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The Influence of Linguistic and Logical-Mathematical Intelligences on EFL Reading Comprehension

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Article information	
Abstract	Intelligence is a key factor underlying individual differences in learning. This study aimed to determine whether students with strong linguistic and logical-mathematical intelligences learned better or more quickly than those with weak linguistic and logical-mathematical intelligences. Forty-nine senior high school students were taught reading comprehension of argumentative texts for three meetings, before and after which a reading test was administered. In addition, a differential aptitude test was administered to measure students' mathematical and linguistic intelligences. A paired sample *t*-test and Pearson's correlation formula were used to analyze the data, at a significance level of .05. The research results showed that students with low and high linguistic or logical-mathematical intelligences improved their ability to comprehend the texts after the treatment. No significant difference was observed between students with different levels of either linguistic or logical-mathematical intelligence. In addition, levels of logical-mathematical and linguistic intelligences did not significantly correlate to the improvement of reading comprehension. Therefore, students who had stronger linguistic intelligence did not learn better or more quickly than those with weaker linguistic intelligence, and the same pattern was found for logical-mathematical intelligence. This result suggests that

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	teachers may teach reading to EFL students without needing to adjust teaching methods and materials to match their students' dominant intelligences.
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1. Introduction

There is a common belief that intelligence influences achievement (Kendeou et al., 2015). Students with better mathematical intelligence are believed to have better learning achievement, including in language learning (Naglieri & Bornstein, 2003). In 1983, Howard Gardner proposed the idea of multiple intelligences, which suggests that humans possess "a set of relatively autonomous intelligences" (Green & Tanner, 2005, p. 312). Gardner (2011) divided intelligences into linguistic, musical, logical-mathematical, bodily-kinesthetic, and personal intelligences. Since then, many research studies have focused on investigating how each of these intelligences helps students learn better. Tanner (2001) provided possible learning characteristics of learners with each dominant intelligence. Tanner (2001) claimed that learners with high linguistic intelligence learn better because they like to read, be it assigned materials or forum discussions in online learning. When multiple intelligences theory was integrated into a classroom, Al-Kasasbeh and Nawafleh (2025) found that students benefited from the multiple-intelligence-based instruction when they learned chemical concepts. In addition, a recent study by Maharani et al. (2020) found that learners with strong logical-mathematical intelligence learned math more easily compared to those with weak logical-mathematical intelligence, although they had strong linguistic intelligence. In addition to helping in learning math, logical-mathematical intelligence is predicted to affect language learning (McMahon et al., 2004), alongside linguistic intelligence (Fayyazi et al., 2017). Also, according to Tsai (2016), these two intelligences determine academic achievement.

In the language learning context, it is expected that students with strong linguistic intelligence should learn languages more successfully than those with strong logical-mathematical intelligence (Hou, 2015), which is suitable for mathematical learning (Silwana et al., 2023). In addition, there was traditionally a belief that multiple intelligences influenced learning style (Ahmadian & Ghasemi, 2017; Grzegorzewska, 2017). However, this claim has been criticized by many scholars (e.g., Al-Hajaya & Al-Khresheh, 2012; Erton, 2010; Huang et al., 2018). On the other hand, multiple intelligences have been found to influence self-efficacy (Moafian & Ebrahimi, 2015), which predicts language learning achievement. Based on these previous studies, it is inconclusive whether multiple intelligences contribute to language learning. Therefore, further studies under a controlled environment were necessary to eliminate intervening variables, which have not been considered in previous studies (e.g., Mujiono et al., 2019; Naglieri & Bornstein, 2003; Parsa et al., 2013). Therefore, this research intended to find empirical evidence of whether multiple intelligences affect English language learning, focusing on argumentative texts through an experiment to control all intervening variables such as materials, teachers, length of learning, and teaching methods. An argumentative text was selected because it requires higher-order thinking skills (Iswati & Purwati, 2022), the area in which multiple intelligences are maximally utilized (Alhamuddin et al., 2023). In addition, most studies have measured multiple intelligences using questionnaires (e.g., Berlian et al., 2022; Pradana et al., 2020; Tsai, 2016), which are not as accurate as the standardized differential aptitude test used in the present study. To provide a systematic investigation, the present study sets out to answer three research questions:

1. Is there any significant difference in reading score improvement between students with high and low logical-mathematical intelligences?
2. Is there any significant difference in reading score improvement between students with high and low linguistic intelligences?
3. Is there a significant correlation between students' levels of linguistic and logical mathematical intelligence and their improvement in EFL reading comprehension?

