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## Student factor influencing Indonesian student reading literacy based on PIRLS data 2011

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**Abstract:** *The study was aimed at (1) examining how student factors (home parental involvement, students' perceptions of reading, reading outside school, and information and communications technology [ICT] use) influenced reading literacy, and (2) investigating how the factor interacts with reading aspects (reading experience, process and comprehension, and reading attitudes and behaviours). The subjects was quantitative research and applied Rasch and hierarchical linear modelling (HLM) analyses. The subjects were 4779 Primary-School students nested within 158 schools sampled using a random sampling technique. The study used Progress in International Reading Literacy (PIRLS) 2011 data that was categorized as secondary data. Findings of the study revealed that (1) there were significant relationships between a number of student factors and reading literacy in both 2011 and (2) there were identifiable significant correlations between reading literacy and home parental involvement, students' perceptions of reading, reading outside school, and information and communications technology [ICT] in 2011.*

**Keywords:** *student factors, reading literacy, reading aspects*

### 1. Introduction

A study about comparing Indonesian reading ability based on local tests and on Progress in International Reading Literacy Study (PIRLS) test shows that reading comprehension for fourth grade students is low in both tests (Suhardjono, Waras & Basuki, 2009: 11). It reaches only 35.64% for local test and 33.27% for PIRLS test. The local test scores correlated significantly with the PIRLS test ( $r=0.673$ ). Suhardjono, Kamdi, & Basuki (2009: 11) also mentions that some factors related to the problems of Indonesian reading ability based on PIRLS

2006 come from students and from teachers and schools.

There is a significant influence based on student factor which is mainly due to their habit of Indonesian language speaking habits, reading at home, and reading at school. Moreover, these factors are often linked to reading aspects such as reading experience, process, and comprehension. Nevertheless, describing how actually Indonesia students practice reading experience, process, and comprehension and maintain supportive reading attitudes and behaviours are now still unclear. Thus, it is necessary to explore the trend and factors about reading literacy

problems based on data collected from a PIRLS survey.

The study is concerned with reading literacy assessment based on PIRLS instead of on math or science provided by another similar test of PISA which assesses reading, math, and science. This is related to researcher's background of social science for primary schools. Hence, advantages of having previous own knowledge and basic information about primary school students broadly bring perspective in conducting this study.

An important finding is derived from the PIRLS tests 2006 and 2011, 405 in the test of 2006 and 428 in the test of 2011 bring a concern in which the mean scores are below the PIRLS scale average (500). However, little precious evident has been published on examining factors that influence the low level result of Indonesian students. On the other hand, PIRLS is initially a survey that reveals a lot of valuable information based on factors from students, teachers, and schools. Thus, it is important to answer such question as why Indonesian students get low scores below the average. Instead of comparing scores across countries, here the study focuses on the trends in the Indonesian samples of 2011 for the factors influencing reading literacy. As an implication, the data can be used as reflection which addresses the problem of the education system in Indonesia especially in reading literacy assessment.

In addition, according to OECD (2010), the main factors which may determine students' reading literacy come from students. Students' factors are related to reading experience, process, comprehension, and supportive reading attitudes and behaviours. On the world-wide scale, Indonesian students fail to make gains considerably in the PIRLS reading literacy score between 2006 and

2011. Although there is progress, educators in the country are still deeply concerned about the lack of the scores below 500. Thus, the study seeks to examine why the students get low scores as manifested by some factors from students in the latest PIRLS survey.

Initially, PIRLS is a collaborative effort among member countries of the IEA (International Association for the Evaluation of Educational Achievement) to measure the outcomes of children's reading literacy achievement in the fourth grade. PIRLS becomes the first continuing five-year cycle of studies in monitoring reading progress. It is also designed to assess changes into the future, for example, providing educational achievements, policies, and learning context. The test has a comprehensive design that aims to assess students on reading performance and collect information on students, their families, teachers, and factors related to that school that helps explain differences in the performance results.

The assessment focuses on three principle areas of reading literacy aspects: reading purposes, the process of comprehension, and reading behaviours and attitudes. The test has been adopted by 36 countries during the first testing in 2001, then by 45 countries in 2006 and 2011. The test consists of a written reading comprehension and a background questionnaire provided by the PIRLS Reading Development Group (RDG) and National Research Coordinator (NRC) from the initial 35 countries.

