompts DepEd review. Retrieved from https://newsinfo.inquirer.net/1198208/worst-ph-ranking-in-math-science-reading-prompts-deped-review

Rutzler, S. (2020). Importance of Reading Comprehension. Retrieved December 23, 2020 from https://www.mathgenie.com/blog/importance-of-reading-comprehension#:~:text=It%20increases%20the%20enjoyment%20and,the%20document%20is%20telling%20you

San Juan, R. (2019). Philippines lowest in reading comprehension among 79 countries from https://www.philstar.com/headlines/2019/12/03/1974002/philippines-lowest-reading-comprehension-among-79-countries

Scholastic.com. (2020). Six Strategies to Improve Reading Comprehension. Retrieved from https://www.scholastic.com/parents/books-and-reading/reading-resources/developing-reading-skills/improve-reading-comprehension.html

Tempest, C. (2018). Implementation of ReadTheory in a. *OnCUE Journal*, 81-91.

Whitten, C., Labby, S., & Sullivan, S. (2016). The Impact of Pleasure Reading on Academic Success. *The Journal of Multidisciplinary Graduate Research*, 48-64.