2. Literature Review

This research deals with multiple intelligences and their effects on language learning. Because previous studies have claimed that linguistic and logical-mathematical intelligences link to language learning, the present study is restricted to these two types of multiple intelligences. Therefore, this section reviews the literature on these multiple intelligences and their association with language acquisition.

2.1 Linguistic and Logical-Mathematical Intelligences

The categorization of types of intelligence belongs to the discipline of multiple intelligences, which was first introduced by Howard Gardner (Green & Tanner, 2005, p. 312). Gardner (2011) proposes that although all types of intelligence are possessed by all individuals, one type of intelligence is usually more dominant. These types of multiple intelligences outlined by Gardner (2011) and Tanner (2001) include interpersonal, intrapersonal, linguistic or verbal, logical-mathematical, visual-spatial, musical, bodily-kinesthetic, and naturalist intelligences. Based on the descriptions of multiple intelligences provided by Gardner (2011) and Tanner (2001), all types of intelligence should affect language learning and have a place in determining the best teaching approach that can accommodate students with various intelligence dominances. Among the intelligences, logical-mathematical intelligence and linguistic intelligence have been subjected to many research studies in the field of language learning, such as Erlina et al. (2019), Khodadady and Dastgahian (2013), Kumar and Prathyusha (2016), Šafranj (2016), and Shakouri et al. (2017).

Linguistic intelligence makes a person very sensitive to the meaning of a language, contributing to a tendency to choose words and grammar correctly (Gardner, 2011). This competence is innate and developed very early in life, more quickly than most other intelligences. In terms of language learning, students with strong linguistic intelligence are more proficient in remembering words, making them superior in learning vocabulary (Marhamah & Mulyadi, 2020), which is the most significant component of language. In addition, individuals with high linguistic intelligence learn better by listening, reading, and communicating with others (Ekici, 2011). Meanwhile, logical-mathematical intelligence is related to the systematic processing of information and solving numerical problems (Savas, 2012). Like linguistic intelligence, this type of intelligence is also innate, and it develops gradually during childhood (Gardner, 2011). Students with strong logical-mathematical intelligence like tasks involving analysis, connecting new information with information they have already learned (Saban, 2004).

2.2 Multiple Intelligences and Second/Foreign Language Acquisition

Ellis (2015, p. 344) defined intelligence as "the general set of cognitive abilities involved in a wide range of tasks." Therefore, high intelligence quotient (IQ) test scores are estimated to correlate with how successful a person can be in life. It can be predicted that intelligence is also one of the general factors that differentiate learners in second and foreign language acquisition (SL and FL). However, from its original definition, intelligence may not contribute anything to a learner's ability to acquire SL or FL. People with different intelligence quotients have shown the same rate of learning SL and FL. In general, schools have focused on developing students' multiple intelligences, including logical and linguistic intelligence, through reading and writing. Although many students thrive in this setting, some do not achieve as expected (Richards & Schmidt, 2011). According to Dörnyei (2008), educators were not well-informed about what the results of intelligence tests offered when the tests were first introduced in the early 20th century, except that they could effectively distinguish brilliant students from their average counterparts.

Sternberg (2002) differentiates intelligence into three types, i.e., analytical, creative, and practical. Analytical intelligence deals with the ability to analyze, compare, and evaluate; meanwhile, creative intelligence is defined as the skill to create a novel solution to a problem. Lastly, practical intelligence relates to the ability to "adapt to, shape, and select" the environment that suits one's abilities (Sternberg, 2002, p. 15). According to Sternberg (2002), intelligence tests should target analytical and creative intelligence because teaching methods focus on these types of intelligence. Gardner (2011) considers intelligences significant for second and foreign language achievement and proposes a concept of multiple intelligences. This concept follows the philosophy of instruction, which differentiates learners according to their learning differences and preferences. Using this theory, teachers can use relevant language teaching methods, tasks and learning activities which suit students with different linguistic and logical intelligences.