The written test is designed to fulfil the objectives of the process of comprehension and the purposes of reading, while the background questionnaire is intended to discover the reading behaviours and attitudes. The three PIRLS surveys are conducted in 2001, 2006, and 2011. An international standard has been set which has a range of

0 to 1000 with the scale centre-point at 500, as corresponds to the standard deviation (PIRLS 2001).

Four aspects of reading are commonly included in the discussion of students' literacy. These are home-parent involvement, student perception on reading, reading outside school, and ICT use. In Home-parent involvement, parents are said to be able to be engaged in children's education and schooling in many ways both formally like in school community and informally like in the home. A previous study shows that parents' involvement has a significant effect on student achievement (Pinantoan, 2013). Further, the research notes that children with a strong relationship of parent engagement are likely to have better social skills.

Likewise, Davis (1948, cited in Walberg, Bole, & Waxman 1980) explained the link between family circumstances and student school learning, which acknowledges the positive behaviour of the students. When children have better engagement with their parents at home, they initially have better attitudes and a higher level of achievement. A study conducted by Emerson, et al. (2012) finds that there are positive correlations of parents and children's learning which reflected in 'improved school readiness, higher retention and graduation rates, enhanced cognitive development and academic achievement, higher motivation and greater ability to self-regulate behaviour, and better social and relationship skills'. Likewise, the National Parent Teacher Association 2008 (Cunningham, Kreider, & Ocon, 2012: 112) also stated that 'the more extensive the family engagement, the greater the student benefits'.

On reading perception, several studies have reported strong associations between student factors such as self-perception and reading (Hao & Johnson, 2013: 54).

This means that the manner in which the students think about reading will affect their performance on reading literacy. Every student has different perceptions about reading. When students have a positive perception of reading, they will easily enjoy reading activity because they think that the method used interesting and fun. Conversely, students who have a poor perception of reading tend to get bored and assume that reading is less attractive and monotonous. This can lead to students having difficulty reading to achieve the expected performance.

Hao & Johnson (2013: 55) provide evidence that the higher the level of a student's self-perception of their reading ability, the greater the benefits to support their reading achievement. The study indicates that self-perception makes students understand the importance of reading and to achieve the goal of learning. In this study, students' perception of reading includes the manner in which they think about reading and how well they read.

In out of school reading, study has observed that reading outside of school (e.g. reading magazines, novels, or newspapers) is a pleasure activity that plays a role in the student's reading development process (Rena, Abedalaziz, & Leng, 2013: 37). To be more specific, there was a positive relationship between reading achievement and fourth grade students' activities outside schools such as 'reading books, telling stories, singing songs, playing with alphabet toys, and playing word games' (PIRLS 2001). An issue that may develop during the reading process is the understanding of text materials, particularly when students need to write homework that is part of the lesson's requirement after school (Mackey, 2006). Thus, in an attempt to create greater support in reading activities outside school, the role of the parents help is noteworthy.

In ICT use, researchers have associated reading literacy achievement with ICT support such as using a computer, the internet, and online learning activities. Luu & Freeman (2011: 1073) state that student use of ICT for educational purposes may be more beneficial to achievement in learning. A study by Lee & Wu (2012: 168) investigates the effects of reading activities based on seeking information by online on reading literacy.

The authors state that the indirect effect of ICT at home and school helps students to gain better knowledge of meta-cognitive strategies, which also has the outcome of improved reading literacy. More importantly, in the previous test of PISA (Programme for International Student Assessment) 2006 measurement, the usage of ICT by students both whether at home and schools shows positive connections. However, in fact, not all parents or schools can provide ICT facility for students due to the lack of socio-economic levels (Luu & Freeman, 2011: 1073). This issue has become more important in a country such as Indonesia. Although ICT benefits for them, not all students are able to experience the use of ICT. Departing from the discussion, there are only some students who take the advantage of ICT to support the reading literacy development due to facility limitation.

The purpose of the present study is to investigate the influence factors of Indonesian students' reading literacy. Given the conceptual framework above, the following research questions are asked: (a) Home parent involvement: How does home parent involvement support students' reading literacy? (b) Think about reading: How do the overall students' perceptions of reading influence their performance on reading literacy? (c) Reading outside school: What type of reading literacy outside school

is most done? (d) ICT use: What type of ICT do students usually use in improving reading literacy? and (e) Influencing factors: What are the most influencing factors of reading literacy?

## **2. Method**

This study was aimed at measuring the influence of student factors on the Indonesian student reading test based on PIRLS data 2011. Drawing upon the previous literature review, the student factors were home-parent involvement, thinking about reading, reading outside school, and ICT use. These factors were scored to discover the reading aspects namely, reading experience, process and comprehension, and reading attitudes and behaviours.