Intelligence is correlated to some aspects of language acquisition and learning. According to Grigorenko et al. (2000), intelligence affects the results of explicit learning when linguistic ability is involved. In other situations, "phonemic-coding" and memory abilities are essential, such as when the learning takes place incidentally or implicitly. More specifically, linguistic intelligence plays a significant role in language learning. Marhamah and Mulyadi (2020) found that, in foreign language learning, students with higher linguistic intelligence learned vocabulary more quickly than their low-linguistic-intelligence counterparts. This positive effect of linguistic intelligence on learning achievement can be explained through several factors. First, linguistic intelligence positively affects students' self-efficacy beliefs (Ahmadian & Ghasemi, 2017; Moafian & Ebrahimi, 2015). Research has found that self-efficacious students are more motivated to learn (Gan et al., 2023), and thus they have better learning achievement (Guo et al., 2023). Finally, Hasbullah et al. (2023) conclude that students with strong linguistic intelligence can convey arguments well. Therefore, it can be assumed that these students excel in understanding and producing argumentative text, which is the focus of the present research. On the other hand, logical-mathematical intelligence is associated with critical thinking skills. The improvement in critical thinking skills might contribute to English language skills. Bakhshayesh et al. (2023) found that students who were critical thinkers were more fluent in using English as a second language. In addition, critical thinking skills are required to understand a difficult text, such as an argumentative one (Davarpanah et al., 2021; Ma & Li, 2022), which is the focus of this research. Another factor that promises the superiority of high logical-mathematical intelligence is that it is associated with better metacognitive strategies (Arani & Mobarakeh, 2012). Therefore, we can hypothesize that students with strong logical-mathematical intelligence can learn second language grammar successfully because, according to Bozorgian et al. (2022), metacognitive strategies enhance students' ability to learn grammar.

3. Methodology

This quantitative study was based on numerical data analyzed using inferential statistics. A pre-test and post-test experimental design was used to compare the learning outcomes in both experimental groups. Since this study aimed not to compare the teaching methods, but to determine whether the methods used in the experiment had similar or different effects on students with different multiple intelligence dominances, a control group was unnecessary.

3.1 Participants

The study involved 49 second-year students (11 males [22.4%] and 38 females [77.6%]) at a senior high school in Bireuen, Aceh, Indonesia. They were between 16 and 17 years old. The sample was selected using a cluster random sample technique, where two classes were selected for the research, and each received the same instruction. Each class was comprised of students with linguistic intelligence dominance and logical-mathematical dominance to reflect the standard practice at schools, because it would have been impractical to separate both types of students in a regular class. Based on the results of differential aptitude tests, 21 students had linguistic dominant intelligence, and the other 28 students had logical-mathematical dominant intelligence. At the time of the research, they were beginning their first semester. They had studied English for 4 years at the junior and senior high school levels, with two 90-minute English lessons per week.

3.2 Instruments

The data were collected using two instruments. The first instrument was a reading test of argumentative texts, used for the pre-test and post-test. The test consisted of six texts with three to four multiple-choice questions with five options. The total number of questions was 20, and the question types included main idea, detailed information, vocabulary, reference, and inference. The texts and questions were adopted from the Senior High School National Examination. The test was designed and validated by experts, but the reliability level of the test was not revealed to the public by the Ministry of Education. The internal consistency of the test, as measured by Cronbach's alpha, was $\alpha = .72$ for the pre-test and $\alpha = .85$ for the post-test, $p < .05$.

The second instrument was a psychology test, i.e., differential aptitude tests (DAT), initially developed by Bennett et al. (1956). The subtests of the DAT consist of verbal reasoning, numerical ability, abstract reasoning, space relations, mechanical reasoning, clerical speed and accuracy, and language use. For the purpose of this research, only two subtests were used, i.e., verbal reasoning and numerical ability. Bennett et al. (1956) used split-half reliability coefficients to determine the reliability level of the two subtests and reported that it ranged between $\alpha = .86$ and $\alpha = .90$. The first subtest, verbal reasoning, consisted of 50 items, and the second subtest, numerical ability, consisted of 60 items.

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3.3 Data Collection

The experiment was conducted by teaching two classes of students how to read argumentative texts. Before instruction began, the students were given a psychology test to assess the level of their mathematical and linguistic intelligences. A psychologist administered the test because the standardized differential aptitude test can only be given by an authorized psychologist. Students with different types of intelligence dominance were placed in the same classes; therefore, each class was heterogeneous regarding intelligence. Before the first learning session started, the students were given a pre-test in the language laboratory. The test was delivered online, and the students were not given their scores.

The students were taught by two experienced university professors in the district of Bireuen, Aceh Province, Indonesia. The teaching process was carefully planned under the supervision of a senior curriculum expert from a leading university in the province. Each class met three times, once a week, with each session lasting 90 minutes. The methods employed in teaching both classes were the scientific approach in the first and second sessions, and contextual teaching and learning (CTL) in the third session. Both methods emphasize constructing knowledge less through individual learning and more through collaborative activities. The scientific approach was conducted by following five stages, i.e., observation, questioning, data collection, associating, and communicating. In the first stage, the teacher explained the materials, in this case, the purposes and structure of an argumentative text (session 1) and the language features of this type of text (session 2). In the second step, learners were encouraged to ask questions about the materials presented by the teacher. In the data collection phase, students working in small groups of four to five collected and read some argumentative texts to determine their purpose and structure (session 1) and language features (session 2). The students drew conclusions in the associating phase. Finally, a representative from each group presented their conclusions to the class, other groups provided feedback, and the teacher added further explanation.

In the third session, a standard CTL approach was used to teach reading skills. In the first learning activity, students were instructed to ask questions about argumentative texts to review what they had learned in the first two sessions. Afterward, students were assigned to work in pairs to determine the main idea, details, and references; to make inferences; and to identify unfamiliar vocabulary in a provided text. This learning activity was designed to help students master reading skills. Afterward, the teacher assigned students to sit in small groups of four to five to discuss their answers from the pair work. The teacher then demonstrated how to answer the questions about the main idea, details, references, inferences, and unfamiliar vocabulary. Afterward, the students were given a new text and asked to answer the same types of questions in their groups by following the model presented earlier by the teacher. They were also asked to help their group members when necessary. Then, the teacher provided feedback on the student work, and they were given another text to answer the same types of questions in their groups. Finally, the teacher collected the students' work as a part of the authentic assessment. After the third session, the students took the post-test, which was also delivered online in a language lab under adequate supervision.

3.4 Data Analyses

The data in this research were analyzed using inferential statistics. However, descriptive statistics were used to visualize the characteristics of the data prior to the primary analyses. The descriptive statistics included key measures such as minimum and maximum scores (*min* and *max*), first and third quartiles (Q_1 and Q_3), median (*Mdn*), mean (*M*), and standard deviation (*SD*). The descriptive statistics were generated using R, an open-source advanced statistical software environment, together with the *mosaic* package.

The inferential statistical analyses included normality tests, significance tests, and correlation analysis. The selection of significance tests and correlation analysis was determined by the data distribution; therefore, the data needed to be inspected using a normal distribution test. Because the sample sizes were relatively small, the Shapiro-Wilk test was used for the normality test. The data were considered normal when the p-value was greater than .05. When the data were not normally distributed, the data were transformed using the square root transformation technique. These inferential statistical analyses, along with the data distribution test, were also performed using R.

There were two types of significance tests used in this research. The paired sample t-test was used to determine whether the pre-test and post-test scores obtained by the students with the same intelligence dominance were statistically different. Meanwhile, the independent samples *t*-test was used to determine whether the score improvements between students with different intelligence dominances were statistically different. The results were considered statistically significant when the *p*-value was .05 or lower. Finally, correlation analyses were conducted to examine how multiple intelligences correlated with the reading comprehension score improvement. The Pearson's correlation formula was used for the correlation analyses, and a correlation was considered when the *p*-value was .05 or lower.

4. Findings

This section is presented in two parts. The first part presents descriptive statistics to illustrate the distribution of the data. Next, the results from inferential statistical analysis are presented to meet the research objective.

4.1 Descriptive Statistics

The following is the description of the data obtained from the reading test. The data are summarized in Table 1 to show the general overview of the students' reading scores.