This influence design study used dependent and independent variables. The dependent variable (Y) was the reading literacy as measured by the reading scales. The independent variables (X) were the student factors that were measured using the PIRLS Questionnaires in 2011. In addition, there were intermediate (mediating and moderating) variables to estimate a controlled direct effect between student factors and reading literacy. The intervening variables that derived from reading aspects included reading experience, process and comprehension, and reading attitude and behaviours.

The participants of this study were the fourth-grade of primary-school students (aged 9 to 11 years old) who participated in the PIRLS data from government schools and nongovernment schools throughout Indonesia. The primary school participants come from 158 schools. 4,779 (2,413 girls and 2,366 boys) that participated in 2011 were anonymous sample during the time of test. Subjects were both girls and boys in fourth

Table 1  
*Description of the Sample of Indonesian Students Used in 2011*

		Frequency	%	Valid (%)	Cumulative (%)
Valid	GIRL	2413	50.4	50.5	50.5
	BOY	2366	49.4	49.5	100.0
	Total	4779	99.7	100.0	
Missing	System	12	0.3		
Total		4791	100.0		

grade. These participants were selected for voluntary and anonymous random sampling during the data collection. Hence, they are called the representative samples.

Instrument validity measure was provided by the results of the Rasch analysis. Table 2 shows the number of questionnaire items of students in the year of 2011 according to IRT Rasch Analysis by Conquest software.

These four variables coded by HOME, THINK, OUTSIDE, and ICT were analysed using different statistics in agreement with the natures of the variables.

### 3. Findings and Discussion

The research variables produce five findings and discussion that are related

to home-parent involvement, think about reading, reading outside the school, ICT use, and influencing factors.

First, the result of the analysis consulted the significance value for the INTRCPT2, 10 in the final estimation output table (refer to Table 3). It supported the relationship between HOME and PVTOT. The simulated data indicated that there was statistically significant between group variance (-5.28,  $p < 0.001$ ).

The negative values indicated that HOME had not contributed significantly to the performance of reading literacy. It meant that the more parents help students on their homework, the less of students perform on reading literacy. In addition, the ICCs was 0.39. It showed that 39% of the variance in the students' reading literacy explained by

Table 2  
*Questionnaire Items 2011*

Variables	Student Level	
	Label of Item Fit	Name of Variables
Home of parents involvement	Q8: May parents make sure that I set asiden time of my homework	HOME
Think about reading	Q19: I think I enjoy reading	THINK
Reading outside school	Q15: I read magazines except books	OUTSIDE
ICT Use	Q12: I have internet connection at home	ICT

Table 3

*Final Estimation of Fixed Effects (with Robust Standard Errors) HOME 2011*

Fixed Effect	Coefficient	Standard Error	t-ratio	Approx. d.f.	p-value
For INTRCPT1, <sub>0</sub> INTRCPT2, <sub>00</sub>	426.53	3.60	119.32	149	<0.001
For HOME slope, <sub>1</sub> INTRCPT2, <sub>10</sub>	-5.28	1.21	-4.37	4021	<0.001

the model was accounted for by the student-level variables (HOME) and 61% was accounted for by the school-level variables. This estimation implies that in Indonesia, most of the variation in reading literacy was not due to differences between students, but due to differences between schools. Thus, this finding indicated that in 2011, between schools may have potential to decrease home parent involvement activity in helping students' homework.

*Second*, analysis was estimated with PVTOT as the outcome and THINK as the mean of dependant variable. The PVTOT intercepts-as-outcomes model was similar to the random coefficient used for the other conditions except that it included other variables as a predictor of the intercept. Thus, the equation was somewhat similar to the previous pattern in HOME, except for the THINK was the variable to be replaced. As

noted in the output, the analysis consulted the significance value for the THINK, <sub>10</sub> in the final estimation output table (refer to Table 4). It gives a meaning that there was a relationship between THINK variable and PVTOT variable.

Moreover, there was a significant relationship between group variance ( $r = -8.13, p < 0.001$ ). The negative values implied that THINK variable had not performed excellent to the performance of reading literacy. It meant that higher level of student perception regarding reading will decrease students' performance on reading literacy. Therefore, it may be suggested that student perception will be valuable when it was supported by reading aspect such as reading attitudes and behaviours as mentioned in the coefficient reading aspect output. In addition, an implication can be made that most of the variation in reading literacy in Indonesia was

Table 4

*Final Estimation of Fixed Effects (with Robust Standard Errors) THINK 2011*

Fixed Effect	Coefficient	Standard Error	t-ratio	Approx. d.f.	p-value
For INTRCPT1, <sub>0</sub> INTRCPT2, <sub>00</sub>	429.46	3.64	118.07	149	<0.001
For HOME slope, <sub>1</sub> INTRCPT2, <sub>10</sub>	-8.13	1.73	-4.69	4021	<0.001

not due to differences between students, but due to differences between schools.