Table 1

Description of Scores for Mathematical Intelligence

Intelligence level	*n*	*min*	Q_1	*Mdn*	Q_3	*max*	*M*	*SD*
Low – Differences	28	-4.00	2.75	6.00	8.25	15.00	5.43	4.98
High – Differences	21	-2.00	3.00	5.00	8.00	12.00	5.09	3.78
Low – Pre-test	28	1.00	4.00	5.00	7.25	12.00	5.57	2.64
Low – Post-test	28	3.00	6.75	12.00	15.00	18.00	11.00	4.53
High – Pre-test	21	3.00	5.00	5.00	9.00	12.00	6.33	2.63
High – Post-test	21	3.00	8.00	12.00	16.00	18.00	11.43	4.61

Table 2

Description of Scores for Linguistic Intelligence

Intelligence level	*n*	*min*	Q_1	*Mdn*	Q_3	*max*	*M*	*SD*
Low – Differences	28	-4.00	2.75	5.00	7.25	14.00	4.93	4.53
High – Differences	21	-4.00	3.00	7.00	8.00	15.00	5.76	4.44
Low – Pre-test	28	1.00	3.75	4.50	6.00	12.00	5.21	2.48

Low – Post-test	28	3.00	6.00	11.00	13.50	17.00	10.14	4.46
High – Pre-test	21	2.00	5.00	6.00	9.00	12.00	6.81	2.62
High – Post-test	21	4.00	11.00	12.00	17.00	18.00	12.57	4.32

Tables 1 and 2 show that the minimum improvement in scores reached as low as -4, but the maximum improvement could jump to 15. In addition, the mean reading scores from pre-test to post-test approximately doubled for all groups. The details about the improvements in scores were analyzed using inferential statistics and are presented in the following subsection. To determine the appropriate inferential statistical analyses, the data normality was inspected using the Shapiro-Wilk test because the sample size was lower than $N = 50$, and the results are presented in Table 3.

Table 3

Results of the Normality Test Using the Shapiro-Wilk Test

Intelligence and level	*n*	*W*			*p*		
		Pre	Post	Diff	Pre	Post	Diff
Mathematical - low	28	.95	.94	.97	.227	.092	.646
Mathematical - high	21	.91	.94	.97	.066	.204	.690
Linguistic - low	28	.90	.93	.98	.012*	.076	.864
Linguistic - high	21	.95	.92	.97	.313	.085	.811

Note: Pre = Pre-test, Post = Post-test, Diff = Difference, * $p < .05$

Normality is implied when the *p*-value exceeds .05 (5%). Based on Table 3, except for the group with low linguistic intelligence, all other group scores were normally distributed. Therefore, the scores for the low linguistic intelligence group were transformed using square root transformation, which is one of the most popular data transformation techniques. After the data were transformed, the data distribution test showed that the square-root transformed data were normally distributed ($W = .95$, $p = .156$). Thus, the parametric test was used for inferential statistical analyses for all groups.

4.2 Inferential Statistics

The first objective of the study was based on the first and second research questions, i.e., to determine whether the score improvements between students with low and high intelligence levels were statistically different, focusing on mathematical and linguistic intelligences. Before the primary analyses, it was therefore essential to determine whether there were improvements in reading scores by comparing the scores in the pre-test and post-test. For this purpose, the paired sample *t*-test was used to show whether these two scores were significantly different at the significance level of .05. The analysis results are summarized in Table 4.

Table 4

Differences in Scores between Pre-test and Post-test

Intelligence and level	*M*			*df*	*t*	*p*
	Pre	Post	Diff			
Mathematical - low	5.57	11.00	5.43	27	-5.77	< .001***
Mathematical - high	6.33	11.43	5.09	20	-6.18	< .001***
Linguistic - low	5.21	10.14	4.93	27	-5.76	< .001***
Linguistic - high	6.81	12.57	5.76	20	5.95	< .001***

Note: Pre = Pre-test, Post = Post-test, Diff = Difference, *** $p < .001$

Based on Table 4, the scores were significantly different for all pairs ($p < .05$). Therefore, the independent samples *t*-test was used to check whether the extent of improvement between the two groups was statistically significant (see Table 5). Group 1 consisted of students with high mathematical and linguistic intelligences, and Group 2 consisted of those who had low mathematical and linguistic intelligences.

Table 5

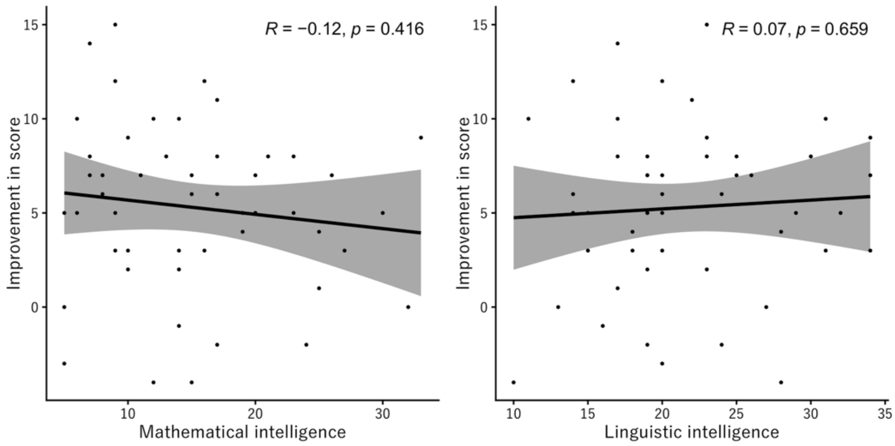
Differences in Score Improvement between Different Levels of Multiple Intelligences

Intelligence dominance	*M*			*df*	*t*	*p*
	Low	High	Diff			
Mathematical	5.42	5.09	0.33	46.98	0.27	.791
Linguistic	4.92	5.76	0.83	43.70	-0.64	.522

Table 5 shows that the improvements in scores between the different levels of either mathematical or linguistic intelligence were not significantly different ($p > .05$). These results indicate that the level of logical-mathematical intelligence or that of linguistic intelligence did not correlate with students' performance in learning argumentative texts. Further analysis, related to the third research question, was intended to confirm this conclusion. Figure 1 presents correlation plots with the correlation coefficients and their corresponding *p*-values.

Figure 1

Correlation Plots for Intelligence Level and Learning Achievement



The correlations shown in Figure 1 were calculated using Pearson's correlation formula. The mathematical intelligence data were initially not normally distributed, but the normal distribution was achieved by transforming the data using a square root transformation. The results of the analyses showed that mathematical intelligence and improvement in score were not statistically correlated, $r(47) = -.12$, $p = .416$, nor were linguistic intelligence and improvement in score, $r(47) = .07$, $p = .659$.

5. Discussion

This study aimed to determine whether students with linguistic intelligence dominance had different learning achievements than those with logical-mathematical intelligence dominance when receiving similar instruction. The study sought to determine whether there was evidence that multiple intelligences contribute to language learning. Based on the analysis of the experimental results, students with all types of intelligence dominances showed significant improvement in scores between the pre-test and post-test.

Further analyses were performed to determine whether students with strong logical-mathematical intelligence outperformed those with weak logical-mathematical intelligence in reading comprehension tests. However, the results did not show any evidence of differences based on inferential statistical analyses, suggesting that they had the same achievement regardless of the level of logical-mathematical intelligence. It is to be expected that learners who have strong logical-mathematical intelligence should be competent at completing tasks related to logical reasoning, problem-solving, and scientific investigation. The study conducted by Šafranj (2016) concluded that students with strong mathematical intelligence only performed extremely well when they were taught using an approach more suited to students with strong logical-mathematical intelligence. In the current study, the students were taught using a scientific approach and CTL, emphasizing critical thinking skills, which should be appropriate for students with strong logical-mathematical intelligence. Thus, the current study confirms that when English is taught using the same approach, students with weak logical-mathematical intelligence benefit just as much as their strong logical-mathematical intelligence counterparts at the same level. Khodadady and Dastgahian (2013) also found that students with strong logical-mathematical intelligence did not have better reading scores than students with weak logical-mathematical intelligence. Therefore, the findings of our study, supported by the literature, suggest that the level of logical-mathematical intelligence did not influence the EFL learners' reading outcomes.