*Third*, the reading type was most done by activity of reading magazines except books. As shown in the output, it was clearly noted that OUTSIDE (Reading outside of the school) produced the t statistic ( $t=0.85$ ,  $p=0.394$ ) indicating that reading outside school factor was statistically not significant with PVTOT. Therefore it could not adapt this model to two-level modelling of the clustering. It signed that reading magazines outside school do not have straight relationship with reading literacy. This might be significant when reading aspects such as process and comprehension and reading attitudes and behaviours were employed.

*Fourth*, Indonesian students were noticed to have internet connection to support their reading activity at home. The estimate of the average ICT value across schools is 429.52. The variance component estimates match those mentioned previously. It can be inferred from the result that, there was a statistically significant amount of variability in ICT scores between schools ( $\sigma^2=2905.10$ ,  $p<0.001$ ). Thus this evidence supported the two-level modelling of the clustering of students' ICT use within schools. For the 2011 data set, the ICCs was 0.40. It denoted that in 2011, there is 40% of the variability in ICT scores was estimated to lie between schools. It meant that about 60% lied within schools.

*Fifth*, evidence showed that the influence between factors was significantly correlated ( $p<0.001$ ). For student factors, only THINK ( $r=116.41$ ,  $p<0.001$ ) had influence on reading literacy. THINK performed negatively referred that the absence of students' perception that 'reading is enjoyable' outperformed the presence of involvement. Furthermore, the additional tabulation was

measured reading aspects variables such as reading experience and reading attitudes and behaviours [PRE ( $r=-2.40$ ,  $p<0.001$ ); PRAB ( $r=3.66$ ,  $p<0.001$ ) were statistically significant. These findings conferred with the reading aspects had correlated with reading literacy. In addition, THINK\*PRAB ( $r=0.80$ ,  $p<0.001$ ) and ICT\*PAC ( $r=0.92$ ,  $p<0.01$ ) were in positively significant. These findings consulted that when there was self-perception that 'reading is enjoyable' (refers to Q19 2011), which had an impact on reading attitudes and behaviours, significantly affected students' reading literacy. Likewise, the use of internet at home (refers to Q12 2011), which had an impact on process and comprehension, influenced the performance of reading literacy. In the other hand, HOME\*PAC ( $r=-0.01$ ,  $p<0.001$ ), OUTSIDE\*PRAB ( $r=-0.80$ ,  $p<0.001$ ), and ICT\*PRAB were in negatively significant.

These findings consult that without home parent involvement, which had an impact on process and comprehension, significantly affected students' reading literacy. Further, the absence of reading magazines outside schools (Q15 2011), which had an interaction with reading attitudes and behaviours, outperformed the presence of that relationship. Similar to the absence of internet connection at home, which had an interaction with reading attitudes and behaviours, reading attitudes and behaviours outperformed the presence of internet connection at home in improving reading literacy.

In summary, although some of factors were significantly negative on reading plausible value, the significant values indicated that those factors were influential in the performance of Indonesian students' reading literacy in 2011. Thus the influence could be positive and negative.

#### 4. Conclusion

The involvement of parents cannot be underestimated in terms of literacy development. The results of the analysis demonstrate that parental involvement at home affects students' reading literacy, whether directly or indirectly. Parents' assistance in children's homework had a direct effect on reading literacy. However, it also supported reading literacy through the aspect of process and comprehension. Students assume that reading is enjoyable. The belief that 'I enjoy reading' is essential for reading literacy. Evidence-based result suggests that this factor affects reading literacy directly. Reading activities outside school—such as reading magazines—were linked with reading literacy achievement. Findings showed that this factor had a direct and significant relationship to reading attitudes and behaviours that improved literacy. For individuals, the use of ICT had an effect on reading attitudes and behaviours. Results indicated that internet use, which had an impact on reading attitudes and behaviours, significantly affected Indonesian students' literacy. The most influential factors on reading literacy in 2011 were all the student factor variables (home parental involvement, student perceptions of reading, reading outside school and ICT use).

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