The second in-depth analysis showed an unexpected result, where students with strong linguistic intelligence did not learn better than those with weak linguistic intelligence. There is a common belief, supported by preservice EFL teachers (Savas, 2012), that strong linguistic intelligence positively influences language learning ability. However, Gardner (2011) emphasizes the importance of sensitivity to words and the ability to use language proficiently to communicate what is in the mind, rather than the ability to learn a new language. He illustrates linguistic intelligence using the poets Keith Douglas and T. S. Eliot, who used their linguistic intelligence to produce beautiful language with precise meaning. Therefore, the result of the current study does make sense because the ability to use language in the way specified by Gardner (2011) has not been developed among pre-intermediate language learners. However, Mirzaei et al. (2014) found that, at advanced proficiency levels, linguistic intelligence is significantly correlated with learners' use of learning strategies, which may in turn influence learning achievement.

Finally, correlation analysis in the current study did not show any effect of either linguistic intelligence or logical-mathematical intelligence on the improvement in reading scores. This result might seem unexpected compared to the results of other studies. However, previous studies related to language learning only investigated the level of linguistic intelligence and language skills without controlling any variables (Hasanudin & Fitrianingsih, 2020; Nugraheni & Nuardi, 2018; Shakouri et al., 2017; Sumarta, 2016). Therefore, it cannot be concluded with confidence that linguistic intelligence alone affects English language achievement. Thus, there is a strong possibility that mathematical intelligence can substitute for linguistic intelligence in language learning. A study by Piaw et al. (2014) found that communication skills may be predicted by logical-mathematical intelligence and linguistic intelligence with the same level of correlation. In addition, Mirzaei et al. (2014) found that logical-mathematical intelligence and linguistic intelligence were the most common types of intelligence among successful EFL learners in Turkey. Although Sulaiman et al. (2010, p. 517) highlight teachers' awareness of the need for different teaching strategies to accommodate students with different multiple intelligences, Visser et al. (2006, pp. 500–501) conclude that there is not enough evidence to differentiate learners based on their dominant multiple intelligences.

As a pedagogical implication, we can conclude that teachers do not need to differentiate their teaching approaches or materials among students with different multiple intelligence dominances. This conclusion aligns with a meta-analysis conducted by Syafii et al. (2022). Tiansoodeenon and Sitthitikul (2022) experimented with multiple-intelligence-based instruction, where students were exposed to teaching activities which were believed to accommodate all students' multiple intelligence dominances, including linguistic and logical-mathematical intelligence dominance. However, the experimental group did not show any additional benefit from this instruction in terms of learning achievement. Previous studies claiming that multiple intelligence dominance is significant for language learning were mostly observational studies. For example, Hou (2015) investigated the correlation between multiple intelligence and learning achievement based on the results of student university entrance tests. Other factors might influence student achievement, such as instructional approaches used by their teachers in high schools, which have always been a strong predictor of learning success (Abdallah & Alkaabi, 2023; Dugasa et al., 2022).

6. Limitations and Future Research

This study revealed that students with strong linguistic intelligence and those with strong logical-mathematical intelligence showed similar improvements in learning English as a foreign language in a controlled learning environment. However, the generalizability of this study is subject to several limitations. First, the language skill investigated in this study was reading, specifically argumentative texts. Therefore, the result of this study might have been different if other language skills or other types of text were the focus. Future studies could examine other language skills and other genres. Second, the differences in levels of linguistic or logical-mathematical intelligence between the strong and weak groups were relatively small. If this study had a large sample size, it would have been possible to obtain scores from students with very different intelligence levels, and the results of the study might have been different. Therefore, future research should utilize larger and more diverse samples to allow for more accurate conclusions.

7. Conclusion

This study found that neither the level of linguistic intelligence nor that of logical-mathematical intelligence significantly impacted language learning outcomes. This conclusion is based on the results of three analyses. First, the students with strong and weak logical-mathematical intelligences achieved similar improvement in reading scores after they were taught using the scientific approach and CTL. Second, the students with different levels of linguistic intelligence also achieved similar learning outcomes when they were taught using similar teaching approaches. Finally, there was no significant correlation between the level of either linguistic intelligence or logical-mathematical intelligence and the improvement in reading comprehension scores. The findings of these three analyses provide significant implications for language pedagogy, and taken together, they may be encouraging for language teachers. Although students with varying levels of multiple intelligences might learn from and respond to instruction differently, this study did not procure evidence that teachers must differentiate materials and instructional approaches to accommodate such differences.

8. About the Authors

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10. References

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